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*by* Jovi Iristian

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## Managing uncertainty during disaster: case on typhoon hagibis japan

Daniel Susilo<sup>1</sup>, Meithiana Indrasari<sup>2</sup>, Harliantara<sup>1</sup>, Jovi Iristian<sup>2</sup> and Eddy Yunus<sup>2</sup>

<sup>1</sup> Communication Science, Dr, Soetomo University, Surabaya, Indonesia

<sup>2</sup> Science of Management, Dr, Soetomo University, Surabaya, Indonesia

{daniel.susilo@unitomo.ac.id}

**Abstract.** Japan has become one of the countries vulnerable to natural disasters, one of which is the earthquake. For Japanese people, the earthquake seemed like a part of their lives because of the intensity of the earthquake that often occurs. Not only the earthquake but also Typhoon that struck Japan, which also occurred in mid-October 2019. Japan was hit by Typhoon Hagibis, which was said to be the most terrible in Japanese history. However, the Japanese Government is more than ready. With the frequent disasters that befall Japan, of course, Japan has stepped in preparing itself before a disaster occurs. The Japanese Government has been very stringent in designing and building buildings and infrastructure since 1981. There is a superior standard to apply, where each building is constructed to deal with earthquakes, winds, typhoons, and rainstorms. Based on this background, the purpose of this study is how Japan manages uncertainty during disasters, especially in the case of the Hagibis typhoon that occurred in Japan. This study uses a qualitative approach with the method of interviewing Japanese people related to the preparation before the disaster. The results have shown Combination on Strategic planning and prepare the preventive action facing the uncertainty offer a great combination to handle a natural disaster like Typhoon.

**Keywords:** Uncertainty; Disaster Management; Hagibis Typhoon; Japan

### 1 Introduction

Located in the Western Pacific Ocean, Japan became a country that encounters numerous disasters, including tremors, hurricanes, volcanic emissions, and overwhelming blizzards[1]. Japan has a reliable government-focused catastrophe avoidance and reaction framework[2], [3]. During weekend on mid-October 2019, Japan facing the great disaster after six decade, named Hagibis[4]. The Japan Meteorological Agency has warned that the typhoon Hagibis became a typhoon that was as strong as the Kanogawa typhoon that struck Shizouka Prefecture and the Tokyo area in 1958.[5] Typhoon Hagibis, said to be the most devastating in the history of Japan, struck Japan. The typhoon was reportedly the worst in a 60-year period.[6], [7] Being in the middle of the Pacific Ocean makes Japan often vulnerable to typhoons and earthquakes. Living in Japan, where the majority of the media do not



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speak English, certainly raises concerns, especially for tourists or migrants who are not ready to face natural disasters that often come suddenly in Japan.

In David K. Berlo's communication model, it is explained that communication is interpreted not only as a mere mathematical model, but also as a process of elaborating messages, channels, and information accuracy. By announcing disaster information early to the public, the level of community sensitivity to disasters is formed and is a reminder of one another. Things are different from what is in the handling of disasters in other Asian countries[8]–[10]. Curative and less communicative handling steps are often the choice made. In the panic of a disaster situation, in fact there are often those who spread hoax or hoax through social media which further adds to the distortion of disaster information. Disaster preparedness and the communicative role of government and competent authorities in delivering credible information are critical points for successful disaster communication.

Related on Yuliarti and Jatimurti research about communication on environmental issue, Ecological communication is the intentional trade of data both as information and natural approaches, to oversee and secure the earth[11]. But, author concern the environmental studies on communication can be extensive as abroad unto disaster management, especially risk and uncertainty communication management.

That uncertainties exist in for all intents and purposes all policymaking circumstances is commonly comprehended by most policymakers, just as by the researchers giving choice help. In any case, there is little thankfulness for the way that there are a wide range of measurements of uncertainties, and there is an absence of comprehension about their various attributes, relative extents, and convenient methods for managing them. Indeed, even inside the various fields of choice help (approach examination, coordinated appraisal, ecological and human hazard evaluation, natural effect evaluation, building hazard investigation, money saving advantage investigation, and so forth.)(12).

This article would to describing the effort of the Japanese government facing the Hagibis Typhoon 2019. How the Japanese manage the uncertainty on disaster and risk management. For comparison data, This work using the interview process to use a qualitative approach. Qualitative research focuses mainly on the use of methods to evaluate and understand the meaning of specific individuals or groups as a consequence of a social or human issue.[13]

An interview is a tool for independently and systematically collecting research data by one-way questions and answers and providing a structure for research objectives [14]. The author interviewed five informants who lived in Japan and affected with Typhoon Hagibis 2019. The background of the Informant can be determined in Table 1.

Table 1. Backgrounds of Informants

Informant Code	Gender	Nationality	Age (years old)	Occupation	City of Lived
A	Male	British	33	Teacher	Shinjuku, Tokyo
B	Male	Japanese	42	Salesman	Chiba
C	Female	Chinese	28	Graduate Student	Shinjuku, Tokyo
D	Female	Filipina	27	Nurse	Shibuya
E	Female	Japanese	31	Lecturer	Misuzawa, Iwate

## 2 Methodology

Tropical storms, including typhoons and hurricanes, cause the temperature of the sea surface (SST) to cool. Due to the potent wind mix associated with hurricanes, cold and nutrient-rich waters from deeper layers are pumped into the surface layer through vertical mixing and upwelling.[15] Typhoon Songda (2004) was one of the ten named typhoons that landed on Japan's main islands in 2004 and caused significant damage to Japan due to strong winds and heavy rainfall.[16] Typhoon Songda (2004), which triggered heavy rainfall in central southern Japan and its adjacent seas when it was far from the massive precipitation zone. The advanced research version of the WRF model developed at the National Center for Atmospheric Experimental (NCAR) is used for two main simulations; To illustrate

<sup>4</sup> the impact of Typhoon Songda (2004) on remote precipitation and examine the physical mechanisms involved, one with and one without typhoon circulation. Some additional studies were performed to investigate the potential effects of topography on Japan and the typhoon's radial wind profile on the remote precipitation simulated.[17]

Songda, like many other typhoons, created heavy rainfall under his eyewall and in his large spiral rainbands. Typhoon Megi, a Category 1 typhoon, was born on 14 August 2004 to the east of the Philippines, according to the Saffir-Simpson tropical storm classification. On 19 August 2004, Typhoon Megi reached the JES as a Category 1 typhoon with a speed of 120 km·h<sup>-1</sup>, and on 20 August became a tropical storm off Hokkaido's southwest coast. After the passage of Typhoon Megi in August 2004, significant decreases in the SST and the air temperature were also observed at the Ulleung Island, which is located on the left side of the typhoon passage.[18]

On September 3–4, 2011, Typhoon Talas passed through western Japan, with significant slope failures in Nara, Wakayama, and Mie prefectures across a large area. Heavy rainfall on the Kii peninsula, over 2000 mm, caused these deadly landslides that killed 97 people.[19] Signals of 18 Typhoon Talas landslides (2011) recorded by high-frequency waveforms. A technique of back-projection can find such landslides, and landslide volumes correspond with an energy parameter determined by the seismic records.[20]

Typhoon Hagibis was a massive and powerful tropical cyclone known to be Japan's most destructive typhoon since Ida in 1958. Hagibis formed from a tropical wave centered a few hundred miles north of the Marshall Islands on 2 October, the nineteenth named storm and the ninth typhoon of the 2019 Pacific typhoon season. On 5 October, as it pushed westward, the system reached tropical storm strength. Shortly after, Hagibis underwent a period of rapid intensification, which on 7 October took Hagibis to its peak intensity. Hagibis began to weaken due to a less favorable environment after holding the peak strength for about three days. On 12 October, Hagibis landed as a Category 2-equivalent typhoon on the Izu Peninsula.[21]. The Japanese government starts warning for all Japanese fellow about awareness on incoming typhoons from Thursday. All news on television delivers an alert from the official government since Morning News show aired. Informant E told the first alert officially came from Head of Meteorological Agency about possibility Hagibis Typhoon from Southern Japan hit the Tokyo area on the weekend. Even, Japanese familiar to facing typhoon and another natural disaster, Informant E notice the official alert remind people to prepare food, water, and other related logistics to facing Hagibis on the weekend. Informant A and B told since Friday morning, food and water were fleeing from most Tokyo supermarkets and *kombini* (Japanese Convenience store). People were preparing food stock facing great typhoons at the weekend.

Japanese authorities inform every hour of the position of typhoon before hitting Tokyo Greater Area, capital and the most populous area on Japan. The information is a slight application to reduce the worries of people and increasing awareness about potential damage from Hagibis. The requirement for progressively productive ways to deal with responsibility about vulnerability and numbness in administrative choices has developed with the expanding consideration regarding the "preparatory guideline." Japanese authority not only communicates with the public as a responsibility but also reduces the uncertainty of people with assurance and legitimation the government already prepares for everything that will happen. Refer to Walker et al, as opposed to the essential discernment, a whole range of various degrees of information exists, going from the unachievable perfect of complete deterministic comprehension toward one side of the scale to add up to obliviousness at the other[12]. As a rule, choices must be taken when there is not just an absence of sureness about the future circumstance or the results from approach changes, yet besides, when a portion of the potential changes themselves stay obscure[22].



### 3 Result and Discussion

Come to Japan as a migrant worker and facing great typhoons in the first month of work makes Informant D's family in Pasig, Philippines worry. After watching the news on local Filipina TV, her intense family contact to make sure Informant D stay safe. On Saturday afternoon before typhoon come and hit on Tokyo greater area, she got information from her fellow Filipino migrant worker about Free WIFI Service from Japan Authority to anticipate lousy network connection or blackout during Typhoon Hagibis. SSID 00000JAPAN served a free access, reliable, and fast connection for all Japan area. This SSID installed on all strategic areas like restaurant, school, *kombini*, public transportation, Bus Stop, and other strategic locations[23]. Informant D felt secure and fewer worries as long as she can give an update to her family in the Philippines when Hagibis come to Tokyo. Informant D's apartment got covered from SSID 00000JAPAN as near with Bus Stop. When typhoons came and hit Japan, she still connected with her relative and family to make sure everyone still safe.

Informant A work as an English teacher in Japan felt SSID 00000JAPAN helpful. Even he already work for ten years in Japan, he only knows a bit Japanese. He cannot access conventional media such as television because airing only in Japanese. He hangs on news updates from the internet as an English news source. During the Hagibis hit Tokyo, his internet provider got disrupted after earthquake 5.7 in Richter Scale hit Chiba at the same time when Hagibis hit Tokyo. He keeps getting news update on English news and Twitter update from NHK English through free WIFI Service from SSID 00000JAPAN. On the theory of Uncertainty reduction theory, Berger stated that people are active in seeking information to reduce their uncertainty[24]. Primary information for a non-Japanese native speaker like Informant A has come from an internet-based device. SSID 00000JAPAN endeavor a fast and reliable internet connection as a medium to reduce uncertainty for non-Japanese. He mentions if no internet service from WIFI, maybe he became panic and felt uncertainty because cannot understand Japanese information from television.

The Japanese government also proactively provides information for foreigners living in disaster-affected areas by providing 24-hour toll-free call center services with English, Korean, Tagalog, and Mandarin assistant services. Informant C, who felt horrified after earthquake 5.7 in the Richter Scale, also hit Japan during Hagibis call the 24 hours toll-free services provided by Japan Authorities. She got fast and appeased information told in her native language, Mandarin. Something we need to emulate from the readiness of handling the Japanese disaster. Information about the location of the shelter and access to transportation is also given in full. Even at the same time as Typhoon'sTyphoon's winds passed, Japan was also hit by the 5.7 SR Earthquake. In such a panic situation, the Japanese government continues to provide updates via emergency notification services via mobile phones.

Berger explains key success to reduce uncertainty is to develop a strategic personal communication[25]. A functioning strategist would result in methods for decreasing vulnerabilities with no close to direct personal contact. For instance, if one somehow managed to get some information about a specific individual, or approach the specific individual's companion for some data without really facing the individual straightforwardly[26][27].

Informant B explain with strategic and curative action, on Monday morning, most of the office in the Tokyo area runs as normal. He felt Japan Authority success reduce uncertainty and directly impacting to his work productively on Monday morning.

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### 4 Conclusion

The combination of Strategic planning and prepare the preventive action facing the uncertainty to offer a great combination to handle natural disasters like Typhoon. With active information and early alert from an authority, increasing the awareness of people about the threat of disaster. Trust and public engagement increasing significantly with the decision to provide free, fast, and reliable internet service during the disaster. The public felt uncertainty and panic reduce significantly. Also, effective personal communication emulates the readiness to manage information about the disaster.

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