sciendo
1862 RIGA TECHNICAL UNIVERSITY

Architecture and Urban Planning
2020, Vol. 16, Issue 1, pp. 1–4
https://doi.org/10.2478/aup-2020-0001
https://content.sciendo.com
Online ISSN 2255-8764

"Build Back Better": Between Public Policy and Local Implementation, the Challenges in Tohoku's Reconstruction

Camille Cosson, Kyoto Institute of Technology, Kyoto, Japan*

***Abstract* – Although Japan, because of its long history of natural disasters, has always been one of the most prepared country, the 2011 Great East Japanese Earthquake and tsunami caused unprecedented damages to the country. This paper introduces public policies for urban resilience from international level to national level, analysing Tohoku's reconstruction. First, we will introduce the United Nations frameworks and guidelines for "Build Back Better" before confronting this theory with its practical application. Concluding remarks suggest that Japanese reconstruction policies provoked some challenges in the local implementation of urban resilience.**

***Keywords* – "Build Back Better", earthquake, Japan, reconstruction.**

Introduction

On 11 March 2011, a 9.0 magnitude earthquake shook Japan. A series of tsunami waves devastated Japan's northeast coast of Tohoku flooding more than 500 square kilometres, mainly in Miyagi, Iwate, and Fukushima prefectures. The leak in the Fukushima Daiichi power plant reactors that followed forced the evacuation of the near population outside of the radiation-affected area [1]. This disaster caused severe human casualties with 16,000 victims and 3,000 missing people. Three hundred thirty thousand homes wiped out led to nearly 550,000 refugees without a home (Fig.1) [2]. Also referred to as the "Great East Japan Earthquake" (GEJE) [3] it is a decisive turning point for the entire Japanese society as well as for architecture and urban planning. The unprecedented nature of this triple disaster weakens the confidence of Japanese society, highlighting flaws in its disaster mitigation strategy [4].

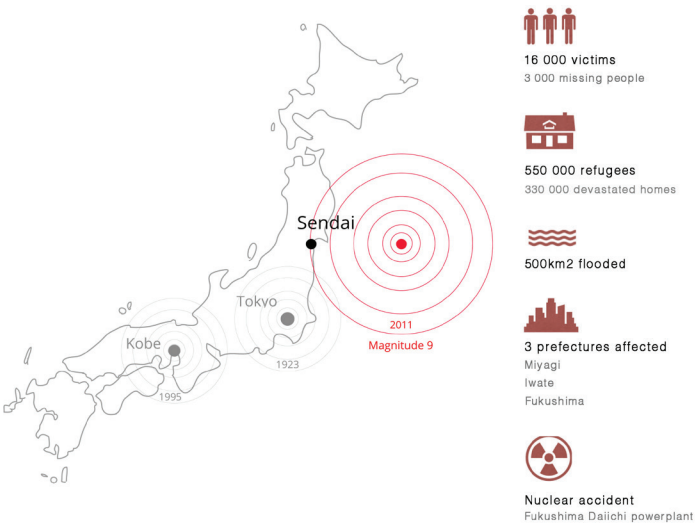

Fig. 1. Few statistics of the 11th of March 2011 Earthquake and tsunami [Figure: Author, using [2]].

Some architects and urban planners see it as a chance to start over and rethink our urban models for more *resilient cities* in order to restore these annihilated territories. The adjective *resilient* has been overused since the beginning of 2000, but what does it mean for the city? Marco Stathopoulos, an architect, defines the resilient city as flexible and transformable, in opposition to the sustainable city, which would be stable, hierarchical and standardized [5]. However, some researchers in urban sociology suggest that this dominance of the resilience term may in some context be used for political purposes only, and lose its original meaning to become an ingenious communication tool solely [6]. This paper introduces public policies for urban resilience from international level to national level, considered in Tohoku reconstruction plan. We will present the United Nations guide to "Build Back Better", before going to national policies implemented by the Japanese government in the aftermath of the disaster and the challenges for the local implementations.

I. The United Nations Policies for Resiliency

The United Nations has been assisting countries around the world after disasters since the 1960s. Nevertheless, from 1990 onwards, the Organization has decided to change its modus operandi from post-disaster relief to upstream measures to reduce disasters before their occurrence. The UN primary purpose is the implementation of "International Strategy for Disaster Reduction" (ISDR). Since 1999, a secretariat has been mainly dedicated to this mission: the United Nations Office for Disaster Risk Reduction (UNDRR).

A. Framework for Action and Risk Reduction

In January 2005, the UN organized a World Conference on Disaster Reduction (WCDR) in Kobe (Hyogo). Ten years after the Yokohama Conference (1994), the objectives are to summarize the past decade achievements and make propositions for the coming one. As a result, the Hyogo Framework for Action (HFA) 2005−2015 becomes the global blueprint for disaster risk reduction efforts. Its objective is to reduce disaster losses by 2015 substantially not only in lives, but also in social, economic, and environmental assets to "Build the Resilience of Nations and Communities to Disasters". This first Framework for action focuses on prevention and preparedness to mitigate the effects of disasters. The HFA identifies five priorities in its action plan and implementation strategy. To achieve a significant reduction in losses by 2015, the UN focus on strengthening the resilience of nations and communities.

* Corresponding author. E-mail address: camicosson@gmail.com

In March 2015, four years after the 2011 Great East Japan Earthquake and tsunami, the United Nations assembled this time in Sendai (Tohoku). From there, the "Sendai Framework for Disaster Risk Reduction 2015–2030" is taking over the HFA. Hyogo Framework focused on disaster losses, the Sendai Framework for Action maintains these objectives but focuses on disaster risks. The new framework aims to reduce vulnerability to disasters, improve preparedness for response and recovery activities in order to build resilience capacities. The term "resilience" first appears in the UN's disaster risk reduction policies in the 2000s. At the same time, the concept of "Build Back Better" also emerged, and became one of the four priorities highlighted in the Sendai Framework.

B. The "Build Back Better" Concept and Theory

"Build Back Better (BBB) is an approach to post-disaster recovery that reduces vulnerability to future disasters and builds community resilience to address physical, social, environmental, and economic vulnerabilities and shocks." [7]. The motto of Build Back Better is to improve the reconstruction of disaster-stricken territories by aiming eco-friendlier, disaster-resilient and socially responsible projects in order to support the affected communities' recovery. The concept of BBB emerges after the devastating tsunami in the Indian Ocean of 2004. The UN sent then former President Bill Clinton to visit the site and report on the situation. This report, "Lessons Learned from Tsunami Recovery – Key propositions for Building Back Better"[8], is the outset of a global reflection on mitigation, hazard preparedness and post-disaster reconstruction.

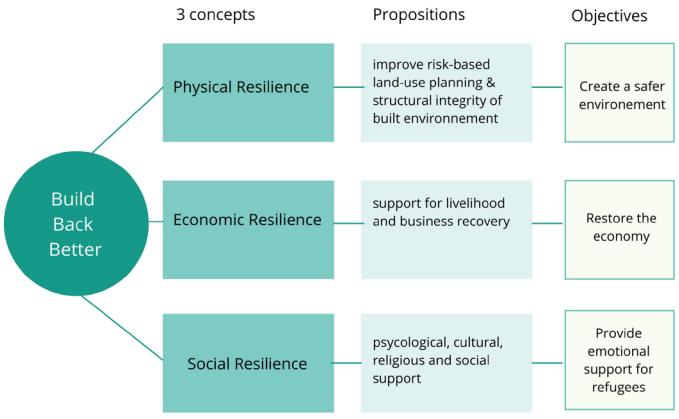

Fig. 2. Build Back Better principles in diagram [Figure: Author, using [8]].

Given the global awareness on climate issues and the increase in natural disasters in recent decades, "a concept started to emerge where post-disaster reconstruction was to be taken as an opportunity to not only reconstruct what was damaged and return the community to its pre-disaster state but to also seize the opportunity to improve its physical, social, environmental, and economic conditions to create a new state of normalcy that is more *resilient*" [9]. The adjective *resilient*, is referring here as the ability to recover or bounce back after an event, the Build Back Better concept offers thus a holistic approach to resilience and post-disaster reconstruction. Figure 2 summarises the global ideas outlined by Bill Clinton in his 2006 report. It shows how BBB relies upon three pillars: physical resilience (improve the safety of construction), economic resilience (help business recovery), and social resilience (provide support for disaster victims). These three main axes are evocative of the three pillars of sustainability − economic viability, environmental protection, and social equity.

II. Japan's National Policy for Reconstruction

The UN's frameworks remain general guidelines that countries decide to follow or not. For the 2011 post-disaster reconstruction, the Japanese government has taken legal measures to impose drastic securities standards in the new urban blueprint. These decisions have been made from Tokyo, however, the national decentralisation policy requires a local implementation on a case-by-case basis in each prefecture.

C. Development of a National Policy for Areas Resilient to Tsunami Disasters

The results of a survey conducted by the Japanese government in the summer of 2011 revealed that only 58 % of coastal residents in Iwate, Miyagi and Fukushima prefectures escaped to higher ground immediately after the earthquake. Among them only 5 % were caught by the wave. For the 42 % who did not escape, almost half perished in the tsunami. One of the good example is the "Miracle of Kamaishi" where 3,000 elementary and junior high school students of Kamaishi (Iwate Prefecture) miraculously survived after they had evacuated to higher ground, even though their school was considered as a safe place [9], [10]. Conversely, in Okawa school (near Ishinomaki) the majority of students and teachers lost their lives because the decision to evacuate was too late. This incident rose a scandal on evacuation plans and tsunami awareness in Japanese schools [9], [11].

These various cases arose in the aftermath of the tsunami revealed flaws in the disaster evacuation plan, like the delay in the warning or the forecast that announced the wave lower than in reality. Moreover, a blind belief in coastal tsunami protection may have led some inhabitants to ignore the warning and not take refuge in higher-ground. Given the severity of the disaster, the central government has to amend policies to prevent and reduce the damage caused by future tsunamis. The purpose of the government proposal is to develop tsunami-resilient areas thanks to a global system combining "strong" structural measures and "soft" non-structural measures. This comprehensive system would be then developed and adapted for further implementation on a national scale.

In December 2011, the government's Central Disaster Prevention Council enacted the "Development of Areas Resilient to Tsunami Disasters Act" to establish new standards for disaster mitigation and protection. This Act classifies two types of tsunamis that municipalities have to consider when they are

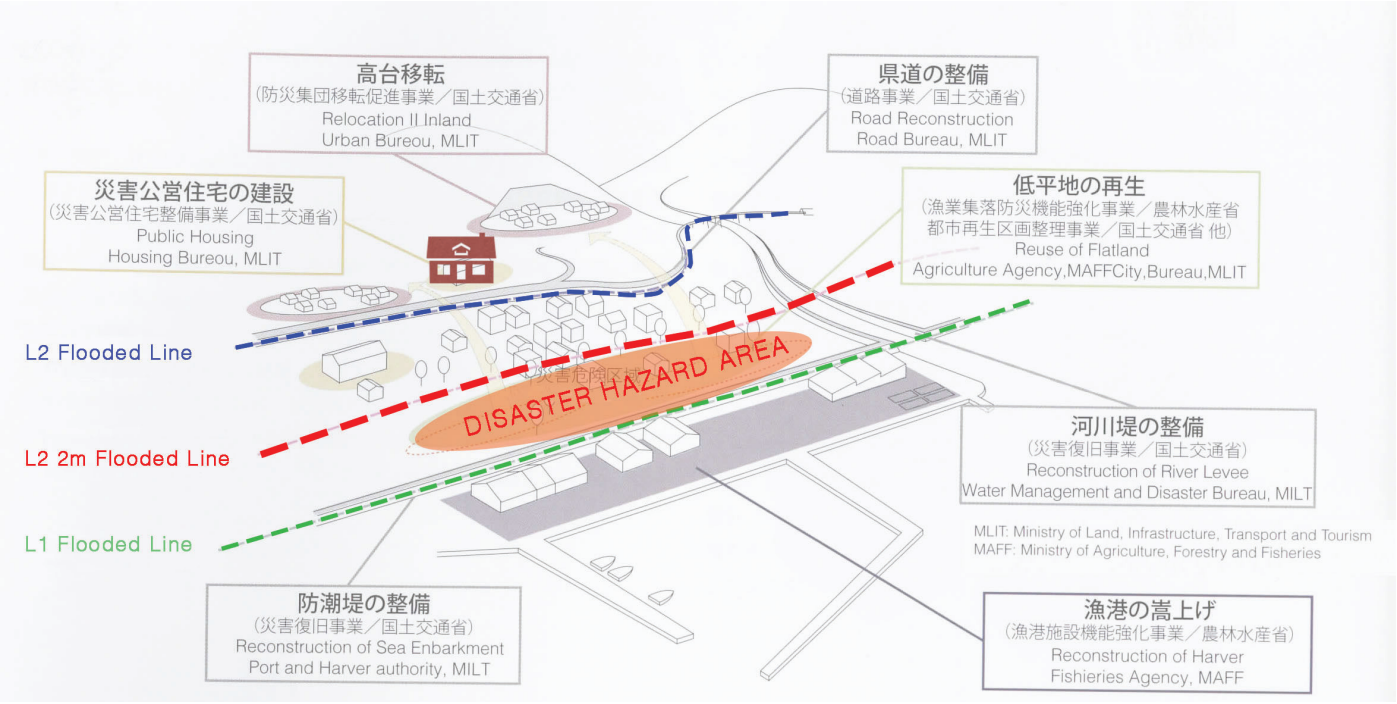

Fig. 3. Schema of reconstruction project [Figure: Author, using [14]].

designing their new hazard map. Level 1 tsunami is caused by an earthquake of magnitude eight, and its possibility of occurring is within a hundred years. Level 2 tsunami is caused by an earthquake of magnitude nine or superior and is estimated to occur within a thousand years [12]. The reconstruction policies stipulated two principal objectives: protect lives and properties from Level 1 tsunami, and provide more time for evacuation in the case of Level 2 tsunami. Nevertheless, the local population refuses these decisions made by the authorities, denying a policy that chooses evacuation over protection. Facing criticisms, the Council revised the reconstruction policies: "the government announced that any area that is vulnerable to more than 2m depth of inundation from Level 2 tsunami would be considered a high-risk zone" [13]. Therefore, known as the "Two-Two rule", this new standard considered any area vulnerable to Level 2 tsunami as a disaster risk area, restricting the type of construction authorised.

D. Identification of Disaster Hazard Areas and Determination of Tsunami Protection Strategy

The implementation of the revised law decided at the highest political level in Tokyo, remains the responsibility of the prefectures and municipalities. In order to develop its reconstruction plan, each municipality has to identify, first, its Level 1 and Level 2 boundaries, then, determine a tsunami protection strategy. To achieve it, the municipalities must use a computer simulation programme developed by the Ministry of Territory, Infrastructure and Transport (MLIT) and implemented within the prefectures [13].

As an architectural planner and reconstruction advisor Yasuaki Onoda has participated in several reconstruction projects. From this experience Onoda had expressed some concern about this computer-assisted process, pointing out that several simulations were necessary to be able to find the best combination (given the unusual topography of the Sanriku coast). The Sanriku Coast (三陸海岸 , *sanriku kaigan*) is a coastal region along the Pacific Coast, extending from southern Aomori Prefecture through Iwate Prefecture and northern Miyagi Prefecture in Tōhoku (northeastern part of Japan's main Island of Honshu). Its rocky shoreline has cliffs, sharp rocks, and sandy beaches. According to Onoda, unfortunately only a few municipalities have made this multi-simulation approach, presumably due to lack of time and resources: "…testing several combinations or modifying designs based on simulation results required asking the prefectural government to do multiple simulations for accuracy. Unfortunately, only a few municipalities took this multi-cycle approach in their planning" [14].

The reconstruction strategy towards a resilient city had three major approaches for the municipalities. Some of them naturally decide to relocate to higher ground, this strategy was applied in particular in the ria coast in the northern part of Tohoku [15]. Where there is no possibility of moving to higher ground, a second approach was to combine "multi-layer protections." In this strategy, a protection against Level 1 tsunami is installed first at the coastal levee, also helping to reduce the power of Level 2 tsunami. A second protection is installed inland to stop the Level 2 tsunami, using, for example, a high-banked road or railway. Residential areas are only allowed behind this inland protection. The third strategy, following the "principle of Two-Two rule", as we explained, is based on restricting the land use. During the simulation of Level 2 tsunami, if the land showed an inundation

of two meters depth, it is considered thus as a disaster risk area and residential land use is prohibited (Fig. 3).

However, in some municipalities the land was insufficient, and residential areas had to be created by cutting through the hard rock of a hillside. These decisions have caused time-consuming work dramatically slowing down the construction of public and private housing [14], [16]. The result is a significant outflow of the population who decide to move out. Shingo Nagamatsu found out in his study that the larger the scale of recovery programs was, the more substantial the decrease in population followed. He calls this phenomenon "the reconstruction paradox" [12].

Conclusions

In recent decades, given the increase in natural disasters, international organisations have reflected on risk management policies. In addition to the previous aims of prevention and protection, there are growing efforts in reducing risks by pursuing hazard-resilient communities. The Build Back Better concept relies on three pillars to achieve resilient communities: physical resilience, economic resilience, and social resilience. To support the transition from theory to practice, the United Nations enacted Frameworks for Action, firstly, with the Hyogo Framework for Action (2005−2015). Then followed the Sendai Framework (2015−2030) to maintain and persevere in efforts for resilience, emphasising the need to understand the risks better so that they can be fully managed upstream.

Due to its harsh environment, Japan has a long history of disasters that influence its culture and has given an ephemeral aspect to architecture. Therefore, even if the concept of resilience may not necessarily hold the same meaning as in Western culture, the idea arose in the aftermath of 2011 in reconstruction policies implemented by the government. However, the overwhelming dominance of Tokyo's Central Urban Planning Office has imposed severe conditions on municipalities for designing their reconstruction plan. Furthermore, some of them did not necessarily had the technical or financial resources to comply with the standards and to carry out these policies properly.

Nonetheless, each municipality had to, first, take into account its physical, economic and social resources and then determine how to pursue the high goal of resilience set by the Government and the United Nations. Consequently, some municipalities struggled, and in the end, only a few will have fully succeeded. Instead of Build Back Better, most of these devastated communities could only afford to rebuild as best they could with the means at their disposal.

References

1. **Sabouret, J.-F.** *Mars 2012 : Un an après Fukushima, le Japon entre catastrophes et résilience*. 15-Mar-2012. 8 p. [online, cited 10.02.2020]. https://halshs.archives-ouvertes.fr/halshs-00681154/document
2. **Pelletier, P., Fournier, C.** *Atlas du Japon: après Fukushima, une société fragilisée*. Paris: Autrement, 2012. 96 p.
3. *The 2011 Japan earthquake and tsunami: reconstruction and restoration : Insights and assessment after 5 years* (Eds.: V. Santiago-Fandino, S.Sato, N.Maki, K.Iuchi). New York: Springer International publishing AG, 2018. 485 p. https://doi.org/10.1007/978-3-319-58691-5
4. **Schweisguth, D.** Japon : faille dans la confiance. *Revue de l'OFCE*, April, 2011, pp. 170−177.
5. **Stathopoulos, M.** Qu'est-ce que la résilience urbaine? *Revue Urbanisme*, No. 381, Dec. 2011, pp. 90–92.
6. **Asanuma-Brice, C.** De la vulnérabilité à la résilience, réflexions sur la protection en cas de désastre extrême - Le cas de la gestion des conséquences de l'explosion d'une centrale nucléaire à Fukushima - raison-publique.fr [online]. *Raison-Publique* [cited 26.03.2020]. https://www.raison-publique.fr/article771.html
7. GFDRR, Building Back Better in Post-Disaster Recovery [online, cited 27.03.2020]. https://www.recoveryplatform.org/assets/tools_guidelines/GFDRR/Disaster%20Recovery%20Guidance%20Series-%20Building%20Back%20Better%20in%20Post-Disaster%20Recovery.pdf
8. United Nations, Lessons Learned from tsunami recovery - Key propositions for building back Better - Thailand [online]. *ReliefWeb* [cited 27.03.2020]. https://reliefweb.int/report/thailand/lessons-learned-tsunami-recovery-key-propositions-building-back-better
9. **Mannakkara, S., Wilkinson, S., Francis, T.R.** "Build Back Better" Principles for Reconstruction, in: Beer, M., Kougioumtzoglou, I.A., Patelli, E., Au, I.S.-K. (Eds.), *Encyclopedia of Earthquake Engineering.* Berlin, Heidelberg: Springer Berlin Heidelberg, 2014. pp. 1–12. https://doi.org/10.1007/978-3-642-36197-5_343-1
10. **Koshimura, S., Shuto, N.** Response to the 2011 Great East Japan Earthquake and Tsunami disaster. *Philosophical Transactions of the Royal Society A: Mathematical, Physical and Engineering Sciences*, Vol. 373, No. 2053, Oct. 2015, p. 20140373. https://doi.org/10.1098/rsta.2014.0373
11. **Parry, R. L., Reignier, P.-F.** *Les fantômes du tsunami: périr et survivre dans un Japon dévasté*. Paris: Payot, 2018. 315 p.
12. **Nagamatsu, S.** Building Back a Better Tohoku After the March 2011 Tsunami: Contradicting Evidence, *The 2011 Japan Earthquake and Tsunami: Reconstruction and Restoration: Insights and Assessment after 5 Years* [Eds.: V. Santiago-Fandino, S.Sato, N.Maki, K.Iuchi]. New York: Springer International Publishing, 2018, pp. 37–54. https://doi.org/10.1007/978-3-319-58691-5_3
13. *Shūgō jūtaku no atarashii bunpō: higashi nihon daishinsai fukkō ni okeru saigai kōei jūtaku = New germination of japanese housing complexes ; post-disaster public housing on the reconstruction from the Great East Japan Earthquake*. Tōkyō: Shinkenchiku-sha, 2016. 128 p.
14. **Onoda, Y., Tsukuda, H., Suzuki, S.** Complexities and Difficulties Behind the Implementation of Reconstruction Plans After the Great East Japan Earthquake and Tsunami of March 2011. *The 2011 Japan Earthquake and Tsunami: Reconstruction and Restoration: Insights and Assessment after 5 Years*, [Eds.: V. Santiago-Fandino, S.Sato, N.Maki, K.Iuchi]. New York: Springer International Publishing, 2018, pp. 3–20. https://doi.org/10.1007/978-3-319-58691-5_1
15. **Hirano, K.** Difficulties in post-tsunami reconstruction plan following japan's 3.11 mega disaster:dilemma between protection and sustainability, *Journal of JSCE*, Vol. 1, No. 1, 2013, pp. 1–11. https://doi.org/10.2208/journalofjsce.1.1_1
16. **Jonas, M.** *Contested terrains. Re-building – or building back better? Observations of three years of working in Shibitachi, Miyagi, Tohoku, Japan.* pp. 1–5. [online, cited 26.03.2020]. https://www.academia.edu/12991979/Contested_terrains._Re-building_or_building_back_better_Observations_of_three_years_of_working_in_Shibitachi_Miyagi_Tohoku_Japan

Camille Cosson received the degree of Bachelor of Architecture in 2013, and Master of Architecture in 2015 from the Paris La Villette National School of Architecture. After receiving an MPhil from the same university, she was granted a scholarship from the Japanese Government to pursue her studies in Japan. Currently, she is a PhD student with the Kyoto Institute of Technology.

The theme of her MPhil Thesis was "Impact of the 3.11 on Architects' Works and Process: Rupture or Evolution?" Her current research interests include Japanese architecture, the Great East Japan earthquake and tsunami, post-disaster reconstruction, disaster-relief housing and sustainable urban planning and architecture.

Contact Data

Camille Cosson
Department of Architecture, Faculty of Design and Architecture, Kyoto Institute of Technology
Address: Matsugasaki, Sakyô-ku, 606-8585, Kyoto, Japan