UNDERSTANDING MEMORY TRANSMISSION IN DISASTER RISK REDUCTION PRACTICES: A CASE STUDY FROM JAPAN

ABSTRACT

"Disaster strike when they have faded from memory", is a powerful quote from the Japanese geophysicist Terada Torahiko (1878-1935). This sentence, often used when addressing the urge for improving disaster resilience, is a powerful reminder of the role local memories of past disasters and lessons learned play in ensuring the safety of those communities exposed to hazards. Twelve years from the Great East Japan Earthquake and Tsunami (GEJET) that hit Japan Tohoku's East Coast, this article aims at understanding how the transmission of local knowledge and experiences of past disasters contribute to disaster risk reduction measures. Based on an on-site field research along the coast of the Japanese prefectures of Iwate, Miyagi and Fukushima, this study analyses 11 semi-structured interviews, investigating the role of memory transmission in preparing to cascading events such as the GEJET. Data analysis was done through word coding with the use of NVivo. Results have been analysed in relation to the adopted theoretical framework connecting the field of risk perception and memory studies, distinguishing between three main forms of memory transmission, and guiding the identification of potentially effective practices for reducing disaster risk. Among the identified practices for transmitting memories of past disasters, it results that, if integrated in disaster risk reduction, the most effective ones are those that have been passed down alternating oral transmission with the use of backup memory archives. Such practices allow both communicability and durability of lessons learned. The act of transmitting and maintaining a constant interaction between these two forms of memory, is responsibility of those institutions that oversee keeping memories alive, by continuously repurposing and renewing them.

Keywords: memory transmission, local knowledge, tsunami, risk perception, Japan

[H1] INTRODUCTION

"Disaster strike when they have faded from memory". This quote from the Japanese geophysicist Terada Torahiko (1878-1935) highlights that risk management is a constantly repeating process of identifying risks, analysing them, and finding solutions by incorporating feedback and learning (Twigg, 2015). The process of resilience building strongly relies on the capacity of communities to integrate these feedback and learnings in disaster risk management plans, based on the history of interactions with ecosystem they live in (Folke, 2006). Appropriate integration of lessons learned and memories of past disaster experiences into disaster risk reduction measures contributes to the implementation of the Sendai Framework for Disaster Risk Reduction Priority for Action 1 "Understanding disaster risk" and Priority for Action 3 "Investing in disaster risk reduction for resilience" (Boret and Shibayama, 2016; Ranghieri and Ishiwatari, 2014; UNDRR, 2015). Understanding disaster risk for disaster resilience also means having a good understanding of historical records of past events and being aware of the geographical characteristics for the addressed areas (Mercer et al., 2012). This knowledge can help identify patterns of occurrence of hazards and, if appropriately shared within communities, it increases community's risk perception, influencing the effectiveness of disaster risk management plans (Schneiderbauer et al., 2021; UNDRR and ICCROM, 2022).

Connecting communities to the creation and use of collective memories requires first a process of selection of significant memories. The generation of stories related to these memories contributes to social dialogue and to the creation of common values among citizens (Tidball et al. 2010). The transmission of these stories can be done in various ways, giving materiality to memory with street plaques, preserved urban ruins,

memorials etc. that represent traces of catastrophes (Le Blanc 2012). Heritage plays a key role in the institutionalization of disaster memories and has the power of increasing or decreasing vulnerability of communities towards disaster risk (Ahmad and Sayadi, 2011).

The role of heritage and specifically local knowledge for disaster risk reduction has gained popularity over the last decades (UNDRR and ICCROM, 2022; Šakić Trogrlić et al., 2021). Representative is the story of the high level of risk perception of the Simeulue Island community (Banda Aceh, Indonesia), passed down from generation to generation through a lullaby that saved the life of most of inhabitants during 2004'catastrophic tsunamis that hit Indian Ocean coasts (Ahmad and Sayadi, 2011; McAdoo et al., 2006; Rahman and Munadi, 2019; Rahman, Sakurai and Munadi, 2017; Rahman, Sakurai and Munadi, 2018). Another example, which is widely known in Japan, is the *Inamura-no-hi* legend, which translates as "The fire of rice sheaves". This story is related to a tsunami wave that hit the Japanese Kii Peninsula on December 23rd and 24th 1854 (Asian Disaster Reduction Centre, 2010; Shuto and Fujima, 2009). The legend talks about how an old man understood a tsunami was coming based on his past experience and saved the inhabitants of his village by setting his own rice field on fire and attracting them far from the coast (Hearn, 1897).

Simply remembering does however not automatically guarantee a high level of risk perception enabling community resilience, reason why a better understanding on the dynamics of memory transmission and the interrelation with disaster risk management is necessary. Remembering disasters often goes beyond the disaster itself, and can be shaped by contrasting intentions, such as mourning, recovering and oblivion (Le Blanc, 2012). In the process of institutionalizing memories aimed at reducing disaster risks, emotional and cognitive implications must be considered along with an understanding of how collective memory and memory transmission work. This paper analyzes the dynamics that have guided and still guide disaster memory transmission in the area hit by 2011's Great East Japan Earthquake and Tsunami, in association with their role as risk perception drivers.

[H2] THEORETICAL FRAMEWORK

Remembering is an active orientation towards the past, otherwise seen as an individual act of thinking of things in their absence, interdependent to external factors and social constraints (Erll, Nünning, and Young, 2008; Misztal, 2003). Memory as something that can be socially organized and mediated is defined as "collective memory" (Halbwachs and Coser, 1992; Tidball et al., 2010). It is through collective memory, that humans maintain their existence through generations, directing behaviours and experience in the interactive framework of a society (Assmann and Czaplicka, 1995). Although generated at the individual level within people's mind, collective memory is transmitted through communication and social interactions (Assmann Jan, 2008). Collective memory can is distinguished between "communicative memory", therefore based on everyday communication and at the origins of oral history, and "cultural memory" (Assmann and Czaplicka, 1995, Kansteiner, 2002). Understanding the difference between these two forms of memory, and the way they are transmitted within communities, is the first step towards understanding how memory transmission can play a role influencing risk perception.

Independent from the support of any institutions of learning, transmission, or interpretation (Assmann Jan 2008), "communicative memory" is generally held in "households", with no structured organization, back-up archive or symbolism to ensure its continuity (Assmann and Czaplicka, 1995; Erll, Nünning, and Young, 2008). Its' time depth is very limited, with a maximum of an eighty-year time span of three interacting generations (Assmann Jan, 2008). Because generally transmitted within households, the decline of extended multi-generational families is threatening more and more this form of transmission (Misztal, 2003).

In opposition to communicative memory, cultural memory is an "institutionalized" form of memory including the realm of traditions, transmissions, and transferences, constructing people's relation with the past (Assmann Jan, 2008; Misztal, 2003). Being cultural memory an institutionalized form of memory, it takes distance from the everyday, as opposite to the communicative memory (Assmann and Czaplicka, 1995). The cultivation of reusable texts, images, and rituals serves to stabilize and convey events in the history of the collective meant for the *longue durée* (Kansteiner, 2002). Objectified forms of memory are more easily transmitted from one generation to another through institutions of preservation and re-embodiment. The constant interaction between these forms of memory is essential to define the dynamics of cultural memory (Assmann Aleida, 2008). Collective cultural memory is here defined as a process of (voluntary or involuntary) selection between remembering and forgetting. Ernst Renan, in his discourse "what is a nation" (Renan, 1882), insists on the importance of forgetting, as part of the process of selecting and creating new memories (Misztal, 2003). Forgetting can be either active or passive, and is caused by change of frames and values, in which social bonds have faded (Assmann Jan, 2008). The process of remembering is instead well described by Aleida Assmann (2008), with her theory on the Canon and the Archive. The Archive corresponds to "potential" cultural memories, meaning representations of the past that are stored in libraries, archives or museum and not actively used and actualized (Kansteiner, 2002). These memories are not forgotten, as they can be accessed to anytime, but are not actively used either. Time represents a threat to this kind of memory as much as it is to communicative memory, as memories in archives easily lose their function, relevance, and fall into a position between remembering and forgetting, between "no longer and not yet" (Assmann Aleida, 2008). Archived and unused memories can also serve new purposes and be adapted to new realities, whereas active memories can lose their status and fall into the archive (Misztal, 2003). The Canon, on the other side, comprehends those cultural memories constantly renewed and adapted to new social historical contexts (Kansteiner, 2002). To this kind of memory belong myths, places, artifacts and stories actively circulated and communicated (Assmann Aleida, 2008). Cultural institutions play a fundamental role in this process, strongly influencing their position as Canon or Archive. The process of selection is called "canonization" (Assmann Aleida, 2008). To summarize, a depiction of the past as past represents the Archive, whereas an interpretation of the past as present generates active memories (Misztal, 2003; Assmann Aleida, 2008).

Table 1: Summary of the processes of memory transmission identified in this study

Collective memory			
Communicative memory	Cultural memory		
	Remembering		Forgetting
	Canon (enabled by *points de vue)*	Archive	
pro:	• strong communicability	• strong communicability • durability	• durability
cons:	• no durability	• requires constant reinterpretation	• no communicability

Cultural memory responds to the urge of institutionalization of collective memory, in order to ensure its durability through generations. Ever since its invention, writing has always been a. a fundamental tool for creating and remembering physical data. However, most of written heritage ends up being simply archived, initiating what Georg Simmel defined "the tragedy of culture" (Erll, Nünning, and Young, 2008), as only a

minimum part of the written heritage is actively transferred into the Canon. Plat considered writing, as both the remedy and the poison, as it causes people to over-rely on it (Le Blanc, 2012). An abuse of writing as mnemonic practice limits the communication and therefore the transmission of the written memories, which potential is archived, waiting for new use. The most recent technology (e.g. audiovisual recording) has allowed for the creation of a more dynamic and accessible form of institutionalized memory, partially solving this issue (Zanten, 2008).

Collective memory can exist independently from its carriers (memories of the Archive), but effectiveness of memory on the social level is only given if articulated and capable of being actively transmitted (memories of the Canon) (Misztal, 2003).

The transmission process is enabled by common traditions and social representations of the past that are actively shared by members of a community, defined by Halbwachs as the *points de vue* of the transmission process (Erll, Nünning, and Young, 2008). Through these memory carriers, seen as symbolic interactions, the past is a collectively shaped and experienced temporal reference point that becomes present (Eyerman, 2004). A canon can however outlive the generations only if their *points de vue* provide with constant reinterpretation, reflecting contemporary society (Erll, Nünning, and Young, 2008). Memories of the Canon are therefore dialogues framed as narratives, passed down through traditions, in rituals and ceremonies (Eyerman, 2004). The past can therefore be embodied in material objects, but it is only through language and dialogue that it can be revived and transmitted (Eyerman, 2004). This concept, summarized and visually represented in Table 1, sets the basis to understanding which kind of memory transmission has a stronger influence on community risk perception, delineating the theoretical framework that guides the analysis of results.

[H3] CASE STUDY AREA

Based on an on-site field research along the coast of the Japanese prefectures of Iwate, Miyagi and Fukushima, this study analyses 11 semi-structured interviews, investigating the role of memory transmission in preparing to tsunamis. On Friday 11th March 2011, at 02:46:23 PM JST time a magnitude 9.0 Mw (moment magnitude scale) earthquake occurred at the level of the Japan Trench, approximately 130 km east from Sendai and at a depth of 32km (Ishigaki et al., 2013; Renaud and Murti, 2013). From the quake generated a tsunami that inundated 516km2 of the eastern coastline of Japan (Pushpalal, Rhyner, and Hossini, 2013; Renaud and Murti 2013). The tsunami reached a wave height of 40 m (Suppasri, 2013). The three prefectures of Iwate, Miyagi and Fukushima were the most damaged (Ishigaki et al., 2013). This disaster, also remembered for the nuclear meltdown caused by the tsunami at the Fukushima Dai-Ichi Power Plant (Renaud and Murti 2013), is known as the Great East Japan Earthquake and Tsunami (GEJET) (UNEP 2012), or sometimes as 3/11 (Renaud and Murti, 2013). In some papers it is also referred to as Tohoku-oki Earthquake and Tsunami (Mori et al., 2013). First disaster ever recorded with such a cascade of events including tsunami, earthquake, and power plant disaster (Ranghieri and Ishiwatari, 2014), it caused the death of 19,727 people, of which 2,559 still missing (Otsuyama and Shaw, 2021). Approximately 300,000 people have been evacuated (Renaud and Murti 2013).

It was the greatest earthquake ever recorded in Japan, nonetheless the number of victims directly caused by the collapse were extremely limited, due to the advanced quake-resistant buildings in the area, result of centuries living with earthquakes and developing resistant infrastructure (Ishigaki et al. 2013). Several studies investigating the lessons learned from this multiple disaster have conclude that most of the victims have died by drowning. This evidence shows that most of the people delayed the evacuation from coastlines, for reason that variate from an over-reliance on structural measures to a lack of awareness and underestimation of tsunami risk (Ranghieri and Ishiwatari, 2014). The impact of the GEJET was uneven

along the Sanriku coast and the Sendai Plain, due both to the run-up wave and people's past experience dealing with the hazard (Suppasri, 2013). Understanding how local memories and lessons learned can be passed down from generation to generation so to improve the resilience of future communities is a key step to prevent disastrous outcomes from repeating. For this purpose, this paper analyses results from field research in the above-mentioned case study setting, identifying good practices and analysing their role influencing risk perception through a framework of theories on memory transmission.

[H4] METHODOLOGY

This research aims at understanding how memory is transmitted, and how memory transmission can be incorporated into disaster management plans throughout time. For this purpose, the author has conducted field research along Japan's Tohoku East Coast, between November and December 2017. The study area extends along Tohoku's Iwate, Miyagi, and Fukushima prefecture, targeting community centres that were active towards commemorating the aftermaths of the GEJET (see figure 1).

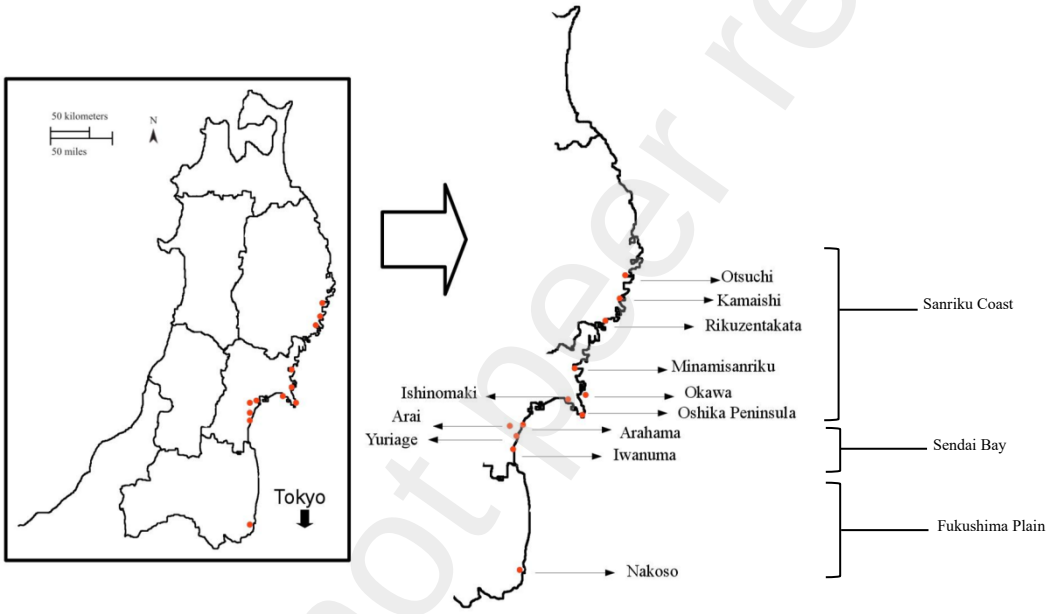

Figure 1 Sites covered during the field research along the Tohoku East Coast

The field-research corresponds to a first phase of participatory observation in the areas listed in Figure 1, followed by interviews recorded upon consensus. All interviews were conducted in Japanese. No discrimination of age and gender has been made, while the only specific criteria for the sample to be included was that they had an attachment to the study area, and that they had experienced the GEJET.

People interviewed belonged to these three categories:

- *Kataribe* (story tellers): locals that decided to share the burden by narrating their personal experience and local knowledge with visitors. Although aware of the cultural and social implications of the tsunami, they are usually not directly involved in reconstruction process.
- *Leading figures in community centers:* locals that cooperate with municipalities and local governments, working in centers of disaster memory. They often have a less in depth understanding of their land but are more aware of local post-disaster projects.

- *Figures working for municipalities*: as professionals, they are aware of the reconstruction projects and represent the decision-making point of view of heritage interpretation.

Table 2 List of Interviewees with the category they represented and target area

Interviewee	Category	Area	Interview Date
Interviewee 1	Community center	Otsuchi	2nd December 2017
Interviewee 2	*Kataribe*	Minamisanriku	19th November 2017
Interviewee 3	*Kataribe*	Minamisanriku	18th November 2017
Interviewee 4	Community Center	Ishinomaki	20th December 2017
Interviewee 5	*Kataribe*	Ishinomaki	18th December 2017
Interviewee 6	Community Center	Arai	24th November 2017
Interviewee 7	Community Center	Arahama	12th December 2017
Interviewee 8	*Kataribe*	Yuriage	11th December 2017
Interviewee 9	Municipality	Iwanuma	11th December 2017
Interviewee 10	Community Center	Iwanuma	11th December 2017
Interviewee 11	Community Center	Nakoso / Iwaki	16th December 2017

An initial round of test interviews (not included in the data analysis) has determined the adoption of semi-structured interviews for data collection. In contrast to structured interviews, this approach allowed the sample to present their personal experience and perceptions without the limit of a pre-determined structure, which would have inevitably affected the depth of answers and the reliability of the results.

For the interviews to be considered valid, it was critical that the sample covered the following points:

1. Their knowledge on past tsunamis and related practices carried pre-GEJET.
2. Their experience of the GEJET, evaluating the effectives of adopted traditional practices in response to the GEJET.
3. Their perception on how lessons learned post-GEJET can be transmitted to warn future generations.

A total of 11 valid interviews (see Table 2) has been collected, transcribed, and analysed. Data analysis was done through coding and categorizing (Saldaña, 2013) with the use of NVivo. The initial coding process resulted in the identification of the different mnemonic practices, that have been color coded. Later, the analysis moved towards the identification of the dynamics for memory transmission presented in the theoretical framework. The interviews have then been used to contribute to the thesis in these parts:

- Identification of past disasters and human-nature interactions.
- Identification of past mnemonic practices.
- Identification of post-GEJET mnemonic practices.
- Identification of perceived needs and challenges for memory transmission of disasters in contribution to resilience building.

The transmitted practices that resulted from the interviews have followingly been analysed in relation to the adopted theoretical framework, allowing an identification of successful practices of memory transmission for disaster risk reduction through the life histories approach. The life histories method is useful for gathering information about changes in the material and social networks within which people construct their lives (Cassell and Symon, 2004).

[H5] RESULTS

Because of its location on the Pacific Ocean along the "Ring of Fire", Tohoku has a long history of fighting against earthquakes, often accompanied by structural damage, fires and tsunamis (Ishigaki et al. 2013) (see figure 2).

Jogan Tsunami	Keicho Tsunami	Meiji Sanriku Tsunami	Showa Sanriku Tsunami	ChileanTsunami	GEJET
869	1611	1896	1933	1960	2011
• 8.6 M • 1000 casualties ca. • 40 m tsunami ca.	• 8.1 M • 5000 casualties ca. • 20 m tsunami	• 8.5 M • 21888 casualties • 38 m tsunami	• 8.4 M • 2995 casualties • 29 m tsunami	• 9.4 M • 142 casualties • 6 m tsunami	• 9.0 M • 19729 casualties (2559 missing) • Up to 40 m tsunami

Figure 2 Overview on history of past tsunamis along Tohoku's East Coast

Against this background, Tohoku's East Coast provides strong examples in understanding how local knowledge can influence disaster risk reduction measures if appropriately transmitted in form of memory. Among these, a very popular practice was that of erecting stone memorials (*tsunami kinenhi*). Shrines along coastlines in Japan were also often connected to the history of past disasters (Hidaka, 2012). Myths and spiritual associations to disasters were additionally supported by scientific evidence, as archaeological deposits, and archives. Investigation of tsunami deposits started during 1980s, to investigate tsunami events that occurred before historical literature (Shuto and Fujima, 2009). Later on, archives of records of past disasters have been often adopted to ensure these memories will outlive time (Interview 8). Some of these memorials and mnemonic practices have been lost during the 2011's tsunami (Kitahara, Uhana, and Ohmura, 2012). The unprecedented impact of the GEJET has generated the need for new disaster memories, and saw the creation of new stone memorials, together with other forms of commemoration. These forms include the preservation of disaster ruins, known in Japanese with the word *shinsai ikou*. Prior to 3.11, damaged structures had never been used as memorials (Suppasri, 2013). Remains and ruins of buildings damaged by the tsunami correspond to one of the most recent forms of memorialization in Tohoku. Symbolizing the destructing power of tsunamis, have become a commonly used visual tool to maintain memories of disasters alive. Among the newest form of commemoration of tsunamis in Tohoku, is the role of *kataribe*. *Kataribe* are storytellers, often local people witness of the tsunami, who decided to work in the interpretation of disaster ruins and memorials by sharing their own experience as survivors of the GEJET. These are some of the most relevant identified efforts for commemorating tsunamis along Tohoku's coastal area. However, simply remembering disasters cannot automatically guarantee effective memory transmission in contribution to disaster risk reduction (Le Blanc, 2012). Based on the understanding of the dynamics of memory transmission identified in the theoretical framework, this section presents the role that tsunami memory transmission practices played and still plays in warning communities and raising their perception to tsunami risk.

Table 3 list of type of measures for memory transmission identified along the case study area

Pre-GEJET	**Post-GEJET**
• Stone memorials (*tsunami kinenhi*)	• Storytelling (*kataribe*)

- Shrines and associated myths
- Written memories
- Place naming

- Audiovisual media
- Disaster ruins (*shinsai ikou*)

The field research not only confirmed the existence of several forms of heritage which history is linked to the memory of past tsunamis, but also allowed for mapping of these practices, and evaluating to which extent people relate to them and perceives them as a tool for building a "tsunami culture" and prepare to future events.

[H5.1] Orally transmitted tsunami memories and their institutionalization

Memories that develop exclusively orally, and that are not institutionalized (Assmann Jan, 2008) are called in Japanese *kouten,* roughly meaning *"*oral transmission" (Interview 5). It generates among communities, at a local level or in households (Misztal, 2003). Survivors and witnesses of tsunamis generate this form of memory, sharing their experiences in daily life. It is a powerful form of communication of disaster risk, as it reflects the living society and is based on human interactions. Several cases of successful evacuation during the GEJET have been attributed to memories of this kind. Most of these examples are along the Sanriku coast, where communities had last experienced a tsunami in 1960 and living memories are still shared within families. Interviewees 2, 5, and 11 provided significant examples of how stories narrated within their households have motivated their prompt reaction as GEJET occurred (see Box 1).

Box 1: Examples of communicative memory as a tool to convey messages of disaster risk:

On March 11th, 2011, many were the children outside school, as for some of them it was the day before their graduation ceremony. Among these, there were two children, a middle school girl and her five-year-old brother, who were home alone as the earthquake caused their house to shake. Immediately, the little girl knew she had to run on top of a hill, recalling her grandmother's stories from when she survived a tsunami decades ago. This memory, explained Interviewee 5, saved the life of the two children, who promptly evacuated before the tsunami inundated their neighborhood (Interview 5).

However, these memories exist for as long as their carriers exist, or for as long as they communicate them effectively to future generations. The communication of these memories usually stops after few generations, as it was explained by most of interviewees from the Sanriku Coast in response to the lack of communication over the Meiji Sanriku Tsunami and Showa Sanriku Tsunami in particular (Interview 1; Interview 2; Interview 3). Time has a strong impact on oral memories. Most of interviewees refer to human nature as inclined to forget about bad and painful memories (Interview 1; Interview 2; Interview 4; Interview 5; Interview 7). Disasters do however leave scars that urge the need for memorialization, so to convey lessons learned to future generations. This process marks the institutionalization of memory, in which the shift from communicative to cultural memory occurs (Assmann Jan 2008). In the past, stone memorials had been erected with this purpose, so to commemorate tsunamis and their victims, warning people to escape and save themselves in case of tsunami. Messages on stone memorials, in Japanese *tsunami kinenhi,* variate from "run quickly to higher ground" (*sugu koudai he nigeyo*), "don't build any house from here onward" (*koko yori shita ni ie wo tateruna*) and many more (Takano and Kamiyama 2015). These messages, originally part of the lessons learned from past tsunamis, have been institutionalized and objectified with the scope of informing people on tsunami risk. On occasion of the field-research, interviewees have been questioned on the importance of remembering disasters and the message they perceived to be important to pass down to future generations. Most of them answered with no hesitation, remarking how unique and fragile life is (e.g. Interview 6; Interview 8).

[H5.2] Neglected memories

Along the Tohoku East Coast, only selected disaster memories have shifted into the cultural form of collective memory. Many people, especially from the Sanriku coast, claimed to be aware of the existence of this instutionalization of past disasters. Both Interviewee 1 and 3 remember to have grown up hearing about stone memorials. (Interview 1; Interview 3). However, as Interviewee 4 from the Ishinomaki Info Center pointed out, having memories of past tsunamis, such as Keicho tsunami of 1611, doesn't necessarily mean that there was awareness of the risks (Interview 4; Interview 6). A great majority of interviewees, when asked whether they were aware of tsunami risk, answered negatively. Objects like stone memorials had been built to encourage people not to forget past disasters and their victims, "and since there's written not to forget, we all forgot of course" said Interviewee 1 with a bitter laugh (Interview 1; Original: 忘れるなだけでは、忘れてしまいますね, *wasureruna dake dewa, wasureteshimaimasu ne).* It would however be inappropriate to say that memories of past disasters were forgotten in this case. Referring to the analysis of the dynamics of remembering and forgetting presented in the theoretical framework, it can be said that most of these memories had been instead "archived" (Erll, Nünning, and Young, 2008). Memories in the Archive can be accessed anytime but fail to have a key for interpretation in the present and are for this reason neglected. Most of stone memorials *(tsunami kinenhi)* and archives, collectors of memories of past tsunamis in the investigated areas, have in time fallen into this category of memory, failing to actively warn communities and to transmit safe behaviors in case of tsunami.

[H5.2.1] Stone Memorials: tsunami kinenhi

For many centuries it has been a common practice in Japan to build stone memorials in commemoration to past disasters. In the case study of Tohoku, many of these stones have been placed following the Meiji (1896) and the Showa (1933) Sanriku Tsunamis (Suppasri et al., 2013; Takano and Kamiyama, 2015). A survey collecting all stone memorials along Aomori, Iwate and Miyagi prefectures reports the incision of a total of 286 stone memorials, belonging to the years between 1896 to 1960, when the Chilean Tsunami hit the coast (Kitahara, Uhana, and Ohmura, 2012).

They are often located where the commemorated tsunami reached, serving as hazard-map and inviting people to not forget, ideally suggesting safe routes of evacuation based on past experiences (Takano and Kamiyama, 2015). Interviewees claimed that only few people along the coast remembered about these *tsunami kinenhi* before the GEJET, mainly due to the lack of inclusiveness of these memorials into communities' everyday life (Interview 1, 2nd December 2017; Interview 3, 18th November 2017; Interview 11). Most of interviewees suggested that these forms of memories do not generate any sort of emotional involvement with the commemorated past disasters, inducing the visitor to simply acknowledge that something has happened (Interview 11). This acknowledgment generates an unconscious sense of safety, further alimented by the advancement of disaster risk reduction measures. Most of stone memorials have been built prior to the introduction of seawalls and dikes as DRR measure, inducing local communities to perceive memorials as narrating of past risks. Because people believed that an eight, ten meters seawall could totally offset the impact of a tsunami, stone memorials and other forms of disaster memories have lost purpose and been excluded from communities' daily life (Interview 1). To be ready for the unexpected caused by residual risk is one of the most important lessons learned by the GEJET (Ranghieri and Ishiwatari, 2014). After the GEJET, *tsunami kinenhi* have gained a renewed value as effort of previous generations to warn about tsunami risk (Good, 2016).

[H5.2.3] Shrines and Associated Myths

Similarly to stone memorials, built infrastructures such as shrines have also been referred to as life-hazard-

maps, guiding people towards safe areas in case of tsunami-evacuation. Shrines along coastlines in Japan are often connected to the history of past disasters (Hidaka, 2012). Stories on the origins of these shrines are part of legends and myths, that see shrines as exceptionally sacred places, miraculously spared by the destruction of tsunamis and other hazards (Hidaka, 2012). In some of these cases, shrines were built at locations that were regarded as safe on the basis of historical tsunamis, and left as a warning message to future generations (Suppasri et al., 2013). This probably explains why several shrines along the Pacific coast of Iwate, Miyagi and Fukushima prefectures resisted the GEJET (Suppasri et al., 2013). Shimomasuda Shrine, for example, has been spared by 2011's tsunami (Hidaka, 2012). It is located halfway between the coast and Sendai Airport, in Miyagi Prefecture, and whereas everything else around has been destroyed, the shrine alone has been spared (Hidaka, 2012). It must however be noted, that not for this reason all shrines have been spared by GEJET, as many are the examples of shrines sadly washed away from the wave (Hidaka, 2012).

[H5.2.3] From Written Sources to Audiovisual Media

In the past, archives of records of past disasters have been often adopted to ensure these memories will outlive time (Interview 8; Sato, 2017; Hearn, 1897). Both interviewee 5 and 11 mentioned the importance of written memories as a tool for people to learn about past events. However, only a limited number of written resources is actively transmitted into the Canon (see box 2). Although aware of their existence, not many people had direct access to them, explaining the lack of integration of these memories in people's daily lives (Interview 11). A solution to the accessibility of written data is given by the adoption of digital archives (Interview 8). With the intention of collecting experiences of the GEJET, many cities and community centers have collected memories and experiences of the tsunami survivors.

Box 2: Digital archives after the GEJET

The city of Sendai, for example, engaged since 2009 into a collection of memories of past disasters, including photographs, documents, and other forms of memorials. Collected memories have been shared online, through exhibitions, and through booklets (Post Disaster Reconstruction Department City of Sendai 2017). This project, called 20th Century Sendai, aims to encourage people to share their experiences and to communicate more, and is one of the many that have generated since 2011's tsunami.

Digital archives serve themselves not only of written sources, but also of audiovisual data. When asked to express their opinion on the best way to actively convey memories of the GEJET to future generations, many interviewees expressed their confidence in the power of pictures and videos (Interview 2; Interview 7; Interview 10). Interviewee 2, a photographer from Minamisanriku, was holding an exposition of pictures of the area from during and after the tsunami, when the author approached them for an interview. Aware of the fact that with their carriers, memories also fade, they hope to transmit the memories of the GEJET to future generations so to avoid a similar outcome (Interview 2).

[H5.2.4] A solution for Memories of the Archive

Most of the stone memorials pre-GEJET found in the Miyagi prefecture were located along the Sanriku coast, while the Sendai Bay area did not witness any major tsunami over the previous century. The only remains of a stone memorial commemorating the 1933 tsunami can be found in the fishing harbor of Yuriage. At the time of the field study, the stone was left to lay near the *Memoire de Yuriage* community center (Memoire de Yuriage, 2023) at the feet of Hiyoriyama Hill. It has words on it inscribed, barely visible because of the erosion of the stone, and barely understandable because of its antiquated language: “the

course of the tsunami has been blocked by the Oshika Peninsula" (Interview 8; From original: 津波の勢いは、牡鹿半島に遮断された, *Tsunami no ikioi wa, Oshikahantō ni shadan sareta*). Referring to the Showa Sanriku Tsunami that hit the Sanriku coast in 1933, this memorial suggests that Yuriage could be considered a safe area. Yuriage had been protected by the Oshika Peninsula, that located northern the Sendai Bay blocked the tsunami waves. Interviewee 8, born and raised in Yuriage, explains how all inhabitants had unconsciously believed their area to be safe, also because of this stone memorial. Probably also influenced by this interpretation of the disaster memorial, and due to the lack of risk awareness of the community of Yuriage, 750 people lost their lives there (Interview 8). Interviewee 8 states that, because of its detachment with community's daily life, in addition to the incomprehensible language and the poor status of conservation, this specific stone memorial had been neglected, and its meaning altered. For memories to effectively enter the Canon, there is need for continuous renewal (Erll, Nünning, and Young, 2008). This can be ensured through a ceremony, where the local community would be forced to reproduce the writings on the stone memorials, and the memories of the tsunami can be successfully transmitted despite generation gaps (Interview 8).

[H5.2.5] Re-evaluation of the Archive

Stone memorials and other past tsunami memorials have become significantly important after the Great East Japan Earthquake and Tsunami. An analysis of evidence of past tsunamis through memorials has revealed that they didn't serve their purpose when the tsunami arrived, opening questions on their effectiveness as warning system. After 11th March 2011, many people recognized the importance of past efforts warning on tsunami risk. Legends, shrines, place naming, stone memorials and history books have gained a new importance and a new role, confirming the theory for which memories of the Archive can be subject to re-evaluation and re-interpretation and move into the Canon anytime.

Box 3: the Namiwake shrine

A valid example is the case related to the Namiwake shrine. The shrine is located at approximately 5 km from the ocean, not far from Sendai city (Suppasri et al., 2013). Built before 1611 Keicho Tsunami, the shrine had been inundated despite its distance from the coast (Suppasri et al., 2013). Its name, meaning "shrine where the wave breaks", refers to a legend according to which the tsunami split exactly in that location. This fact has been associated to the intervention of the god of the sea and has for centuries been symbol of tsunami prevention (Hidaka, 2012; Suppasri et al., 2013). Archaeological deposits from the 869 Jogan tsunami were also found few meters from the shrine. The location of this shrine, which meaning had been almost forgotten, happens to correspond to the point where also the GEJET stopped its course (Suppasri et al., 2013). It is for this reason, that its value as an attempt of the ancestors to warn about tsunami risk has been revived (Hidaka, 2012; Suppasri et al., 2012). The Namiwake shrine is now known by most of locals, and its story is being told in both digital archives, exhibitions, and community centers (Sendai City, 2017).

[H 5.3] Active memories

Memories that fall into the Canon are memories which potential is expressed in contemporary society (Kansteiner, 2002). To maintain their status, memories of the Canon need constant renewal and re-adaptation to the socio-cultural context. To this category belong most of the newest form of memorialization, including memorial parks, disaster ruins (*shinsai ikou*), and institutionalized storytellers (*kataribe*), in addition to the above-mentioned forms of renewed memories from the Archive. In the context of the post-GEJET Tohoku coastal areas, the role of *points de vue* is played by cultural institutions

and community centers, functioning as agents of constant renewal. To their heritage interpretation and their capability to constantly adapt the memories to current needs depend on the messages transmitted to future generations.

[H5.3.1] Places and Associated Values

Places can provide with essential information on tsunami risk, becoming important carriers of memories of past disasters (Dall'Ò, 2019). Changes in the environment are intentional and unintentional memorials of past disasters, and if appropriately interpreted can convey strong warning meanings. Elements like the age of buildings, vegetation and so on can be used as indicators of safety. If houses had a two-hundred-year history or more, it may indicate that they resisted the last four tsunamis prior the GEJET, and that that area was considered to be safe (Sato, 2017). Forests' age as well have been used for long as tool to understand the history of a certain area (Sato, 2017).

A great impact on people's risk perception is expected to come from city reconstruction (Interview 8). Many are the municipalities along Tohoku coastline that have decided to entirely relocate cities to artificially built 3-meter-higher ground relocated to an artificially built 3-meter-high ground. A drastic change in the landscape (mainly flat, especially along the Sendai Bay and Fukushima Plain) would trigger both visitors and locals, serving as constant reminder of the 2011 tsunami (Interview 8).

Place naming itself has been often used to mark areas that have been historically exposed to tsunami risk (Hidaka 2012; Isoda et al., 2019, Box 4).

Box 4: Place naming as a means to remember past tsunamis

Examples of place naming recalling past tsunamis can be found almost everywhere along the Sendai Bay and Sanriku Coast. Ishinomaki's Watanoha (渡波), for instance, is located between the city of Ishinomaki and the Oshika Peninsula. Its name means "place of the passing wave" clearly referring to exceptional waves that hit the village before. Other examples are Funakoshi (船越, meaning "the boat that came") Namikiri (波切, meaning "cutting wave"), Nagiri (浪切), Namiyoke (波除, meaning "the removing wave"), Namiwake (浪分, meaning "the -place that- divided the wave"), and so on (Hidaka, 2012). Similarly, the Hadenya valley (波伝谷), located on the Tokura Peninsula along the ria-structured coast of Minamisanrikuin Miyagi Prefecture (Takakura and Takizawa, 2014), can be literally translated as the "valley that transmits (the story) of the wave" (Hidaka, 2012). It takes this name because it is considered an area full of traditions, telling the story of past tsunamis that hit in the past (Takakura and Takizawa, 2014). Being places part of communities' daily routine, they have great potential to transmit and evoke memories. However, places themselves do not have embedded memories, and that it is their interpretation to influence individuals' associations (Erll, Nünning, and Young, 2008).

[H5.3.2] Shinsai Ikou

The conservation of damaged structures had never been used as memorials before the GEJET, at least in Tohoku's context (Suppasri, 2013). Remains and ruins of buildings damaged by the tsunami correspond to one of the most recent forms of memorialization in Tohoku. Known in Japanese with the name *shinsai ikou*, they are as much of a powerful tool for memory transmission, as they are being criticized by local communities. (Suppasri, 2013). In an interview, Interviewee 3 from Minamisanriku talks about the municipal Disaster Management Center, which ruins have been conserved as memorial. The Disaster Management Center, a 12-meter-tall building, originally designated as evacuation center in case of tsunami risk, is today reduced to only its frame, washed away by the 15-meter-high tsunami wave. That day, 53

people took refuge on that building. However, only 10 people saved themselves, whereas the other 43 have been washed away as the tsunami arrived. Revealing to be one of the people who saved themselves, Interviewee 3 explains the ongoing debates on the conservation of the skeleton of this building are due to the feelings of relatives of the 43 victims. Although looking at that building is painful for some people, Interviewee 3 agrees that if there is really value for such a structure to be preserved, it is so not to forget this disaster (Interview 3).

Shinsai ikou are not only preserved to recall painful memories. Arahama Elementary School is another – more positive – example of *shinsai ikou.* Located along the Sendai Bay, it is the only building of the city that resisted the tsunami on 11th March 2011 (Interview 7). Designated as evacuation building in case of emergency, it saved life to 320 people, including the students, who took refuge on the rooftop as the tsunami inundated the first two floors (Sendai City 2017). The ruins of the building have been preserved to maintain alive memories of Arahama, now completely relocated, and to commemorate the importance of resilient infrastructure (Interview 7). The first two floors have been maintained in form of ruin, whereas the other floors have become an exhibition center raising awareness on safety and tsunami risk. It opened in April 2017 (Interview 7).

Interviewee 7 comments on the fact that some people have compared the practice of leaving *shinsai ikou* to the Hiroshima Genbaku Dome. They agreed to a certain extent, clarifying that if that building is left to commemorate the power of a human mistake, this building is instead left to show power of nature. However, this building is not believed to be able to resist many years. It is made of concrete, and it is already ruined. It will last, according to Interviewee 7 no more than 50 or 100 years, but its story will be transmitted through people and photos (Interview 7).

Box 5: Okawa Elementary School

Worth mentioning is also the case of Okawa Elementary School, located along the Kitakami River between Ishinomaki and Onagawa, Miyagi prefecture. The school, which ruins have been designated as monument (Ishinomaki City, 2023), did not have proper guideline or instructions to prepare for a Tsunami. It is still not clear what happened that day, but when the 2011's tsunami arrived, a total of 74 students of 108 and 10 teachers and office workers lost their life, washed away by the wave (Nomoto, 2016). According to the reconstruction of what happened, a lack of evacuation directories led to teachers and pupils waiting in the playground of the school for over fifty minutes, without taking action such as moving to the nearby hill. As the group decided to move towards the bridge of the river, the tsunami reached following the course of the river (Interview 4; Nomoto, 2016). Interviewee 4, from the Ishinomaki Community & Info Center (Interview 4), and Interviewee 5, from the Hibi Shinbun (Interview 5) shared some reflections on the reasons behind conserving the building. The ruins of the school are today a painful reminder of the consequences of poor preparation to tsunami risk and lack of awareness. They are preserved – not without oppositions – to warn future generations from committing the same mistakes (Interview 5). Interviewee 4 expressed their concerns on the sort of tourism that the ruins of this school might trigger in the future. Whenever they accompany visitors to visit them, they realized that it is hard for everyone to share the same respect to these memories. Some people would pose smiling in front of the school for a memory picture, others would laugh with friends while walking around. Without an appropriate interpretation of the message that this school wants to transmit to the future, the ruins are nothing else but ruins. It is for this reason, that some parents who have lost their children in that school have chosen to become *kataribe,* guiding visitors through the right interpretation of the site (Interview 4).

[H5.3.3] Kataribe: Storytellers

Communicative memory is a useful tool to transmit memories, although it's lack of institutionalization makes it fragile through time (Assmann and Czaplicka, 1995). Following the GEJET, many people who survived the tsunami became *kataribe,* meaning storytellers, and started to provide interpretations in disaster areas by reviving their experience to the public. They represent the *points de vue,* that enable the transmission of disaster memories, inducing listeners to feel an emotional attachment to the memory they are sharing. Many of the interviewees are *kataribe* themselves, who decided to share their stories to the public. An example is Interviewee 8 from the Memoire de Yuriage community center (Interview 8). In the interview, they explain how they find comfort from being a *kataribe*, responsible for sharing their own experience to others. They hope to serve the purpose of raising awareness on disaster risk and transmit how precious human life is (Interview 8).

[H5.3.4] The Floating Gap between Memory and History

The contribution of *kataribe* is purely communicative, and upon their passing there are two possible outcomes: either the memories are lost along with their carriers, or other means for transmission are adopted. The process from communicative to cultural memory is very important for ensuring active transmission and durability of the memory. However, this process is very delicate. An institutionalization of these memories might cause them to fall into the Archive and to become detached from the everyday life. Legends and myths, for example, originate from communicative memory and transform in stories commonly not associated to actual existing risks.

To maintain its communicative status, memory transmission requires the recurrence of events or ceremonies. Time capsules are an archiving method used for transmitting disaster memories to future generations (Hidaka, 2012). Example of this method for archiving is Nakoso's Time Capsule Project. Starting 2011, the city of Nakoso in the Fukushima Prefecture has collected experiences of the tsunami in form of video and audio recordings, *memoires*, drawings, pictures. School children, for example, have been asked to draw their perception of themselves after the tsunami, and elders have been asked to record narrations on their personal experience (Interview 11; Nakoso Machizukuri Support Center, Tsukuba for 3.11, and Nakoso Fukkou Project, 2017). Upon completion of the collecting process, these memories have been archived in a metal box and buried in a memorial part along the coast on 16th September 2018. It will be reopened 20 years after, and memories will be distributed among the relatives of those who recorded, generating emotional attachment between older and new generations (Interview 11). According to Interviewee 11, the emotional attachment to these memories will make people more conscious of future tsunami risk, for they will remember how to behave in case of tsunami warnings (Interview 11).

[H5.3.5] Linking ecosystem-based measures to memorial parks: Millennium Hope Hills

Memorial parks have been built within many relocated areas along Japan's Tohoku East coast, with the scope of maintaining a high level of risk awareness and give new purpose to places exposed to tsunamis where urbanization is not allowed anymore. Cities like Rikuzentakata, Ishinomaki, Iwanuma and Nakoso have committed to such measure to discourage communities to come back to the coast, as well as to actively commemorate the disaster.

The Millennium Hope Hills Park (in Japanese: Sennen Kibou no Oka), in Iwanuma (along the Sendai Bay), is one of those and it officially opened in 2015 with the continuous support of local communities and visitors (Interview 10). The project consists of a 10km long park, separated from the ocean by a 2.7 meters high seawall. A rich forest of trees has been planted by all the stakeholders, local communities, and visitors of

the park to slow down future tsunamis (Koch, 2013), while people can seek refuge on the 15 hills distributed along the flat surface of the park (Interview 9; Interview 10; Suppasri et al., 2012).

The height of these artificial hills varies from 10 to 5 meters, and foundations are made using debris from the tsunami (Suppasri 2013). The idea came from the experience of Matsushima Bay, which islands have served as buffer, blocking, and redirecting the wave energy and protecting coastal cities along the bay (Koch, 2013).

These mitigating measures alone are however not sufficient and should be combined with raising awareness activities involving communities. Although the use of ecosystem-based approaches presents a solid opportunity for both sustainable development and long-term plans for disaster risk reduction (Koch, 2013), their protection is not total. The message is conveyed by the park managers, through organized visits and a permanent exhibition on the history of past disasters. In addition to the protective and educational value, the Millennium Hope Hills also hosts a commemorative monument for the victims of the 2011 tsunami.

[H6] DISCUSSION

Below, the previously identified measures are analysed in relation to the theoretical framework, facilitating an understanding of their strengths and weaknesses as conveyors of messages to future generations influencing community risk perception.

Effective practices of memory transmission can be found within the Canon, meaning cultural memories that constantly undergo the process of renewal and adaptation to new social historical contexts (Kansteiner, 2002). For memories of the Canon to exist, there is need for a constant interaction between two main characteristics: communicability and durability.

[H6.1] Communicative memory

Communicative memory is regarded as highly effective way of actively sharing values and memories among communities keeping a high level of awareness (Interview 5; Interview 11). Unprovided of backup archive, this memory requires constant engagement for transmission through communication (Assmann Jan, 2008) and it exists as long as its carriers communicate it effectively. Time has a strong impact on communicative memory which is considered to last up to 80 or 100 years (Assmann Aleida, 2008). and most of interviews attributed the lack of living memories of past tsunamis to humans tending to forget with time (Interview 1; Interview 2; Interview 4; Interview 5; Interview 7). nevertheless, especially if transmitted within families, these memories act upon emotional attachment and are considered to effectively trigger safe behaviors in case of emergency (Interview 5; Interview 4; Interview 11).

[H6.2] Cultural memory and the Archive

Institutionalization of memories allows to meet needs for the *longue durèe* (Kansteiner, 2002) and overcome the limits of time. Most interviewees agree on the need for institutionalization of memory, for example achieved through the conservation of monuments, exposition of photos or collection of archives (Interview 2; Interview 5; Interview 11). Institutionalized memories are however at high risk of falling into the Archive. Memories in the Archive are memories transmitted as element of the past in the past (Assmann Aleida, 2008). They have no active role in contemporary society; hence they could not serve the purpose of raising awareness on disaster risk. Most of tsunami memorials established in Eastern Tohoku before the GEJET were detached from society's everyday life, reason why people did not recall these memories when the GEJET hit the coast. The detachment is given by different factors: lack of

communication, mythicization and misinterpretation. Lack of communication is due to an over-reliance of the institutionalized form of memory, that frees the individuals from the responsibility of being carriers. This sense of "freedom" frees the carriers from the responsibility of proactively communicating their memories (Le Blanc, 2012). This is most likely what happened in the case of stone memorials along the Tohoku East Coast. Time and exposure to the elements make eventual inscriptions difficult to read, and the memories did not find contemporary interpretation for active use. Such memorials can lead visitors to simply acknowledge that there has been a tsunami in the past, without a direct association with their warning message (Interview 11).

These memories lost their role in influencing community risk perception, and narratives on past disasters become legends and myths (Assmann Jan, 2008). Legends and myths were considered by interviewees as far away memories, leading to giving a false sense of safety to exposed communities (Interview 1; Interview 8). Lack of communication and mythicization also lead to misinterpretation of objects of memory, as objects do not have memories per-se (Erll, Nünning, and Young, 2008). If messages warning about future possible threats are not properly communicated, the meaning of memorials could also be subject to change and be misinterpreted. This is what happened to the stone memorial in Yuriage, where the message that was meant to become warning to future tsunamis was mistakenly transformed into reassuring message guaranteeing safety from tsunami hazards (Interview 8).

[H6.3] Memories of the Canon

If alone, neither communicability (characteristic of communicative memory) or durability (characteristic of the Archive) can positively impact active memory transmission useful to inform risk perception. Both characteristics must constantly interact and alternate each other, for memory to last in time, while being actively communicated within the society. For institutionalized memories not to fall into the Archive and maintain their communicable efficacy, it is necessary to constantly engage in activities giving them an ever-present status (Erll, Nünning, and Young, 2008). For them to have a role in influencing community and individual risk perception post-GEJET memorials and mnemonic practices (e.g. *shinsai ikou*, exhibitions, memorial parks) need constant reinterpretation, renewal and active involvement of local communities. Agents of interpretation are what Halbwachs called *points de vue* (Erll, Nünning, and Young, 2008). In Eastern Tohoku, the role of *points de vue* is played by community centers, *kataribe* (storytellers) and other institutions that take upon the responsibility of conveying the memories of the GEJET, adapting the message to contemporary needs.

The analysis also reveals some considerations on improving the transmissibility of mnemonic practices. The establishment of periodical ceremonies involving local communities into restoring or reviving tsunami memorials was suggested as solution to re-establish their emotional attachment to the memory (Interview 8). The way interpretation of memorials is conducted is also important. As long as the *kataribe* (storytellers) are alive and willing to narrate their experience the lessons learned from the GEJET will be transmitted (Interview 3; Interview 4; Interview 8). Interviewees agree that once the direct witnesses of the GEJET disappear, their will be necessary to transmit these memories to future generations with the support of physical backup memory (Interview 1; Interview 2; Interview 4; Interview 5; Interview 7). Here, a solution has been found within digital archives, including the collection of audiovisual media recording memories of *kataribe* (Fulco and O'Day, 2019). *Shinsai ikou* (disaster ruins) are not likely to last long given their conditions and their exposure to the elements (Interview 7). Conservation of *shinsai ikou* is costly, and related costs can be met only if these ruins succeed in creating an emotional attachment with the visitor (Interview 2; Interview 7). *Shinsai ikou* will one day be substituted with digital records of them, and their exhibition should be constantly associated with constant interpretation efforts.

This study has also highlighted the need for coastal communities to understand the limits of physical measures and ecosystem-based disaster risk reduction measures (Renaud and Murti, 2013). The activities undertaken by the Millennium Hope Hills, involving local communities, stress on the role and limits played by protection forests (Interview 9; Interview 10). Memorial parks, besides serving as "expedient" to discourage future generations to move back in proximity to the coastline, and have a role in slowing the impact of future tsunamis and changing people's mindset on the efficiency of these physical measures (Interview 10 The community center of the Millennium Hope Hills, that coordinates activities and its management, often involves the community of Iwanuma actively educating on benefits and risks, while offering children and adults an opportunity to communicate during the volunteering events for the management of the protective forest and other activities (Interview 10).

Another measure operating on generating emotional attachment is the Nakoso Time Capsule (Interview 11). Time capsules act directly on the long-term memory, aiming to overcome intergenerational detachment. Time capsules foster intergenerational communication and exchanges, enabling the transmission of collective memory and therefore meeting both the requirements of communicability and durability. Being the ceremony of unburying the Time Capsule fixed to 2031, there are already prospects of renewal and revival of the memories, as suggested above among the recommendations (Interview 11).

[H7] CONCLUSION

The Sendai Framework for Disaster Risk Reduction encourages communities and governments to fully understand disaster risk and to invest on building resilience. Understanding disaster risk means to learn from past disasters and develop a culture of safe responsive behaviors, so as not to be unprepared in the occurrence of a hazard. Through the direct experience of communities hit by the 2011 Great East Japan Earthquake and Tsunami, this paper has demonstrated that memory transmission plays a fundamental role in this process. The means for disaster memory transmission to influence risk perception and community resilience depend on the way messages are conveyed and defined by the level of interaction with society. Therefore, although many practices of memory transmission have been registered in Japan's Tohoku, only those that combine communicability and durability are likely to be actively transmitted to the future as tools for raising awareness. Memories solely belonging to the Archive are ensured durability in time but fail to build resilience as they have no direct connection to daily life. On the other side, memories with no institutionalized backup are too fragile and cannot be ensured to last in time, although very effective on the social level. The act of transmitting, maintaining a constant interaction between these two forms of memory, is responsibility of the *points de vue,* the institutions that oversee keeping memories alive by continuously repurposing and renewing them.

The analysis on collected data in relation to the theoretical framework led to the following conclusion: for memory transmission to have a potentially positive impact on risk perception and disaster risk reduction measures, it must merge elements of the Archive with elements of communicative memory. Oral transmissions alternated with the use of backup memory is the ideal method to ensure communicability and durability. *Points de vue* should take into consideration the importance for generating emotional attachment between memories and their receivers.

Recommendations for effective disaster memory transmission are:

- Stone memorials should be restored on a 20-year basis, as a form of renewal of the message.

- For enabling a comprehensive approach on disaster risk reduction, structural measures and raising awareness approaches should be interconnected, so to actively involve and educate communities on adopted disaster risk management.

- Family education should be encouraged, as powerful tool to connect generations and transmit memories embedded with emotional attachment. This can be done with support of institutions and periodic ceremonies.

- Encouraging the adoption of audiovisual digital archives to the interpretation of objectified memories could be a smart way to maintain an active interpretation of memories when direct witnesses of the disaster will not be able to transmit their experience personally.

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UNDERSTANDING MEMORY TRANSMISSION IN DISASTER RISK REDUCTION PRACTICES: A CASE STUDY FROM JAPAN

Paola Fontanella Pisa[1,2,3]

[1] **United Nations University, Institute for Environment and Human Security, Bonn, Germany at Eurac Research, Centre for Global Mountain Safeguard Research (GLOMOS), 1 Viale Druso, Bolzano 39100, Italy**

[2] **Eurac Research, Centre for Global Mountain Safeguard Research (GLOMOS), 1 Viale Druso, Bolzano 39100, Italy**

[3] **Tohoku University, Graduate School of Environmental Studies, Sendai, Japan**

Corresponding author: fontanella.pisa@ehs.unu.edu