# REINVENTING POST-DISASTER SHELTER PROVISION

Mobilising Spontaneous Volunteers as First Shelter Respondents During Urban Disasters

Airi (Iris) Ryu

## INTRODUCTION

### The Problem: Inadequate Shelter Provision in Urban Disasters

During an urban disaster, conventional emergency shelters are often overcrowded, uncomfortable, dangerous, and unsanitary for internally displaced people. In 2016, a 7.3 magnitude earthquake hit Kumamoto, Japan, resulting in 216 deaths and over 196,000 displacements. The most affected prefecture had 183,882 people evacuate into 855 evacuation centres averaging approximately 215 people per evacuation centre[1], each with a mere 3.9m$^2$ of living space[2]. Sickness and disease spread fast in the absence of adequate sanitation practices, killing almost 900 people - 4 times more than that of the earthquake itself[3]. Additionally, sexual assault of women and children, unhygienic excreta management, and sleep deprivation due to noise pollution exacerbated living conditions. Desperate, some evacuees retreated back into their damaged home, slept in their cars, or pitched a tent outside.

Unfortunately, this is not an exception to the 2016 Kumamoto Earthquake. During Hurricane Katrina, there were more than 100 sexual violence cases reported from inside evacuation centres in Houston, of which 93.2% of victims were women and girls[4]. With only 37% of incidents getting reported even during non-disaster times, it is expected that this number is a vast under-statement[5]. The Kincade fire in California[6], unprecedented torrential rainfall in Japan[7], and Typhoon Haiyan in the Philippines[8] is only a small list of other disasters that experienced similar challenges. Additionally, with the exacerbation of climate change, future citizens will likely experience more frequent and extreme disasters[9]. Without further improvements, more people will be displaced, and communities will further struggle to resume pre-disaster lifestyles.

### WHAT IS HAPPENING: A Movement by Spontaneous Volunteers

An urban disaster is distinct because of the dense, diverse, dynamic, and regulated nature of cities. This means that when a disaster occurs, taller buildings are likely to fall, critical

[1] DMCO Japan. “2016年 (平成28年) 熊本地震.” Disaster Management Cabinet Office Japan, 2016.

[2] Kumamoto Education Council. “平成２８年熊本地震の被害状況と課題,” June 30, 2016.

[3] Fukuoka City. 避難生活ハンドブック｜大規模災害を生き抜くために. 福岡市, 2018.

[4] Klein, Alisa. “Sexual Violence in Disasters |A Planning Guide for Prevention & Response.” LaFASA, NSVRC, 2008.

[5] National Sexual Violence Resource Center. “Statistics About Sexual Violence.” NSVRC, 2015.

[6] La Ganga, M., 2019. Kincade fire creates 200,000 evacuees. “Who’s going to take them in?” Los Angeles Times.

[7] Improving Japan’s Emergency Shelters [WWW Document], 2019. The Japan Times.

[8] Ramos, R.A., Reyes, V.C. de los, Sucaldito, M.N., Tayag, E., 2015. Rapid health assessments of evacuation centres in areas affected by Typhoon Haiyan. Western Pacific Surveillance and Response 6.

[9] Norwegian Refugee Council, n.d. Disaster and climate change [WWW Document]. NRC. (accessed 2.12.20).

infrastructure to collapse, and sewage systems to break down. Public transportation is likely to be hindered, and communication systems to be paralyzed. These disruptions can cage areas and prevent formal relief groups from arriving to damaged locations in a timely manner. The provision of food, medicine, shelter, and living supplies are inevitably delayed and some cases may not arrive for days[10].

But in fact, what has been seen throughout history is the emergence of ordinary citizens becoming critical first respondents in affected areas. Rather than waiting for official aid to arrive, locals self-organise and deliver a variety of responses including food distribution, debris cleaning, and emergency shelter provision[11]. Often times these "emergent", otherwise known as spontaneous volunteers, can provide more rapid response than formal groups, especially in urban environments[12].

Shelter provision by spontaneous volunteers can happen in several ways. During the 2015 earthquake in Kathmandu, local people donated tents for those who were displaced[13]. After the 2018 Hokkaido earthquake, guesthouse owners opened their rooms for evacuees to refuge in[14]. With the rise of digital technology and shared spaces, companies like Airbnb are providing hosts with a way to offer their rooms to those displaced for free[15]. Social media platforms like Facebook have created crisis response pages where users can offer or request for help[16].

However, while the participation of spontaneous volunteers in disaster relief has long existed, their efforts have been largely overlooked in formal disaster planning. Spontaneous volunteers are informal, temporary, and unstructured[17] by nature and therefore difficult to include in preparedness plans made before a disaster. Until the disaster occurs, there is no way to know how many people will do what for how long. With the lack of formal integration and so much uncertainty, the contributions of spontaneous volunteers are often dismissed and unsupported by larger organisations. Most spontaneous volunteers are also new to disaster relief, and therefore will not have established networks in the humanitarian sector, leaving them to work within their already formulated communities[18]. As a result, help can become localised and exclusive to social circles such as family, colleagues, neighbours, and local communities like religious, school, and sports groups [19]. People who have smaller social networks or live in solitude therefore may be unable receive the extra support offered by spontaneous volunteers. To maximize the positive

[10] Twigg, J., Mosel, I., 2017. Emergent groups and spontaneous volunteers in urban disaster response. 29, 443–458
[11] Twigg, J., Mosel, I., 2017. Emergent groups and spontaneous volunteers in urban disaster response. 29, 443–458
[12] Whittaker, Joshua, Blythe McLennan, and John Handmer. "A Review of Informal Volunteerism in Emergencies and Disasters: Definition, Opportunities and Challenges." *International Journal of Disaster Risk Reduction* 13 (September 1, 2015): 358–68. https://doi.org/10.1016/j.ijdrr.2015.07.010.
[13] Twigg, J., Mosel, I., 2017. Emergent groups and spontaneous volunteers in urban disaster response. 29, 443–458
[14] Sugiyama Yasuhiko. "北海道地震で被災した経営者が「ゲストハウス基金」を通じて本当に伝えたいこと." LOCAL LETTER, October 31, 2018.
[15] Airbnb. "Airbnb Open Homes - Disaster Relief." Airbnb, 2019.
[16] Facebook. "Crisis Response." Accessed December 11, 2019.
[17] Twigg, J., Mosel, I., 2017. Emergent groups and spontaneous volunteers in urban disaster response. 29, 443–458
[18] The Australian Government, 2015. Spontaneous Volunteer Strategy: Coordination of Volunteer Effort in the Immediate Post Disaster Stage.
[19] HM Government, 2019. Planning the Coordination of Spontaneous Volunteers in Emergencies.

impact of shelter provision by spontaneous volunteers, more information about how they are supporting disaster relief and better integration with existing plans is needed.

## THE RESEARCH QUESTION

It is undeniable that current conventional evacuation centres can exacerbate living conditions for internally displaced people and are not fit-for-purpose. However, history has shown that civilians have and do step up in disaster situations to help others find emergency shelter. But despite their consistent involvement in relief work, little study has been done to investigate how to better include them as a reliable source of emergency support. This research therefore attempts to answer two questions. First, what are the current ways spontaneous volunteers try to provide emergency shelter, and what are the roadblocks they face that inhibit the delivery of them? Second, given the roadblocks are identified, what is a possible solution and its consequent impact on improving the wellbeing of internally displaced people during a disaster?

## METHODOLOGY

To identify roadblocks spontaneous volunteers face when offering emergency shelter, semi-structured interviews via email and phone were conducted. Interviewees were found by browsing existing information dissemination platforms related to post-natural disaster shelter provision. These include Airbnb's Open Homes platform, Facebook's Crisis Response Page, search engines such as Google, and online media pages such as The Guardian and Daily Mail. Table 1 shows details of the types of people interviewed.

| SPONTANEOUS VOLUNTEERS INTERVIEWED | | | | | |
|---|---|---|---|---|---|
| Disaster | Year | Medium Discovered | Persona | Approached | Responded |
| Australia NSW Bushfire | 2019 | Airbnb Open Homes | Individual Host | 8 | 6 |
| Australia NSW Bushfire | 2019 | Facebook Crisis Response | Individual Host | 7 | 1 |
| Australia NSW Bushfire | 2019 | Facebook Crisis Response | Hotel Owner | 1 | 1 |
| Australia NSW Bushfire | 2019 | Online Research | Hotel Group | 3 | 1 |
| California Wild Fire | 2019 | Airbnb Open Homes | Individual Host | 5 | 1 |
| East Japan Earthquake & Tsunami | 2011 | Online Research | Non-host volunteer | 1 | 1 |
| Japan Typhoon Hagibis | 2019 | Online Research | Guesthouse Owner | 1 | 0 |
| Japan Typhoon Jebi | 2018 | Word of Mouth | Hostel Owner | 1 | 0 |
| USA Hurricane Harvey | 2017 | Online Media | OTA Site Owner | 1 | 0 |
| | | | | 28 | 11 |

*Table 1 Details on Interviewees Approached and Received Response*

Out of the 28 people approached for interviews, 11 people responded. For those who responded via email, questions about their motive to offer shelter, how the experience has been so far, and what their current challenges are were asked. All 11 interviewees answered every question. For those who were interviewed via phone, an additional question about their opinion on how the current situation could be improved was asked.

In addition to the interviews, case studies on three disasters were analysed to further understand the interactions between spontaneous shelter volunteers and internally displaced people. These were the 2018 Hokkaido Earthquake, Hurricane Katrina in Houston, and the 2011 Eastern Japan Earthquake & Tsunami. The purpose here was to diversify the types of disasters

being investigated beyond what was covered in the semi-structured interviews. The main reference analysed for the 2018 Hokkaido Earthquake was a transcribed interview of a guesthouse owner who opened his home to evacuees[20]. For Hurricane Katrina, a planning guide and report published by the US National Sexual Violence Resource Centre[21] as well as articles written about spontaneous volunteers were used. The 2011 Earthquake and Tsunami case studies consisted of several government studies, nonfiction books, and opinion papers written several years after the disaster occurred. Both the interviews and the case study analyses were focused on disasters in developed cities, and outcomes were qualitative.

To address the second research question regarding a potential solution and its relative impact on improving the lives of internally displaced people, further case study analysis was performed in combination with literature review. The potential impact of the solution was determined through the Theory of Change approach. The Theory of Change approach is a method that describes through a diagram, how certain features of a proposal can trigger impacts that will initiate a desired change. For each step, beneficiaries and stakeholders are identified, along with any assumptions made in order for the change to occur. Each identified impact must also have an associated impact measurement metric. This necessity is one of the advantages of the Theory of Change method, as it better equips the implementer with concrete plans of measurement and data collection to help monitor and evaluate the success and progress of a plan[22]. However, while the Theory of Change is a good tool to establish viable and measurable pathways to achieving identified objectives, the success of the model is contingent on assumptions being met.

## FINDINGS: ROADBLOCKS TO STREAMLINED SHELTER PROVISION

Based on the responses received from phone and email interactions with spontaneous volunteers, several complications obstructing the smooth delivery of shelters were identified. The most notable issues include the uneven discoverability of particular shelters to those needing shelter, difficulty in finalising shelter arrangements, and uncertainty of spontaneous volunteers on how to best help.

### Discoverability of Shelter Offerings is Uneven

Results of the study showed that there are inconsistencies in which shelters provided by spontaneous volunteers were known and unknown to internally displaced people. For example, out of all of the people interviewed during the Australia NSW Bushfire, no one was able to make shelter arrangements with internally displaced people. This was the case regardless of the platform used, where both Airbnb Open Homes and Facebook Crisis Page – the two largest portals delivering information on spontaneous volunteer shelters – were equally unsuccessful.

There could be several reasons for this lack of discoverability. First, the current available platforms are offered by organisations whose primary purpose is not emergency shelter provision

[20] Sugiyama Y., 2018. 北海道地震で被災した経営者が「ゲストハウス基金」を通じて本当に伝えたいこと. LOCAL LETTER. (accessed 12.11.19).
[21] Klein, Alisa. "Sexual Violence in Disasters |A Planning Guide for Prevention & Response." LaFASA, NSVRC, 2008.
[22] Connell, J.P., Kubisch, A.C., 1998. Applying a Theory of Change Approach to the Evaluation of Comprehensive Community Initiatives: Progress, Prospects, and Problems. The Aspen Institute, United States of America.

during a disaster. Airbnb's Open Homes platform is on the same system as their conventional hosting platform, and Facebook is a social media platform designed to share social activity with friends. Both platforms are not known for crisis response, and therefore would not be the instinctive destination for internally displaced people to look for shelter. Second, information about shelter provision by volunteers is not centralised. Habitual hosts offer their shelter on Airbnb Open Homes, whereas emergent civilians with extra living space would offer their shelter on Facebook or tweet about it. Small hostels or guesthouses may post a blog on their website, and efforts by large hotel groups may be retrospectively featured on news articles. As a result, internally displaced people would need to dig through too many pages and sites just to find information, and unfortunately many of them may not even find a suitable place. There is additionally a strong dependency on access to internet and mobile devices that can be precarious during disaster times.

There is also a definite imbalance in how many internally displaced people go to which shelter. Some shelters may receive no internally displaced people and others may be too crowded. During the 2018 Hokkaido Earthquake, one guesthouse received 200 people within 4 days of opening their doors[23]. During Hurricane Harvey in Houston, a furniture store owner hosted 400 people inside its two stores[24]. A 2011 Eastern Japan Earthquake and Tsunami survivor recalls one hotel that turned into an evacuation centre that was fully occupied with people internally displaced for months after the quake. Comparing these cases with interviews that reveal the opposite phenomena, it can be concluded that not all shelters are found with equal opportunity. While potential reasons for this can be the amount of information exposure and physical location of the shelter, the study did not reveal definitive reasons for this imbalance.

### Making Shelter Arrangements are Difficult

Another finding from the study is the difficulty around finalising shelter arrangements. For emergency shelters that are promoted offline through posters or signage, the internally displaced person must physically walk past the shelter to know that the shelter exists. If the shelter is located on a street that has less foot traffic, it is unlikely internally displaced people will find the shelter. For emergency shelters that are promoted online on platforms like Facebook's Crisis Response Page, the initial contact must be made by the internally displaced person. If the interaction is met with no response, there is a potential that internally displaced people will feel even more helpless, exacerbating their mental wellbeing[25]. In fact, the interview process with shelter providers revealed that only one out of seven spontaneous volunteers provided a response to messages sent and even this person only responded 3 weeks after the initial contact. In another occurrence, a large hotel group that offered free accommodation for internally displaced persons revoked their offer and changed their website after being inquired for more information. Assuming this is representative of what would happen if an internally displaced person contacted these spontaneous volunteers, the likelihood of actually being able to move into a shelter is low.

---

[23] Sugiyama Y., 2018. 北海道地震で被災した経営者が「ゲストハウス基金」を通じて本当に伝えたいこと. LOCAL LETTER. (accessed 12.11.19).
[24] Ko, S., 2017. Houston entrepreneur turns his furniture stores into shelters. USA Today.
[25] Goldmann, E., Galea, S., 2014. Mental Health Consequences of Disasters. Annual Review of Public Health 35,169–183.

Another tricky dimension is the current lengths of stay offered by these spontaneous volunteers. When looking at the available offers of emergency shelter in this study, for those that mentioned length of stay, only 20% offered their space for longer than 3 weeks, with the remaining 60% offering 2 weeks and 20% offering 1 week. Additionally, some hosts, particularly large hotel groups and those on Airbnb Open Homes, had several black-out dates within the available period either due to prior booking arrangements or personal preference. When shelters are only available for a short period and there is no next shelter secured, internally displaced people will continue to worry about their uncertain future. It would be a challenge for them to feel comfortable and settled in this state, even if they are offered a nice space[26]. Additionally, the provision of emergency shelter by government and international organisations such as the UN or the Red Cross often occur in the early days of a disaster. In some situations, when an internally displaced person misses this window to claim a tent or space in an evacuation centre, they may not be able to easily receive shelter support as a latecomer. For example, during the 2011 Great Eastern Japan Earthquake and Tsunami, some families affected by the tsunami decided not to evacuate immediately and refuged inside their home instead. After a couple of days, they realised their home was uninhabitable and decided to go to an evacuation centre. However, by that time, those who had arrived at the evacuation centre some days ago had already set up a living space for themselves. The latecomers received harsh treatment from those already there and were inevitably forced to retreat back to their damaged home[27]. If the length of stay offered by spontaneous volunteers is not long enough to provide internally displaced people with meaningful shelter, there is a risk that people will experience something similar to what happened during the 2011 Eastern Japan Disaster.

### Spontaneous Volunteers Don't Know How Best to Help

Because spontaneous volunteers are new groups that form after a disaster, they are not professionals in disaster response. Unless the affected area is exposed to disasters often, it is likely that these volunteers have no experience providing help to internally displaced people. Many of them help because they are struck by a strong desire to do something, despite their knowledge gap[28]. Due to their lack of expertise, volunteers are often unsure about what types of information would be helpful for internally displaced people. For example, most Facebook posts offering shelter would provide one sentence about the host's willingness to offer shelter, followed by little to no information on details about the shelter. Below is a table indicating the level of information found on Facebook postings for the Australia NSW Bushfire. The information types in this table were based on the Sphere Standards and other standards that provide minimum requirement guidelines for shelters during crisis response[29].

[26] Goldmann, E., Galea, S., 2014. Mental Health Consequences of Disasters. Annual Review of Public Health 35,169–183.

[27] Kato, Y., Ikegami, M., 2012. あのとき、大川小学校で何が起きたのか. Seishisha.

[28] Twigg, J., Mosel, I., 2017. Emergent groups and spontaneous volunteers in urban disaster response. 29, 443–458

[29] Sphere Project (Ed.), 2018. The Sphere Handbook: Humanitarian Charter and Minimum Standards in Humanitarian Response, Fourth edition. ed. Sphere Association, Geneva, Switzerland.

| Information Type | % With Information |
|---|---|
| Location | 70.0% |
| Drinking Water | 67.5% |
| Food | 60.0% |
| # of Guests | 45.0% |
| Shower | 30.0% |
| # of Rooms | 25.0% |
| Pets Allowed | 22.5% |
| Kitchen | 20.0% |
| Children Allowed | 15.0% |
| Length of Stay | 12.5% |
| # of Beds | 10.0% |
| Heating/Cooling | 0.0% |

*Table 2 Available Information on Initial Shelter Offering on Facebook Crisis Response After the Australia Bushfires*

Out of the total 42 postings offering shelter during the Australia NSW Bushfire found on Facebook Crisis Response during the first 3 weeks of the disaster, the vast majority of posts did not include important shelter information suggested by grey and peer-reviewed literature, such as IFRC's Shelter After Disaster. This includes number of beds, rooms, and guests, which is fundamental to know when internally displaced persons search for shelter[30]. As seen in Table 2, only 10% of postings provided information about how many beds were available, and only 12.5% about how long the shelter was open for. Without this information available prior to initial contact, interested displaced people will inevitably have to follow up with the host for more information. This becomes increasingly difficult with more personal questions such as requesting shelter for a child, pet, elderly, or disabled person, and the likelihood that internally displaced people will get rejected from some shelter offerings will increase. However, as said previously, the lack of suitable information seems to be due to the hosts' lack of knowledge on what displaced persons may need. Thus, much of these obstacles can be overcome if there is better support in liaising between spontaneous volunteers and internally displaced people.

## THE SOLUTION: LINKING SPONTANEOUS VOLUNTEERS WITH IDPS

The findings of this study show the need for major improvements in streamlining the provision of shelter by spontaneous volunteers to internally displaced people. However, good news is that most of the obstacles are not intractable problems and can be addressed. If they were to be addressed, there is a high potential to improve emergency shelter quality and availability.

In lieu of the identified roadblocks, the proposed solution is a digital platform that centralises all information about shelters provided by spontaneous volunteers into one place. The goal is to use the platform as an information portal that provides more clarity on available alternative emergency shelter differentiated by disaster, to better integrate spontaneous volunteer efforts into disaster response plans. The types of shelters included in the platform could range from spare rooms in individual homes to available rooms in hostels, hotels, and even school dormitories. It will be the first ever platform to centralise all information regarding shelter

[30] IFRC, 2015. Shelter After Disaster | Second Edition

offerings by informal shelter providers and will serve only those displaced by a disaster. The platform will mandate the input of critical information such as number of rooms, guests, and beds, as well as length of stay, shelter address, and available amenities to minimise the need for back and forth interactions to gather helpful information. By pre-determining required fields for spontaneous volunteers to provide information on, the existing knowledge gap can be minimised, reducing the risk of lengthy and inefficient shelter arrangement processes. The database will be designed at the city level in collaboration with local government and organisations such as UN bodies and IFRC. The initial design will be focused on megacities located in developed cities, due to the solution needing internet and smartphone access. Because cities tend to face unique challenges because of their dense, diverse, dynamic, and regulated nature, there is a need to find solutions at the city level to deliver the most effective impact. For example, if an urban disaster occurs during the day when most people are at their workplace, there will be a large portion of people who struggle to return home due to the failure of public transportation. This can potentially lead to commuters needing overnight shelter or taking extreme measures like walking long distances to get home[31]. Such phenomenon is special to large cities because workplaces tend to be concentrated in areas separate from residences, and therefore commuters rely heavily on public transportation. Additionally, developed nation cities have enough and established infrastructure to be able to deliver non-formal emergency shelter by spontaneous volunteers at scale[32]. However, it is important to always consider and involve national government bodies as well because most regulations and protocols are determined at the national level.

The target users of the platform are government bodies and organisations mentioned above that are involved in disaster response. Examples include city councils and local emergency response teams. The platform will inform them on what types of informal shelters provided by spontaneous volunteers are available to be used as additional emergency shelter for disaster relief. By having more clarity on what types of alternative shelter are available in which location for how long, these organisations involved in disaster response can make better and more informed decisions on how to allocate emergency shelter to the affected population. Additionally, spontaneous volunteer efforts will be better integrated into official disaster management plans. In the first stage prototype, the platform will not be offered to individual internally displaced people. More information can be found in Section 0.

The proposed solution has three main missions. First is to enable healthier disaster recovery for internally displaced people and community members in the affected area by reducing the number of people living in inadequate shelter after a disaster. Second is to fight climate change injustice by providing shelter options that are inclusive to all people affected, including those who are vulnerable. The last is to help make progress towards achieving the Sendai Framework for Disaster Risk Reduction by increasing knowledge on displacement through data collection, as well as increase resilience through pre-disaster engagement of local communities. Within the constraint that ubiquitous access to internet and smartphone is necessary, how the proposed

[31] DMCO Japan, 2016. 避難所運営ガイドライン.

[32] Shell International, 2014. New Lenses on Future Cities | A New Lens Scenario Supplement.

solution can achieve these are highlighted in the Theory of Change diagram shown in the following section.

## THEORY OF CHANGE

In order to better understand how the solution can achieve the desired missions and how beneficiaries can benefit from it, a Theory of Change diagram was created, seen in Figure 1.

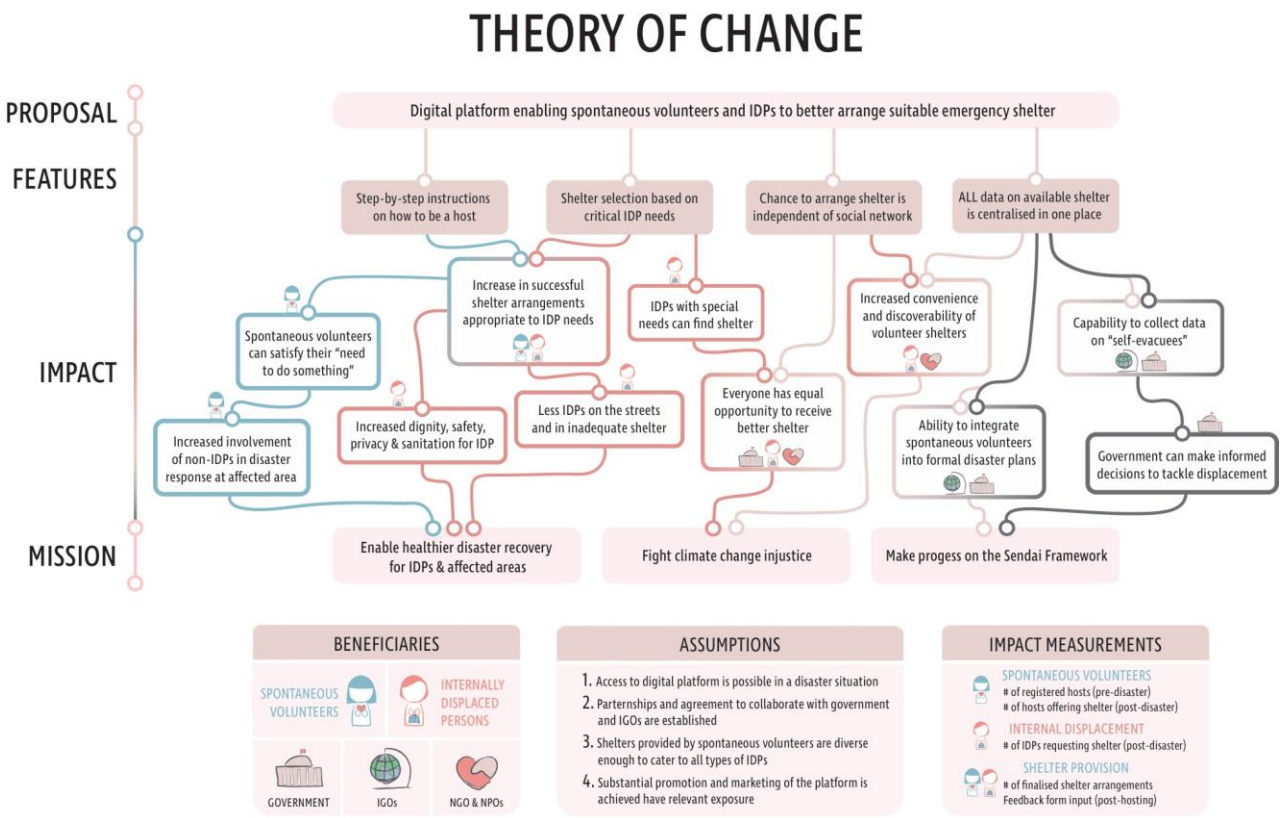


*Figure 1 Theory of Change Diagram for Proposed Digital Platform Solution*

The Theory of Change diagram maps out how features of the digital platform can have certain short-term impacts that lead to achieving long-term missions. The diagram is read from top to bottom where it starts with the description of the proposed solution, followed by the key features in the solution. The features are then traced to the direct benefits or impacts resulting from the feature. Impacts can snowball from immediate benefits to long-term changes that can lead to the success of achieving desired missions. Each pathway and impact have associated beneficiaries that can be traced by colour, where blue represents spontaneous volunteers, red the internally displaced people, beige the NGOs, NPOs, and intergovernmental organisations, and dark grey the government bodies. The key impact points are highlighted under the impact section with pink background and have distinct evaluation measurements to ensure progress is properly tracked. All measurements will be coupled with relevant metadata collected, such as disaster event and all attributes seen in Table 2 to enrich data. These key impact points will be further elaborated in the following section.

## THE IMPACT & BENEFITS

### INCREASED WELL-BEING: Better Shelter for More Displaced People

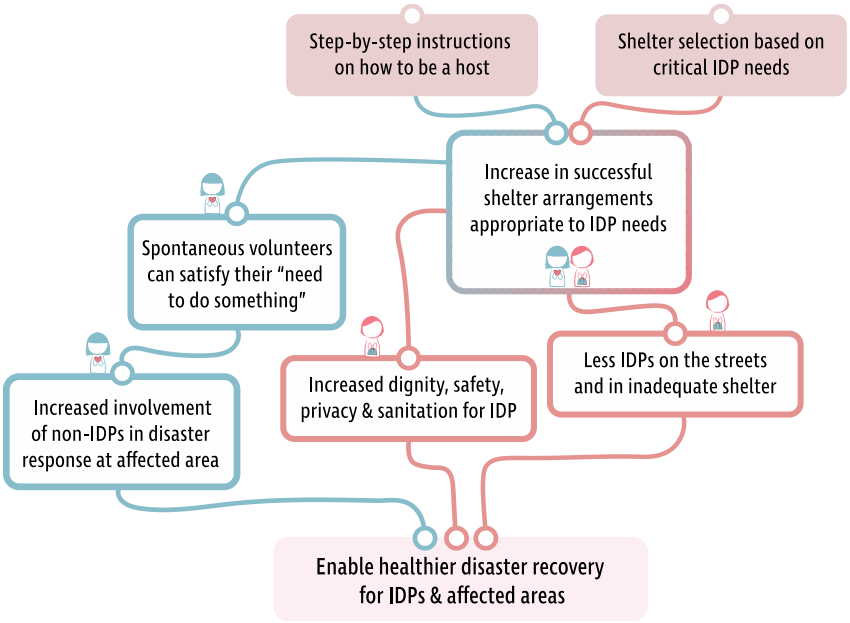


*Figure 2 Internally Displaced People (IDP) Well-Being Impact in Theory of Change Diagram*

The findings of this study showed that there was a significant population of spontaneous volunteers who were unable to fill their shelter. Additionally, many postings on various digital platforms lacked critical information to help internally displaced people make informed decisions on whether to proceed with requesting a shelter.

In order to tackle these problems, the digital platform will provide two features focused on reducing risk from lack of knowledge and increasing information availability to cater to the needs of internally displaced people. Step-by-step instructions for hosts on what information should be provided when offering shelter will allow spontaneous volunteers who may be first time shelter providers to maximise their positive impact. Additionally, by properly curating what information would be requested by hosts will increase the likelihood that an internally displaced person's concern is addressed. Some examples of critical information include the ability for hosts to house pets and children, if the shelter is accessible for people with special needs, and if elderly is welcome. The result is an increase in successful shelter arrangements appropriate to internally displaced people's needs, which consequently improves the physical and mental well-being of sheltered people. Having this information also reduces risk of future conflicts that may arise from misunderstandings.

To measure the success in delivering this impact, a combination of two measurements can be used. First, is to monitor the number of finalised shelter arrangements made by spontaneous volunteers and internally displaced people. Tracking this measurement with a time stamp will allow trend analysis overtime to inform how well the impact is being achieved. This measurement will be coupled with information received by a feedback form received during and after the hosting is completed to better measure the satisfaction of both spontaneous volunteers and internally displaced persons.

## INCLUSIVITY: Equal Chance for All Displaced People to Receive Shelter

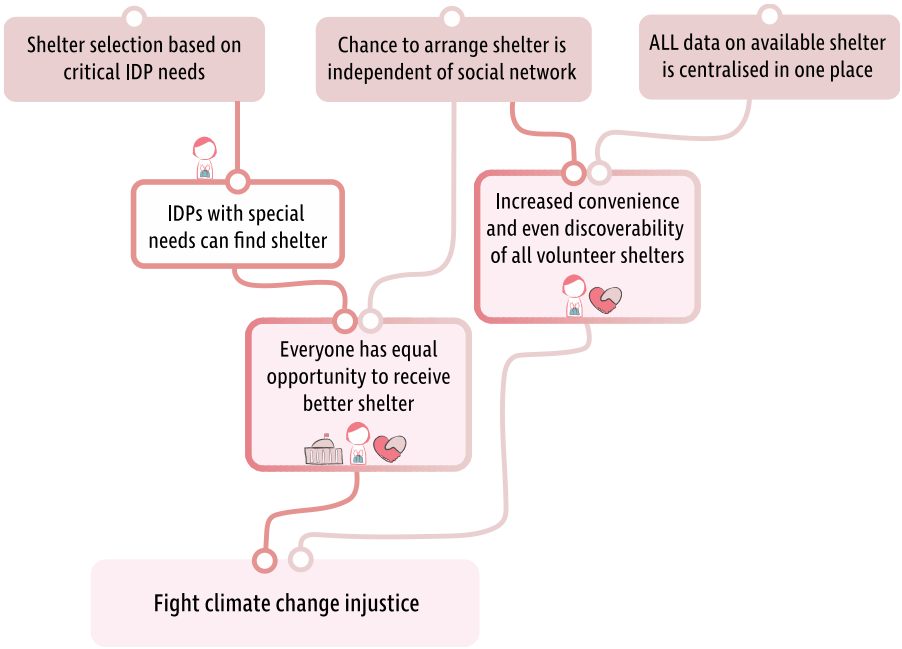


*Figure 3 Internally Displaced People (IDP) Inclusivity Impact in Theory of Change Diagram*

A problem in the current shelter provision from spontaneous volunteers is that finding out about them is contingent on how much information access you have, who is in your social network, and sometimes just being at the right place at the right time. It also has to do with persistence in looking for this information, which is often buried deep within the digital world. The current process therefore has a danger of only making information available to those who have a wide network, are tech-savvy, and are physically and mentally capable of dedicating time to search for these options. The result may be a disproportionate allocation of these shelters to those who are less vulnerable.

To prevent this disproportionate provision of adequate shelter, the solution proposes a centralised platform that makes everyone, regardless of vulnerability, equally eligible to receive shelter. By making the users of the platform not individual internally displaced people but organisations that specialise in disaster response and planning, a fairer distribution of informal emergency shelter can be achieved that is inclusive of the most vulnerable and marginalised populations. These are people who are less tech-savvy such as the elderly, those with less access to the internet and technology such as lower income groups, and those who may have a smaller social network such as people with special needs. If the platform is available for booking by individuals on a first-come-first-serve basis, there is a chance these marginalised groups may get left behind by those who are more resourceful and quicker to act. Moreover, by collaborating with already existing experts in disaster response, the platform can become a powerful tool to aid current response plans to act more effectively and inclusively, directly contributing to addressing the 2030 UN Sustainable Development Goals. A centralised platform is additionally far more convenient because it removes the need to dig through pages and pages of information.

However, there are assumptions that must be made to ensure equal opportunity, discoverability, and convenience. First is that the offerings by spontaneous volunteers are inclusive

to special needs and there are enough options for vulnerable internally displaced persons. Second is the city in which the digital platform will be deployed has ubiquitous and accessible internet. Third is that enough spontaneous volunteers register and offer their shelter on the digital platform. A potential idea to market this platform would be to collaborate with organisations central to disaster relief work such as IFRC to promote the platform on their website or even make an appeal for spontaneous shelter volunteers. If these assumptions are met, equal opportunity can be achieved. It is important to note however that further research should be done to investigate whether equality should be the goal, or equity, where those who are most vulnerable receive shelter at a priority.

A measurement that can be used to track inclusiveness is to count the total number of people sheltered through this platform, including specific numbers on sheltered vulnerable groups. Historical data on how likely vulnerable groups are sheltered can be obtained by government and NGOs and used as a proxy to calculate percent improvement.

SENDAI FRAMEWORK: More Displacement Knowledge & Resiliency

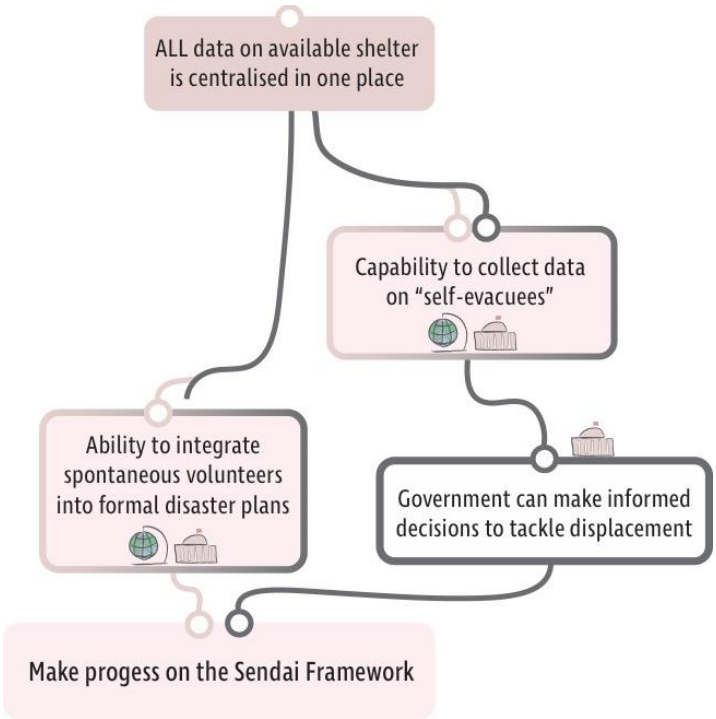


*Figure 4 Sendai Framework Impact in Theory of Change Diagram*

One of the advantages of this solution is the potential ability to collect more information on internally displaced people, particularly around self-evacuees. To minimise data privacy issues, it should also be considered that these measurements be kept secured with government and organisations who already have the approval to gather such information.

Self-evacuees are people who choose not to or are unable to refuge in conventional evacuation centres for reasons including but not limited to the fear of leaving their community, physical inability to move, or a presence of a pet that cannot be brought into an evacuation centre. Because people displaced outside official evacuation centres are usually not tracked by official registers, it is more challenging to gather accurate information on how many of these types of

people exist, and therefore how to support them[33]. However, as people would find refuge through the platform, the system will register information about their number, location, and vulnerabilities, more accurate displacement data can be captured. With more insight on self-evacuees, national and local governments as well as disaster relief organisations will be able to better understand the effects of a disaster. This will help governments to more accurately monitor progress on the Sendai Framework of Disaster Risk Reduction. Namely, the addition of this data will help monitor Target B: "Substantially reduce the number of affected people globally by 2030, aiming to lower the average global figure per 100,000 in the decade 2020–2030 compared to the period 2005–2015"[34].

Beyond collecting more data on internally displaced people, the digital platform will also be able to capture information on spontaneous volunteers, a group that is seldom studied. The advantage of this is that if more is known about spontaneous volunteers and their potential in providing assistance during disaster relief, government and international organisations can have better insight on how to better incorporate them into formal disaster relief plans. Spontaneous volunteers can also use the platform as a knowledge sharing community, where people who want to help can share experiences and best practices together, increasing the effectiveness of spontaneous volunteer efforts.

The success of this impact can be measured by keeping track of how many government bodies and humanitarian organisations leverage data on this platform for decision making. Additionally, partnerships with organisations to increase involvement of spontaneous volunteers through the digital platform will be evidence that more integration of spontaneous volunteers is occurring.

## LIMITATIONS

While the study showed the proposed solution can better streamline shelter provision between spontaneous volunteers an internally displaced people in urban environments, there are limitations. First, the study did not interview actual displaced people but rather focused on studying the spontaneous volunteers. The main reason for this was that spontaneous volunteers were more easily accessible remotely to conduct interviews with than displaced people. Future works should include internally displaced people in the research to further understand the struggles and challenges they face. For next steps, the research should expand the scope of the interviews to include internally displaced people and more spontaneous volunteers. Second, the study focused on a solution that is viable in a developed city context. The reason for this is due to the dependency of the platform on ubiquitous internet access, support from local and national government, and the need for durable shelter that will not be heavily damaged by a disaster.

Another factor that should be addressed in future research is the potential impact of social norms and differences on the platform's effectiveness. Depending on the city's culture, the sentiment around welcoming strangers into a private home may be different. Perhaps the

[33] IDMC, 2019. Global Report on Internal Displacement 2019..
[34] UNISDR, 2015. Sendai Framework for Disaster Risk Reduction 2015 - 2030 37.

hospitality industry in some cities are more philanthropic than others, making this solution more likely to succeed there. Gender equality, income gap, and ethnic diversity may also have an impact on the success of this solution. Thus, it might be helpful as a next step to research and analyse the impact of social factors on the effectiveness of this solution.

## CONCLUSION

Current emergency shelter solutions during an urban disaster must be revisited to prevent the exacerbation of the negative effects on internally displaced people and affected communities. In many cities around the world, spontaneous volunteers are already showing willingness to offer shelter to those who are displaced. Not only are these shelters more fit-for-purpose, but they present an opportunity to reduce the number of internally displaced people who cannot find adequate shelter. However, current infrastructure makes it difficult for shelters offered by spontaneous volunteers to be as effective and streamlined as it could be. Issues that currently exist include the imbalanced discoverability of shelters, lack of convenience, and poor information quality and delivery of available shelters.

Thus, a proposed solution is to create a digital platform that centralises all information on shelter by spontaneous volunteers to be available to governments and humanitarian organisations interested in mobilising such shelters. The digital platform will house information useful to make emergency shelter arrangements and will collect invaluable data that will provide more insight on displacement realities. Moreover, the platform can help accelerate the progress of nations to the Sendai Framework of Disaster Risk Response.

Despite addressing the major benefits that can be realised by this solution, further research is required to develop a more robust design of the platform. This includes understanding the social norms of a city when implementing a prototype, as well as learning more about the issue from the perspective of someone who is displaced. With that said, this study sheds light on a possible innovation that can help increase city disaster resilience through more emergency shelter delivery and community involvement and improve internally displaced people's physical and mental health and wellbeing through providing more and better shelter options.

## ABOUT THE AUTHOR

Airi Iris Ryu is a social entrepreneur from Tokyo, Japan passionate about improving disaster response and climate change adaptation in cities around the world. She holds a Masters degree from University of Cambridge in Engineering for Sustainable Development, where she researched the potential impact of existing accommodation as alternative shelter in urban emergency response. Her background is in industrial and systems engineering with prior experience advising the Data Department COO at Bloomberg LP New York on operational efficiency and process engineering. She also represented Japan at the United Nations UNLEASH Innovation Lab 2019 to offer disruptive solutions to the UN Sustainable Development Goals.

## APPENDIX A: THEORY OF CHANGE DIAGRAM