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Review

Japan's Culture of Prevention: How *Bosai Culture* Combines Cultural Heritage with State-of-the-Art Disaster Risk Management Systems

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Abstract: Due to its geographical location, Japan is exposed to typhoons, floods, earthquakes, tsunamis, and volcanoes. Since time immemorial, the survival of the Japanese people has depended on their ability to prepare for disasters, learn from those painful experiences, and transmit that knowledge from generation to generation as part of their cultural heritage. These elements combined have resulted in a unique Culture of Prevention, known in Japanese as "*bosai culture*", encompassing technical measures and requirements, laws, and a strong civic culture that enables the country to face and learn from disasters. Exploring the roots of the Japanese Culture of Prevention by conducting a critical literature review, this article aims to improve our understanding of the Japanese perspective on Disaster Risk Reduction strategies and actions, by focusing on the cultural and religious influences, as well as on the solid national sense of belonging, embedded in the Japanese Disaster Risk Management system.

Keywords: culture of prevention; *bosai culture*; cultural heritage; disaster risk management; disaster risk reduction; Japan

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Citation: Pastrana-Huguet, J.; Casado-Claro, M.-F.; Gavari-Starkie, E. Japan's Culture of Prevention: How *Bosai Culture* Combines Cultural Heritage with State-of-the-Art Disaster Risk Management Systems. *Sustainability* **2022**, *14*, 13742. https://doi.org/10.3390/su142113742

Academic Editor: Asterios Bakolas

Received: 13 September 2022
Accepted: 18 October 2022
Published: 24 October 2022

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1. Introduction

Disaster Risk Reduction (DRR, henceforth) is part of the history of humanity. It has evolved through the painful experiences with disasters that our societies have undergone. In the present paradigm of resilience, risk is considered a function of the magnitude and frequency of hazards, multiplied by vulnerability, which in turn is attenuated by resilience defined in terms of a community's coping and adaptive capacities. Martin and Paneque [1] define "coping capacity" as the ability of a given community to absorb the effects of an extreme event, ensuring its persistence and survival, and quickly recover from the disturbances. On the other hand, "adaptive capacity" is considered the ability of a given community to learn from past experiences, so that it can better prepare and adjust to reduce the impacts of future events.

Therefore, overall community resilience rests on both hard skills (such as technical measures) and soft skills (such as the ability to learn and the human networks that build social capital). In line with this, this review article contends that the current Japanese Disaster Risk Management (DRM, henceforth) system and Culture of Prevention are based on three fundamental factors: (1) Japan's geographical location, (2) the cultural and religious influences embodied in its cultural heritage, and (3) a solid national identity.

1.1. The Three Pillars of the Current Japanese Disaster Risk Management System

These three intertwined factors have laid the foundations to implement and strengthen Japan's unique Culture of Prevention, known in Japanese as "*Bosai Bunka*" (The word "BOSAI" comes from two Japanese words. The first, "BO", would have several translations:

protection, prevention, mitigation, rehabilitation, or reconstruction. The second, "SAI", can be translated as "disaster".), which has played a central role in building a resilient society and has turned the country into a global role model in DRR.

As for the first pillar of the Japanese Culture of Prevention, Shi, Ye, Wang et al. [2] (p. 428) defend that the geographical environment determines a territory's spatial distribution and, therefore, it influences its exposure to hazards and their complexity. Due to its geography, topography, and climate, Japan has been deemed a "disaster-prone country" [3]. For this reason, the experience of great disasters contributes to society's awareness of the importance of preventive measures incorporating, among others, structures to prepare for and respond to disasters and participate in DRR [4].

According to the Japanese Government [5], several factors contribute to Japan's high incidence of natural disasters, mainly its climate and topography. Firstly, the country is subject to extreme weather variations, including heavy seasonal rains and typhoons, as well as heavy snowfall in the Sea of Japan. Secondly, its rugged topography, with many faults and steep slopes, results in frequent landslides. Thirdly, because of its location in the Pacific Ring of Fire, Japan is prone to earthquakes, and its coastline is vulnerable to tsunamis. Finally, Japan has 111 active volcanoes (according to the National Research Institute for Earth Science and Disaster Resilience) [6], accounting for one-tenth of all active volcanoes on the planet. In sum, these influences can trigger multiple threats and a chain of disasters.

Regarding the second pillar, which encompasses religion and culture, this article contends that religious influences have played a key role in disaster management for the Japanese. In addition, the roots of the Japanese worldview of DRR go back to various traditions, expressed in multiple simultaneous practices incorporated into their cultural heritage, developing a particular way of dealing with disasters.

Finally, the third pillar revolves around the fact that the Japanese is a group-oriented culture. In the last century, the government has promoted and implemented a strong national feeling and a duty of cooperation in which the community prevails over the individual, favouring voluntary associations in DRR. Japanese governments have adopted a comprehensive strategy to prevent and reduce disaster risks, encompassing hard and soft measures. Hard measures, such as enacting laws or defining engineering and architectural requirements for infrastructure, and soft measures, such as integrating DRR education into formal, non-formal, and informal education, as well as fostering a civic culture.

1.2. Japan as an International Role Model in DRR

Even though Japan is a disaster-prone country exposed to frequent natural hazards, it recognizably suffers fewer losses than other countries where similar disasters occur. Arguably, one of the reasons for this is that owing to its exposure to natural disasters, the Japanese have long worked at all stages of the disaster management cycle: early warning and response, recovery, and reconstruction, but most of all, preparedness. As a matter of fact, the country is currently preparing for the next Great Earthquake, which according to seismologists, will occur somewhere in the Japanese archipelago due to the tectonic plate movements in the Nankai Trough. There is a 70% to 80% probability of a Great Earthquake within the next 30 years [7]. However, since the exact place and time cannot be predicted, the whole country must be prepared, and nothing can be left to chance [8]. Not in vain, a Japanese proverb says that disasters happen when people are not expecting them (*saigai wa wasureta koro ni yatte kuru*); therefore, one should always be prepared.

Japan's good results in disaster management highlight the importance of creating resilient communities to face potential risks. The country has a solid record in large-scale crisis management and disaster recovery, offering a relevant example of the successful integration of planning, implementation, and control across multi-stakeholder platforms. Even though technical measures play a crucial role, involving individuals and communities is necessary for incremental improvements.

Japan has also demonstrated its strong commitment to DRR by promoting international cooperation DRR initiatives as part of its public diplomacy policies, as can be inferred from

its official development aid projects as well as from its active participation in the promotion of DRR in international organizations such as the UN [9].

1.3. The Growing Interest in DRR in the Scientific Community

When carrying out a literature review, we can observe how scientific research on DRR has increased significantly from 1990 to the present day. The number of studies published on DRR experienced an annual growth rate of about 3%, which denotes that the interest in the field of DRR has increased over time. Even though DRR-related research focuses primarily on disaster management and science, environmental science, climate change and ecosystem services [10], since 2001, a change in scope has taken place: research studies related to single and exploratory cases prevail, the approach has changed from preparation to response and, in terms of methodology, their diversity has increased over the last few years [11,12]. A significant number of publications that address the cultural dimension of DRR can be found in databases. For example, combining the keywords "disaster" and "culture", a total of 583 results are retrieved in Google Scholar, 131 in JSTOR, 242 in the Web of Science, and 142 in Scopus.

Moreover, in line with this trend, researchers from different fields and various institutions have carried out both theoretical and empirical studies on Japan's DRR. From the 1990s onwards an increase in Japan-focused studies can be perceived, which can be attributed to the celebration of the first UN World Conference on Disaster Risk Reduction in Yokohama in 1994. In addition, the 2011 Great East Japan Earthquake and Tsunami (The Great East Japan Earthquake and Tsunami (GEJET) took place on 11 March 2011 in front of the coast of the Tōhoku region. The earthquake had an intensity of nine points on the Richter scale, the highest magnitude ever recorded in the history of Japan. The tsunami lashed the entire north coast, causing damage to the nuclear power plant Fukushima I, and resulted in a nuclear accident that reached a severity of seven points on the INES scale of the International Atomic Energy Agency (IAEA). The tsunami killed 15,894 people, left 2585 missing (as of March 2017), and destroyed more than 130,000 houses [13].) increased the interest of researchers in studying the Japanese risk management system from various perspectives [14]. Thus, a search using the keyword "Japan" on the UNDRR website recovered 1112 publications; while searching for publications that include the key terms "Japan" and "DRR" in their title or abstract, 156 were retrieved in JSTOR, 16 in the Web of Science, 323 in Scopus, and 86 in Google Scholar. On the other hand, research on DRR in Japan has focused, among other topics, on community and the role of civil society [15–17], the role of the government [18–21], the influences of cultural heritage [22], education [23,24], comparative studies with other countries [25,26], or the promotion of DRR through JICA [4].

After reading scientific articles and institutional reports, it becomes clear that Japan is one of the world's leaders in DRR. However, what are the underlying factors leading to this situation? This is the research question that guides this review article, which, through a critical review and analysis of the literature, aims to better understand the Japanese perspective on DRR strategies and actions, focusing on two of the above-mentioned factors: (1) Japan's cultural and religious influences, and (2) the strong national sense of belonging promoted by the government and incorporated into the Japanese DRM system. Although studies on Japanese culture and cultural heritage abound, their relation to DRR is still an insufficiently researched topic. This is a gap that this article seeks to fill up by making a contribution to the study of the field.

2. Research Methods and Objectives

This article departs from a research question (what are the underlying factors conforming the Japanese Culture of Prevention, known as *bosai culture*?) and relies on a review of selected literature to answer it. Aiming to make a conceptual contribution, the article conducts a critical literature review pursuing a qualitative analysis and evaluation. Therefore, our approach to the literature review has been integrative, since its purpose has been to

critique and synthesize an already existing body of knowledge. In contrast to systematic literature reviews that are more comprehensive and synthesize data chronologically or by themes, critical literature reviews go beyond description to include a degree of analysis and conceptual innovation [27].

With the research question in mind, a selection of relevant primary and secondary sources was made. The primary sources consisted of reports, legislation, and other publications on the institutional websites of the Japanese government and various international organizations, such as the United Nations or the World Bank. As for the secondary sources, a search for scientific research articles related to the subject of study was performed in bibliographical databases and storage systems for academic publications such as JSTOR, Web of Science, and Scopus, but also using the search engine Google Scholar.

From this search, an interdisciplinary and fragmented compendium of information emerged. The authors analysed and organized the information to answer the research question and present it in a logical sequence, that was easy to understand not only to scholars familiar with either Japan or DRR, but also to a larger audience. Through the literature review, the article builds on existing knowledge, but it also makes an original contribution by carrying out a profound analysis and a systematic evaluation, which result in an original interpretation of *bosai culture* as a unique Culture of Prevention.

Our first objective is to assess the role of cultural heritage in constructing an autochthonous Japanese Culture of Prevention and some of the key aspects that characterize it, by focusing on the role of beliefs, mythological and religious influences on the perception and management of disasters. To illustrate this point, some initiatives undertaken throughout history in terms of preventive measures are described.

A second objective is to examine how the authorities have transmitted a strong national feeling and a duty to cooperate over the centuries, promoting a DRM system characterized by community participation under the leadership of voluntary associations. Then, the article aims to briefly describe Japan's international role in DRR, since the country has promoted the value of fostering a Culture of Prevention on the international stage through its active participation in the UNDRR (United Nations Office for Disaster Risk Reduction), the organization behind the three World Conferences on DRR held until now (each held in Japan), and through its ODA policy. Finally, the results of the scoping review are discussed, and some conclusions are attained.

3. DRR as Part of the Cultural Heritage of Japan: "*Bosai Culture*"

Culture can be interpreted from different perspectives. In fact, by incorporating diverse interpretations, we can reflect on its complexities. According to Oliver-Smith [28] (p. 303), any explanation of human adaptation in the past or present that does not consider the interaction among the social, technological, and natural processes of hazards and disasters is far from complete.

If culture is omitted, DRR cannot be fully understood [29]. Thus, a Culture of Prevention manifests itself as a common behaviour learned to respond assertively to situations of danger that could arise. Culture is essential for the survival of societies and can influence DRR in both positive and negative terms. Cultural components such as knowledge, beliefs, values, and norms condition the perception of risks associated with disasters and their impact on the community. In turn, individuals can be influenced by cultural aspects such as beliefs, traditional knowledge, values, or behaviour of the community [30].

Cultural heritage consists of two kinds of manifestations: tangible heritage and intangible heritage. Intangible cultural heritage is just as important as tangible cultural heritage in DRR, insofar as it helps people both in the process of recovery and to ensure that they learn from the past. In this line, Torrence and Grattan [31] contend that studying how a society responds to disasters would be an important step to understanding the broader processes of society's historical and cultural evolution. Weinsefeld [32] (p. 11) points out that disasters are a paradox, destructive and constructive, at once horrible and sublime. In fact, the influence of hazards seems to have stimulated culture in many communities.

While causing physical devastation and psychological trauma, disasters also create space for reflection and renewal.

Clancey [33] (p. 916) points out that natural disasters are culturally and politically quite malleable, resembling holes in a piece of cloth, over which much feverish stitching occurs. When nature kills people suddenly and shockingly, survivors are tasked with the duty of drawing lessons and carrying on. Disasters that cause significant destruction are not only natural phenomena, but also imaginative constructions of reality influenced by the social, political, cultural, religious, and ideological environments in which they occur.

Along the same line, Longworth [34] (p. 120) suggests that the intangible cultural heritage of communities plays a vital role in supporting sustainable development by advancing efforts in DRR and building community resilience because it provides a source of meaning and identity. Furthermore, since intangible cultural heritage fosters a sense of belonging in individuals and communities, it serves as a means of organizing communities and their relationships by promoting values and social cohesion, as well as by cultivating mutual respect, a strong sense of collective purpose and responsibility for maintaining the common good.

In the paragraphs that follow in this section, the review article assesses DRR-related cultural heritage in Japan by examining: (1) beliefs, (2) collective memory, and (3) collective identity, whose influence is illustrated through various examples extracted from the literature review.

3.1. The Japanese Belief System Underpinning Bosai Culture

The cultural heritage of East Asia and, therefore, of Japan tends to be understood in terms of its specific local manifestations. These highlight its differences from the heritage of other regions, such as the so-called "Western" cultures. Many myths related to geological hazards in the Asia-Pacific region contain practical information on how the signs preceding such events might be recognized, which clearly indicates one of the main purposes of the original myths [35].

For people who survived natural disasters in pre-literacy times, it was imperative to inform their descendants about the nature of these traumatic events and what could be done to avoid their worst effects [36] (p. 17). Their commonly recognized expressions in this part of the world are often related to distinctive cultural and social aspects, such as Confucian values, Taoist philosophy, and Buddhist religious practices, as far a religion is concerned, but also languages based on ideograms, and the use of specific local resources and technologies [37] (p. 2).

Lanzaco [38] (p. 2) explains, in line with the words of the philosopher Nishida Kitarō (1870–1945), how the Japanese view of human existence is vertical and places the approach "Heaven–Human beings–Earth" in the same axis, without essential distinction. Whereas Japanese culture follows a "naturalist" model, according to which nature's uncontrollable course makes for submissive human beings (Heaven–Earth–Human beings). Examining cultural responses to catastrophic events throughout Japanese history, we can observe that these reveal the distinction between natural and human-made disasters.

For the Japanese, consciously or unconsciously, there is a communication and a particular meaning for disasters depending on how they are classified. However, if natural phenomena only become "Disasters" through the intercession of human beings, then there is no such thing as natural disasters [32] (p. 11). Nevertheless, some scholars point out a significant influence of Confucianism in shaping Japanese culture throughout its history [39,40]. From the above, we can consider that the roots of the Japanese worldview can be traced back to several traditions cemented in the simultaneous practice of multiple religions through syncretism.

Japanese mythology encompasses Shinto and Buddhist traditions, as well as popular religious practices based on agriculture. Shintoism has long been regarded as a crucial element in Japanese religion that bestows its distinctiveness and individuality. This attitude towards the world implies the sacredness of nature, allowing the possibility of sanctification

to almost any object, including all organic and inorganic things. The Shinto pantheon comprises eight million divinities (*kami*). As an animistic religion, natural phenomena and things are worshipped as 'kami' [41], covering qualities such as growth, fertility, and production; phenomena such as wind and thunder; natural elements such as the sun, rivers, trees, and rocks; and ancestral spirits. Seasonal festivals and rituals, as well as local celebrations and traditions are key to understanding the lives and achievements of past generations and help establish a DRM system.

Shinto rites and ceremonies commemorate life, and everyday life is considered "service to the kami" or *matsuri*. Referring to the sources of disasters, for example, active volcanoes are seen as transcendental beings that possess amazing power, so it is not surprising that many volcanoes are revered as objects of worship. For example, Japan's most renowned mountain, Mount Fuji, is a volcano that is considered sacred. Therefore, it is surrounded by sanctuaries dedicated to its worship, and it even has its own religious followers. Likewise, Japan's most active volcano, Mount Aso in Kumamoto Prefecture, is also revered. Other examples of this kind include the Asama Mountains in Nagano Prefecture and Mount Mihara in the isle of Izu Oshima, Tokyo Prefecture [42] (p. 4).

Throughout the Asia-Pacific region, cultural beliefs attribute earthquakes to the actions of a living being or an animal [36] (p. 9). An example of these beliefs applied to the mythology of disasters in Japan is that of the *namazu*, a giant catfish that inhabits the ocean's depths and produces earthquakes every time it moves, according to tradition. Japanese mythology blames this fish for the earthquakes that have devastated the island throughout its history, amongst which the earthquake that in 1855 devastated Edo (present-day Tokyo), which was represented in ukiyo-e known as "*namazu-e*" (see Figure 1).



Figure 1. Namazu to Kaname-ishi (Namazu and the Foundation Stone) (1855), artist unknown; an example of the genre "*namazu-e*". Source: Tokyo Metropolitan Library.

The demigod Kashima is the guardian of this creature, whose head he usually immobilizes by holding a stone (or sword). However, when Kashima gets distracted or is temporarily absent, the fish manages to release and shake its head, causing an earthquake [36,43]. After the Ansei Edo earthquake of 1855, Japanese printmakers produced hundreds of *namazu-e* prints. These prints provided people in Edo with a pretext to comment on politics and society under the cover of discussing the recent earthquake [44].

An example of the assimilation of these beliefs into everyday life is the letter written by Toyotomi Hideyoshi (Toyotomi Hideyoshi (1537–1598) was a feudal lord and chief imperial minister (1585–98), who completed the 16th-century unification of Japan begun by Oda Nobunaga [45]), a famous samurai general of the period of the States at War, ordering his servants to build their castle, taking into consideration the movements of the "catfish". This is one of the oldest pieces of evidence about the Japanese belief that the *namazu* caused earthquakes [46], as well as of the integration of the Culture of Prevention in all areas of human life, including architecture. In other words, the Japanese belief system has influenced architecture to the extent that its distinctive features have passed from generation to generation. According to Ulak [47], understanding the natural world as a source of spiritual insight and an instructive mirror of human emotion is a persistent feature of Japanese architecture.

In line with this, traditional Japanese houses are built by skilled carpenters using methods based on techniques and knowledge accrued over the course of centuries. As a result, traditional Japanese houses are highly earthquake resistant [48]. In addition, the use of dry wood carpentry (traditional Japanese carpentry is said to be over 1000 years old. It does not use nails, screws, or glue to join pieces together, instead pieces are joined using endings with interlocking shapes that fit into each other. Traditionally, there are four kinds of master carpenters, each specializing in one practice: (1) *miya daiku*; (2) *sukiya daiku*; (3) *tateguya*; (4) *sashimono-shi* [49,50]) allowed for recovery and reconstruction. Meier [51] (p. 38) argues that the use of such methods in traditional Japanese houses and furniture allow for the application of the concept of "local disaster cultures". One example at hand is the five-storied pagoda built in 607 by Prince Shōtoku at the *Hōryūji* Temple (Temple of the Flourishing Law), in Nara, during the Asuka period (see Figure 2). The pagoda has unique earthquake-proof architectural features even by today's standards, making it one of the oldest wooden constructions in the world [52]. The Buddhist monuments in the Hōryūji area have been registered in the UNESCO List of World Heritage since 1993.

On the other hand, the special relationship of the Japanese with nature is reflected in their long tradition of using ecosystem-based solutions for DRR, i.e., taking advantage of ecosystems and biodiversity in various ways to mitigate the effects of disasters: taking care of forests to prevent soil erosion, planting pine trees along the coast to alleviate winds and sand, planting bamboo along riverbanks to reduce flooding, or using rice fields as temporary water reservoirs, among others. In the 16th century, the Shingen Takeda clan chief built a dam known as "Shingen Tsutsumi" to prevent flooding, where the Midai and Kamanashi rivers converge in Yamanashi Prefecture. In 1610, Shigeyasu Narutomi launched an integrated irrigation and flood control project along the Chikugo River of Bizen Domain, in Saga Prefecture [8] (p. 5). Another example of ancient Japanese infrastructures is circular dikes, a type of dam set in floodplain areas surrounded by agricultural land to protect lives and households from floods [16].



Figure 2. Kondo (main hall) and five-storied pagoda at Hōryū-ji (Nara). Artist unknown. Source: Creative Commons.

3.2. Preserving the Collective Memory of Disasters

Strengthening the memory of disasters as part of the cultural heritage, and transmitting it from one generation to the next, can be a powerful strategy for disaster mitigation [46]. In this regard, Japan has a cultural memory steeped in natural disasters [40]. Kuriansky [53] examined what makes the Japanese such resilient and robust people. The Great Nobi earthquake of 1891, the Great Kantō earthquake of 1923 that devastated Tokyo, the Great Hanshin-Awaji earthquake of 1995 that had a considerable impact on Kobe, and many other pre-modern earthquakes have shaped the country's history. Collective memory plays an important part in determining how quickly a society can recover and, in line with this, the Japanese have a spiritual strength that stems from a history marked by misfortune and subsequent resurgence [54].

Based on these influences, the Japanese have developed a unique approach to preserving the collective memory of disasters in the country: public monuments dedicated to disasters influence society by transmitting experiences and their repercussions. Memories of past disasters are found in monuments erected over the centuries in coastal areas: the so-called *tsunamihi* (tsunami stones) [43] are large stone tablets, or elongated rocks from one to three meters high, inserted vertically in the ground, displaying inscriptions commemorating the disasters caused by tsunamis and, thus, recalling the warning messages of their ancestors inscribed on the stones [55] (see Figure 3). These traditional stone monuments represent a part of Japan's disaster heritage, in which some Tōhoku residents sought guidance on where to find safe ground when the Great East Japan Earthquake and Tsunami struck the region on 11 March 2011 [43].



Figure 3. Tsunamihi, (tsunami stone marker), warning about the dangers of past earthquakes and tsunamis. Artist unknown. Source: Creative Commons.

Still today, in consonance with those traditions, the Great East Japan Earthquake and Tsunami memorial stones constitute one of the most common means of remembering the disaster and honouring its victims. One of the first memorial stones was erected in 2012 in Ishinomaki City at the Okawa Primary School, where the central element is a black granite rectangular column in which an engraving reads: "the unnatural death of the Great East Japan Earthquake" [55] (p. 2). Another way of preserving collective memories is through museums and other memorials, whose mission is to transmit the experiences lived in disasters and warn future generations. Thus, along Iwate's entire coastline, various memorials have been created around ruined buildings. Field trips to these local museums are common in the Japanese educational curriculum, in the same way that disaster risk prevention and management centres are visited.

3.3. Institutionalizing DRM by Reinforcing Collective Identity

Japan boasts high rates of civil society participation. Although the concept of "civil society" has a range of contemporary meanings, it has generally been used to describe a space that consists of an organized and sustained social activity that is non-state, non-market, and distinct from the family or the individual [56,57].

Japan's social organization is characterized by strong feelings of group belonging, and social cooperation. The government monopolizes the public sphere, while people are allowed to pursue personal well-being and individual happiness as long as they stay within the legal and political frameworks controlled by the government [58]. On the other hand, the central role that groups play sometimes leads to extreme mobilization, such as the excessive nationalism, which can be considered as one of the causes of World War II, or phenomena such as work addiction [40].

The Japanese government has consciously promoted this sense of community in DRR, which on the one hand is reflected in the important role played by traditional organizations such as the neighbourhood associations, while on the other hand, it has led to the creation of voluntary associations, such as the *Suibo-dan* for flood risk control dating from the 17th century, the *Syobo-dan* for firefighting dating from the 18th century, and the *Jisyubo* for earthquake disasters dating from the 1970s.

In addition, several non-governmental organizations (NGOs) and non-profit organizations (NPO) participate in DRM activities at the community level. Many of them collaborate with neighbourhood associations and local governments and sometimes with local academic institutions [59]. The large numbers of voluntary organizations and people involved in voluntary disaster response attest to the country's high level of DRR awareness. The participation of civil society in volunteer actions in DRR and public administrations can be observed in the *machibikeshi* (volunteer firefighters) *and* the *suibo-dan* (flood control teams). These organizations are described in the lines that follow.

3.3.1. Neighbourhood Associations

An example of civil society participation is be found in the neighbourhood associations (*chōnaikai* or *jichikai,* in Japanese), that function as a centralized organization established within local communities. In addition to acting as a hub of connections with the neighbourhood, they fulfil a valuable function when disasters such as earthquakes and typhoons occur [60].

The history of the *chōnaikai* dates to the 16th century, when autonomous communities saw the light during the Sengoku Period, and although nowadays they do not hold any legal position, they still play an essential role in Japanese society. Participation in *chōnaikai* is almost mandatory in many small communities and apartment buildings in towns [61]. This acceptance of an established order is similar to an ancestral instinct thanks to which each individual feels that he or she is part of the community and occupies his or her rightful place within, becoming the sustaining force of Japanese social architecture. Furthermore, the neighbourhood association system was reinforced during the Tokugawa period as a means of maintaining law and order. The feudal neighbourhood association or *gonin gumi,* primarily used as a policing tool, was developed as a stand-alone tool body of neighbourhood families to manage community problems [62].

3.3.2. Volunteer Firefighters and Flood Control Teams

Japan's volunteer fire departments trace their history back to the Edo period, when significant fire risks emerged as increasing amounts of citizens gathered in cities. In 1648, the Osaka magistrate passed a law that was the basis for the first volunteer fire departments in the city. In 1719, neighbourhood firefighters (*machibikeshi*), the predecessors of today's volunteer fire departments, were established in Edo [63]. Volunteer firefighters participate in community-based disaster management activities, such as extinguishing fires, issuing warnings, assisting with evacuations, conducting search and rescue operations, and managing operational facilities, amongst others.

In Japan, there are over 832,000 active volunteer firefighters, which is nearly six times the number of professional firefighters. The body's principal responsibility lies with the local government, but the federal government subsidizes its infrastructure. The Fire Defence Organization defines the functions of the corps, as well as the organization's structures, members' status as part-time government employees, remuneration and allowances. Some educational tasks, such as performing crisis exercises with specialists and teaching citizens about firefighting, have been added to the current volunteer firefighters' responsibilities [64].

On the other hand, volunteer flood control teams, known as *suibo-dan*, play an important role in Japan's flood control system. The Flood Control Law establishes their responsibility in relation to floods, as well as the kind of activities that they can carry out. *Suibo-dan* teams are usually established within municipalities that are close to rivers. During floods, they are tasked with patrolling, monitoring, and protecting levees in coordination with river managers and other related organizations, whereas during non-flood periods, they conduct patrols and levee inspections, as well as drills and other preparation activities [65].

3.3.3. Voluntary Community-Based Disaster Prevention Organizations

In the neighbourhoods of most cities and towns, there are voluntary disaster prevention organizations for disaster preparedness and rescue activities called *Jishu-bosai-soshiki*, or *Jishubo* for short, with a literal meaning of "autonomous organization for disaster reduction". These neighbourhood associations are generally led by retired firefighters and community leaders, who work conjointly with municipalities. Although the constitution of *Jishubo* is not legally required, local governments exert great persuasion on people in their communities to organize and participate in disaster management activities. Therefore, participants in *Jishubo* activities tend to be subtly guided and mobilized by local governments rather than truly motivated by the goal of reducing disaster risks in their neighbourhoods. Many of these associations have merged with volunteer firefighters and flood control groups.

Currently, *Jishubo* are the most important community-level DRR voluntary organizations in Japan [15,66,67]. At present, 43.89 million people in Japan participate in voluntary Disaster Prevention Organizations [68]. Community-based DRM activities are integrated into the daily life of most Japanese, whose motivations come from a sense of satisfaction that they are fulfilling an obligation to their communities, without seeking any material gain. Nevertheless, citizens recognize volunteer service by paying gratitude to volunteers in both public and private settings, such as public ceremonies and festivals, and the government publicizes the relevance of volunteering through laws and government-sponsored public demonstrations [63]. However, the level of risk awareness or preventive culture in the population varies depending on location and time. Thus, it is lower in areas that are not prone to disasters and in the regions that have experienced periods of calm, despite being areas of risk. Moreover, this culture of prevention decreases when citizens leave the educational system [69].

4. Japan's Current Disaster Management System

DRM refers to a social process whose final objective is the forecast, reduction, and permanent control of the risk factors in society produced by natural and human-made disasters; a process integrated into the achievement of the guidelines for sustainable human, economic, environmental, and territorial development [24].

According to the Japanese government, the current disaster management system is based on three fundamental elements: (1) preparedness, which consists of planning, investing, and educating in risk reduction; (2) early warning and response, which aims at minimizing the dangers of an eventual disaster through emergency alert, evacuation support, and rescue activities; and, (3) recovery and reconstruction, whose goal is helping communities return to normal by assisting in rehabilitation and recovery plans, and supporting livelihoods [70]. These three elements are represented in Figure 4.

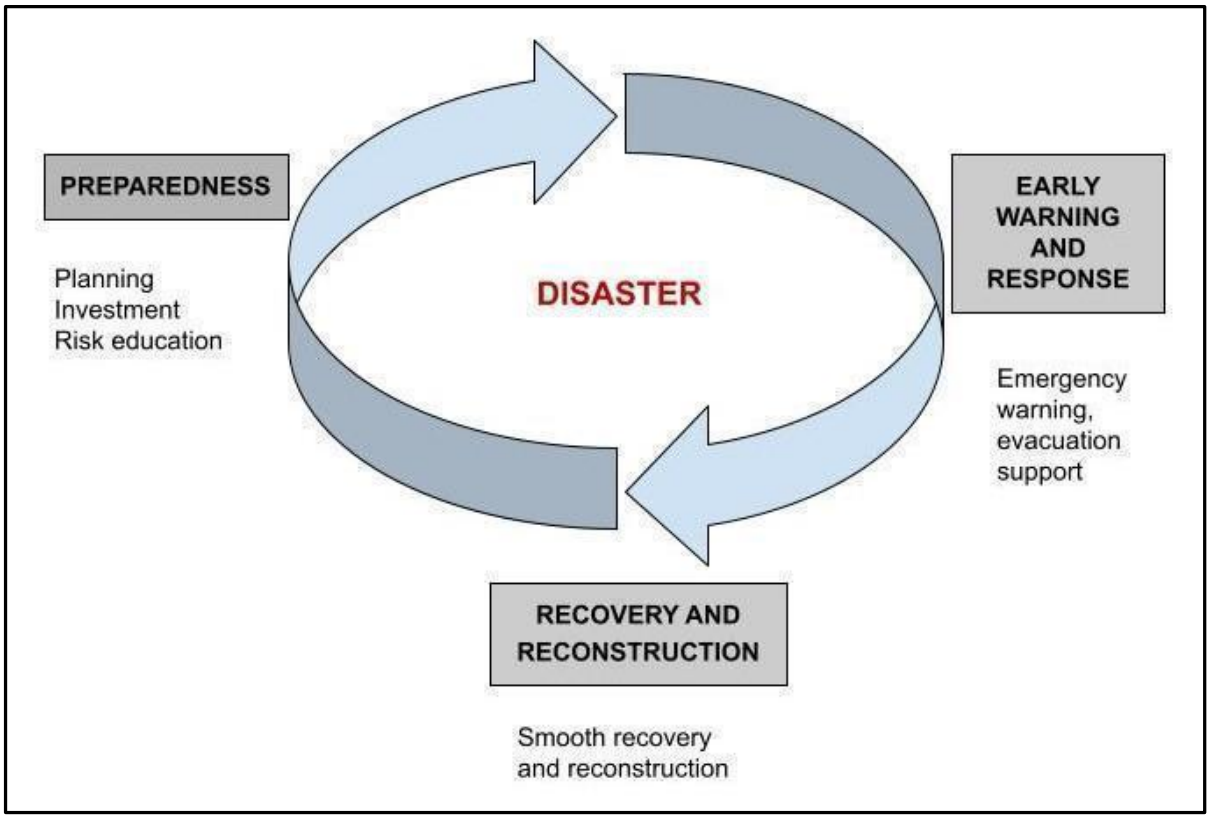


Figure 4. Disaster Management System of Japan. Source: Elaborated by the authors based on Cabinet Office Disaster Management.

4.1. The Legal Framework of the Current Disaster Management Model

Japan's disaster management system has seen remarkable progress in recent decades. Since the late 1940s, Japan has established a legal framework for the disaster management system incorporating laws that cover all phases of disaster management. Since then, the respective governments have incorporated and reformed regulations to reduce disaster risk with specific laws.

Furthermore, after the Great East Japan Earthquake and Tsunami of 11 March 2011, the Japanese government allocated budget, amended laws and orders, and established the "Reconstruction Agency" under the Cabinet Office in February 2012 [22,71,72]. Currently, this legal framework includes seven basic laws, eighteen disaster preparedness and prevention laws, three disaster emergency response laws, and twenty-three disaster recovery and financial measures laws [73]. However, some critics have argued that Japan's policymaking process does not match the demands of managing a crisis, in which rapid, decisive, and more centralized coordination is necessary [74].

After World War II, the government defined a national strategy for DRR. The turning point in the Japanese administration policy has much to do with the 1959 Ise-wan typhoon, which caused extensive damage and sparked a social movement. The pressure on the government resulted in an increase in the investment of resources for the mitigation and prevention of natural disasters, as well as in the approval in 1961 of the Disaster Countermeasures Basic Act (Act no. 223 of 15 November 1961, revised June 1997) [75], which constitutes the current basic legal framework in Japan.

The Disaster Countermeasures Basic Act and related legislation complement one another in response to various specific needs. In the event of a disaster, specific laws apply first depending on the nature of the disaster, whereas the Disaster Countermeasures Basic Act is only invoked when there are no provisions in the other legislation.

4.2. The Role of Education in DRR

In the realm of formal education in DRR, in 2006, the Ministry of Education (MEXT) defined a strategy to promote national commitment to DRR with its reform of the Basic Act on Education (Act No. 120 of 22 December 2006) [76], which was completed with the School Health and Safety Act (Act No. 56 of 1958; Revised by Law No. 46 of 2015) [77]. According to these laws, educational institutions at all levels should develop DRR education according to the specificities of their communities and risks.

Japan's educational model includes DRR education in a transversal way and through an integrated period that allows teachers to carry out activities in association with other stakeholders linked to DRR. Another characteristic that defines DRR education is its flexibility, which allows training activities to be adapted for schoolchildren according to local characteristics [78]. Moreover, several universities participate in research, and define guidelines for teachers so that they can acquire the skills to be part of this DRM system.

Finally, non-formal education is as important as DRR education in schools, in which civil society organizations play a fundamental part, offering DRR training to local communities in collaboration with governmental institutions that support and promote citizen participation. Through these non-formal education initiatives, local communities can acquire proper training in DRR.

4.3. Japan's International Leadership in DRR

For years, Japan has participated actively in the institutionalization of DRR in the international arena. Its international leadership in disaster prevention was demonstrated against the backdrop of the declaration of the International Decade for Natural Disaster Reduction 1990–1999. Furthermore, Japan reinforced its role by hosting the three UN World Conferences on DRR celebrated to date: Yokohama in 1994, Hyogo in 2005, and Sendai in 2015 [79]. Through these conferences, the country has assumed a fundamental role in DRR through the United Nations, exporting its DRR expertise and its Culture of Prevention (the three conferences brought together governments and other organizations from around the world and produced three seminal documents [80–82], which are frameworks of international reference in DRR).

The Japanese government is proactively promoting DRR cooperation through the UN and other international organizations, as well as through bilateral cooperation for the implementation of the Sendai Framework for DRR 2015-2030 [83]. Moreover, Japan's leading role in DRR is also present in its ODA policy which is operationalized through JICA. As part of it, the country offers assistance to developing countries through on-the-field training by experts, technology transfers, and project financing [67]. Thus, to promote the Sendai Framework, the Ministry of Foreign Affairs and the Cabinet Office contributed approximately 5.2 million dollars (approximately 572 million yen) in the fiscal year 2019 to support the activities of the UN Office for Disaster Risk Reduction (UNDRR) [84], whereas in 2020, 61 cooperation projects promoted by various ministries together with JICA were being implemented [85].

5. Discussion

Japan can be considered a role model in the field of DRR, not only in terms of technical measures and technological innovation, but also in terms of human and social capital, due to the extent of involvement of Japanese society and its active participation in all the phases of disaster management: prevention, response, mitigation, and recovery. This article contends that *bosai culture* is a unique Japanese Culture of Prevention that has evolved throughout the country's history by incorporating, as part of its cultural heritage, the lessons learnt from the disasters experienced. In other words, *bosai culture* can be considered a Japanese DRM system to deal with risks and natural hazards, which has been built over the centuries for almost 2000 years [14].

The fact that Japan is exposed to major cyclical natural disasters, has led the Japanese to build a self-reliant mechanism to prevent, protect and overcome catastrophes, in which

voluntary associations play a crucial role. On the other hand, the State has actively participated in creating a DRR system through the implementation of laws that regulate the role of the community in DRR. Furthermore, Japan plays a leading role in the international arena, contributing its experiences and knowledge to the promotion of DRR both through JICA and the UN, as can be inferred from its ODA policy and its initiative in hosting the three UN World Conferences on DRR.

This review article has shown that Japanese society has developed an appropriate strategy to reduce the consequences of disasters throughout history aligned to its geographical environment and socio-political context. In our opinion, one of the inspiring principles of *bosai culture* is the horizontal cooperation (*suihei kyōryoku*) between different public and private institutions in Japan to strengthen disaster response capacity, since by themselves, neither individuals nor the government cannot efficiently manage a disaster, and they need each other's support. Moreover, a coordinated effort from the whole of society is essential, in line with the Sendai Framework's "all-of-society approach".

Japan's social harmony and community well-being is based on a process of informal negotiations and social sanction. This community model allows it to adopt a strategy of resilience to face the frequent disasters that occur in the country. However, according to some researchers, there is a strong notion of competitiveness among different groups. Therefore, even though group members think strongly about their group, they do not necessarily do the same with the community [40]. This competitiveness can be observed in Japanese education, with competition intensified by the entrance examination to the best schools or first-class universities, which causes psychological stress in children and parents. Some students even refuse to attend school (*Futōkō*) due to "dislike of school", school violence, or bullying (Ijime) among the students [86].

Although the Japanese belief system can be considered syncretistic, Shinto tradition favours the search for solutions to overcome crises caused by disasters by focusing on the environment. In contrast to most monotheistic religions where nature is at the service of humanity, in Shintoism the converging relationship between human beings and nature facilitates *bosai culture*. However, Japan has also gone through dark periods. Thus, this particular relationship with nature was broken at the beginning of the Meiji era, when the government prioritized economic and technological growth over communities and nature, losing reverence for nature and traditional wisdom, causing environmental and health crises such as the so called "four big pollution diseases" (*yondai kōgaibyō*): Minamata disease, Yokkaichi asthma, Itai-itai disease, and Niigata Minamata disease [87].

Finally, we consider that the social structure of Japanese society based on the importance of the group over the individual runs parallel to the mentality of "self-sacrifice for the country", which stimulates the creation of an effective DRM system. Citizen participation for the sake of the common good has prompted the development of a powerful volunteer structure in DRR.

6. Conclusions

This review article has enquired about the underlying factors that have conformed the present DRM system of Japan. A community's resilience is determined by both its adaptive capacity (ability to learn from past experiences, to prepare better and reduce the impacts of future events) and its coping capacity (ability to absorb the effects of an extreme event). The article argues that the so-called "*bosai culture*" is a Culture of Prevention and DRR rooted on traditional beliefs and experience with disasters which have become part of Japan's material and immaterial cultural heritage which has passed from generation to generation. Through examples, the article shows how these beliefs have been incorporated into architecture and infrastructures. Moreover, the article has revised the current legal framework for DRR, as well as the key role that education and civil society participation play in DRR. It is the combination of these elements what has positioned Japan as an international referent in DRR.

Carrying out a critical analysis of selected literature, this review article contends that *bosai culture* can be considered an autochthonous Japanese DRM system that encompasses cultural and religious beliefs, laws, technical requirements, and a strong civic culture that allows the country to face and learn from disasters. Therefore, the resulting Culture of Prevention is intrinsically related to the resilience of the Japanese people. Although more studies that support and complement this argument are necessary, the authors argue that *bosai culture* has been influenced by sociocultural factors derived from the perception of risk developed over the years, which has allowed the people of Japan to adapt positively to adverse situations.

Nevertheless, *bosai culture* is neither monolithic nor equally distributed around the territory of Japan and its people. Different subcultures could be pointed out, each focusing on the kind of natural disaster they most frequently face. Thus, coastal communities prepare for tsunamis, whereas those more exposed to torrential rains will work on that direction. Disaster awareness is higher among school-age children and young people, and their families, because the educational system promotes Disaster Education. In contrast, working people and those who are not involved in community activities might be less active in DRR-related initiatives.

Although Japan is an international referent in DRR and the Japanese Culture of Prevention can be a role model for other countries and regions worldwide, doubts arise on whether *bosai culture* can be entirely implemented in other contexts, as it might prove difficult to adapt some of its elements. For example, in the case of Western countries where individualism prevails over the sense of community, it might be challenging organizing strong institutionalized volunteer structures with governmental support. Nevertheless, *bosai culture* can serve as a model to develop safer societies by improving and/or developing a culture of prevention that contributes to build more resilient communities, especially in the face of climate change.

All research has its limitations, especially in the case of qualitative research. Due to the wealth and diversity of the study sources available, this article has opted for a critical literature review instead of a systematic one. This method allows for a subjective interpretation of reality, but various topics presented here can be further explored. Future lines of research include, among other, the dissemination and adoption of *bosai culture* in countries and communities all around the world, the limits to government intervention in non-profit and non-governmental organizations (NPOs and NGOs) in Japan, the challenges of community values in a society that is less group-oriented than in the past, or the current cultural manifestations in which DRR is present.

Author Contributions: J.P.-H., M.-F.C.-C. and E.G.-S. were involved in conceptualization, research, formal analysis, and writing. J.P.-H., M.-F.C.-C. and E.G.-S. have contributed to the development of this paper. The review and editing were performed by J.P.-H. and M.-F.C.-C. All authors have read and agreed to the published version of the manuscript.

Funding: This research received funding from the Universidad Nacional de Educación a Distancia (UNED), Spain, under UNED 2021 Research Projects grant program of the Vice-Rectorate for Research, Knowledge Transfer and Scientific Dissemination, which was used to cover the APC. Project title: *Study of national education strategies in Disaster Risk Reduction with Japan as an international referent: Education system, civil society organizations and school architecture (ESEJERD)*.

Institutional Review Board Statement: Not applicable.

Informed Consent Statement: Not applicable.

Acknowledgments: The authors sincerely the valuable support of the UNED and its Vice-Rectorate for Research, Knowledge Transfer and Scientific Dissemination.

Conflicts of Interest: The authors declare no conflict of interest. The funders had no role in the design of the study; in the collection, analyses, or interpretation of data; in the writing of the manuscript; or in the decision to publish the results.

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