

Community-based fire management and beyond: Role and problems of volunteer fire department *shōbōdan* in Japanese urban spaces and peri-urban forest environments[☆]

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ABSTRACT

In recent years, international organizations have actively promoted community-based fire management to respect and utilize the wisdom of indigenous knowledge for effective fire management. This approach involves active participation of local actors in managing fires on both private and public lands. Japan, known as a country of multiple natural disasters, has consistently adopted this strategy to manage fire and other hazards primarily caused by natural disasters. This study aims to present the brief history and evolution of the role of volunteer fire departments *Shōbōdan* since the 17th century, and explore their expanded functions and the challenges they face in contemporary Japanese society. Through a comprehensive literature review using Japanese databases to collect mainly Japanese references published between 2000 and 2024 about *Shōbōdan*, and ethnographical fieldwork, findings highlights the central role of volunteer fire departments, and their extended burdens not only in managing fire events but also in addressing various types of disaster-related damages. Additionally, the study reveals the serious problems the volunteer fire departments have been facing, primarily due to the aging population, and seeks the possible solutions and changes for the future to sustain their activities.

1. Introduction

Firefighting and the responding to various types of catastrophes have been prevalent throughout human history. Each region has developed its own methods to prevent, combat, and survive these catastrophic events based on its traditions and geographical conditions. In recent years, international organizations such as the Global Fire Monitoring Center (GFMC) and the Food and Agriculture Organization (FAO) have been promoting fire management through community cooperation (RECOFTC, 2023; GFMC, 2017; FAO 2006; 2011). This approach reflects the wisdom of specific communities in fire management that has been passed down from generation to generation. Japan is not an exception. This country with a large number of population and challenging geographical conditions has long been relying on community-based management of catastrophes, not only fires but also other disasters such as floods, landslides, heavy rains, earthquakes and tsunami (Kawajiri et al., 2024; Katsnelson, 2023; Mouri et al., 2011; Terada, 1972). As far as wildfires and urban fires are concerned, there were 36, 314 fire cases in total while wildfires were 1,239 cases in 2022 (Fire and

Disaster Management Agency, 2023, pp.3, 14) .

To fight with these situations, there are many examples in the literature where Japanese forces try to afford them. For instance, Matsushita et al. (2021) mentions the success of community-based fire management in Itoigawa City in Niigata Prefecture in 2016, and Yamada et al. (2020) informs about the remarkable community-based management in floods, landslides and wind damages as well as the loss of volunteer firefighters in the disasters occurred from 1969 to 2018. Moreover, various researchers highlight the essential role of volunteer firefighters during the two large earthquakes in 1995 and 2011 (Hamaguchi, 2020; Nagata, 2017, 2013; Ouchi, 2016). However, recent social problem of aging population and change in life style oblige Japan to find another way to manage fires and disasters (Nagata, 2013; Kobayashi et al. 2018).

Fire serves as both valuable tools for human life and potential danger that can even result in fatalities of human being and vegetation dynamics if not handled appropriately (Price, 2023; Hantson et al., 2022; Fox, 2023). The conventional method of managing fires involves relying on professionals, specifically official firefighters. However, this

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approach makes it challenging to raise awareness among fire users about the importance of learning the proper usage (Ganz & Moore, 2002). Therefore, involving the population in all aspects of fire management is crucial, which justifies the potential of community-based or indigenous-lead fire management (Schultz & Moseley, 2019; Roos, et al., 2022; Coleman, 2022). This participatory approach implies that activities related to fires extend beyond simple fire suppression, but to include the whole “ecological and socio-economic sustainability” (Lineal & Laituri, 2013, p.64). Therefore, community-based fire management can be defined as a fire management approach based on the active participation of local communities in a voluntary manner, but always avoiding excessive labor burdens (GFMC, 2017).

The three foundational principles of community-based fire management include: 1) recognizing the significance of traditional or indigenous knowledge in fire management; 2) involving local stakeholders, including non-governmental organizations; and 3) engaging community volunteers in fire management on behalf of the entire community, spanning not only communal and public lands but also private properties (FAO, 2011, p.4). There are documents on the cases in Africa, Southeast Asia, and other regions (Ganz et al., 2003). Still, manifestations of community-based traditional fire management are observable in most countries, reflecting their social-ecological system (Huffman, 2013). Thus, community-based fire management is already an integral part of fire management as a whole.

Considering such a background, the main objective of this research was to present the historical review of fire management in Japan by voluntary firefighting organizations known as *shōbōdan*, to understand their origins and reasons for development, and to analyze their role in Japanese urban spaces and peri-urban forest areas. More specifically, we aimed to (1) review the roots and evolution of the *shōbōdan*, (2) explore their crucial role in contemporary Japanese society, addressing not only the issue of fires but also their intervention in the management of natural disasters mostly caused by earthquakes, (3) reveal the challenges currently faced by voluntary firefighting organizations, largely due to the rapid aging of the Japanese population, and (4) by comparing with situations in other countries, discuss potential solutions so that Japan is able to live with its severe nature. To achieve these goals, we conducted a review using references from two Japanese databases (CiNii Research and J-Stage) in Japanese published between 2000 and 2024. Moreover, we carried out a two-year ethnographic fieldwork study in a small city in Aichi Prefecture.

2. Japanese geographical and social context

Japan, situated at the far eastern edge of Asia, is known for its natural disasters (Green et al., 2021; Terada, 1973) due to its unique geographical conditions. Key geographical factors include the formation of the Japanese archipelago over four tectonic plates, exposing the region to high seismic and volcanic activities (Garrett et al., 2016; Satake, 2015). Furthermore, the country features mountainous terrain (Shinohara & Watanabe, 2023), resulting in short and swift-flowing rivers (Itsukushima et al., 2021; Takezawa et al., 2007). It is located in the Asian monsoon region, thus, Japan frequently experiences heavy rainfall during the rainy seasons and typhoons (Shakti et al., 2023; Shinohara & Watanabe, 2023). Given its high population density and limited habitable land, urban and agricultural areas are often located in close proximity to rivers, coasts, and volcanoes (Ministry of Environment, 2011). Additionally, there has been a notable increase in the frequency of disasters in recent years (Yamada et al., 2020). When it comes to fire, annually, there are approximately 35,000 fire events, with minimal variation observed over recent years (Fig. 1). Wildfires constitute roughly 3.5% of the total fires. Japan experiences relatively fewer wildfires compared to certain other countries, largely attributed to the significant portion of privately owned forests, particularly by private companies, which account for approximately 57% of forested land (the rest are 31% state-owned and 12% publicly owned) (Ministry of

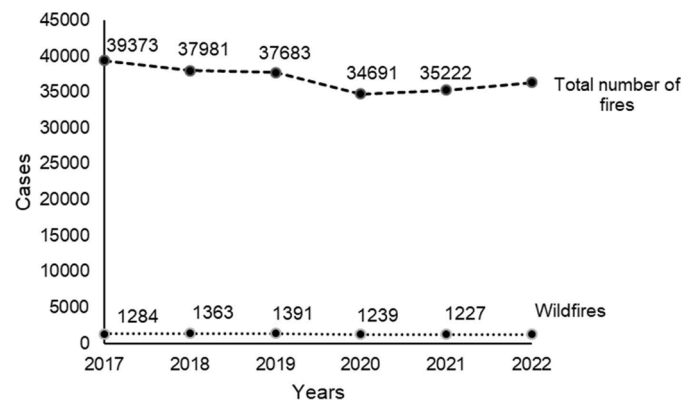


Fig. 1. Tendency of total cases of general fires and wildfires

Agriculture, Forestry and Fisheries (Rinya chō, 2021, p.55). This ownership structure facilitates more effective fire management (Yamanaka, 2023), in addition to the region’s abundant rainfall and humid climate conditions that help to minimize wildfires (Touge et al., 2024).

Note. Composed by author, based on Fire and disaster Management Agency (2023, p. 3) and Ministry of Agriculture, Forestry and Fisheries (2023).

While disasters can stem from both natural and human-made causes, they are normally produced as a result of combination of both factors. There is a discernible trend toward an increase in the magnitude of disasters due to technological advancements and urbanization (Ouchi, 2016). This is precisely what the current Japanese society is experiencing; facing the continuous threats of disasters because of its environmental conditions and the ongoing urban expansion of cities and towns (Kondo & Lizarralde, 2021; Puppim de Oliveira & Fra Paleo, 2016; Inoue, 2007).

Such conditions make the Japanese people constantly aware of the inherent dangers of nature, fostering a culture of *jijyo* (self-help), *kyōjyo* (mutual help), and *kōjo* (public support) (Fire and Disaster Management Agency, n.d.a). Self-help involves the preparation and training of each individual to survive in the event of a catastrophe on his/her own. This includes family members (for instance, parents safeguarding their children or older children caring for elderly relatives). Mutual help refers to cooperative acts among community members to protect and rescue their neighborhood. Lastly, public support comprises services provided by professionals from public entities, such as firefighters, police, and self-defense forces, which may come from local, regional, or central authorities (Fire and Disaster Management Agency, n.d.a).

Due to the limitations of public assistance that were exposed and criticized after the Great East Japan Earthquake in 2011, Japan’s disaster management policy has shifted to place greater emphasis on and involvement in community-based disaster management (Ouchi, 2016), led by voluntary firefighting organizations known as *shōbōdan*.

The Japanese community-based approach to addressing fire and disasters aligns with the strategy of community-based fire management. While the FAO (2011) argues that such an approach is essential and logical for rural communities, especially in developing countries where they are distant from national firefighting agencies and must face fires by themselves, in Japan’s case, community-based disaster management is crucial due to the magnitude of damage caused by disasters. This requires mobilizing all citizens to survive without depending on external supports. In other words, in the event of disasters, public assistance may not be able to provide expected support sufficiently and efficiently. Therefore, community-based disaster management must assume the roles of firefighters, police, and self-defense forces until they arrive to initiate their operations. For these reasons, it is essential for Japan to maintain a good function of volunteer firefighting departments.

2. Methodology

Despite their crucial role in managing fires and disasters, the history and activities of volunteer firefighting departments are not sufficiently explored, both within and outside of Japan. Therefore, this study aimed to investigate the aspects surrounding voluntary firefighting organizations, from their origins and development to their current situation, as well as the challenges they face and their outlook. Two different methodologies were employed to examine the Japanese volunteer firefighting departments from general perspective and anthropological viewpoint.

First, a comprehensive and extensive literature review of sources predominantly in Japanese was carried out, focusing on the historical sequences of volunteer fire departments. Using two Japanese scholarly publication databases, CiNii Research (<https://cir.nii.ac.jp/>) run by the National Institute of Informatics and J-Stage (<https://www.jstage.jst.go.jp/>) by the Japanese Science and Technology Agency, we reviewed accessible resources published between 2000 and 2024 in Japanese, concerning the origin and evolution of volunteer fire departments in Japan. Employing the term “*Shōbōdan*” in abstract search enabled us to pinpoint specific publications relevant to our research focus, recognizing the limited variation in Japanese terminology for volunteer fire departments compared to the variety found in English such as fire brigade, fire company and fire department. After excluding non-academic writing from conventional magazines and non-accessible articles, we identified 19 scholarly papers in CiNii Research and 21 in J-Stage. In addition, data sources included studies from the Institute of Scientific Approaches for Fire & Disaster (<https://www.bousaihaku.com/>), reports and data from the Fire and Disaster Management Agency of the Ministry of Internal Affairs and Communications of Japan and information and reports from local authorities were added to complement the data. This comprehensive analysis served to identify the existing problems to maintain the activities of volunteer fire departments in the contemporary Japan, which served as the foundation to implement an analysis on a case study.

Secondly, a two-year fieldwork was conducted in a small city in central Japan, especially, in Gamagōri City between April 2015 and April 2017. The methodology used was the ethnography (Angrosino, 2012), concretely the participant observation (DeWalt & DeWalt, 2011). This methodology consists of researcher’s participation in the daily activities and interactions with the target community, in order to collect qualitative information and data (DeWalt & DeWalt, 2011) from samples to whom quantitative survey can hardly access (Isono, 2016). Although there are often question regarding the objectivity and accuracy of qualitative methodology, participant observation allowed us in a flexible and spontaneous matter (Isono, 2016) to observe and approach the real situation of a volunteer fire department and voices of its members in a typical rural small city with several concerns identified by the comprehensive literature analysis. We observed several volunteer fire department drills, participated in events where members of volunteer fire department members attempted to recruit new members, and conducted interviews with volunteer fire department members, their families and no-members residing in the area to gain insights into the surrounding circumstances. Additionally, we gathered information distributed by the local authorities and neighborhood associations concerning fire and disaster evacuation drills, which would otherwise have been inaccessible.

3. Results and discussion

3.1. History of volunteer fire departments in Japan

The history of voluntary fire departments in Japan dates back to the 16th century, during the Edo period (1603-1868) (Hamaguchi, 2020; Maruyama, 2004; Institute of Scientific Approaches for Fire & Disaster, n.d.). Edo, at that time the capital and present-day Tokyo, had a dry

winter climate with strong winds known as *karakkaze* (dry wind) of the Kantō region, where Edo was located. The use of fire as a source of heat was common among Edo residents. Additionally, due to its status as the capital, the city suffered (and continues to undergo) from overpopulation issues. Consequently, fires were frequent in Edo. To manage these fires, the *Bakufu* (Edo government) first ordered the *damyō* (feudal lords) to create the *buke hikeshi* (official firefighters), and later *machi hikeshi* (voluntary firefighters) composed by Edo residents were formed to reduce the personnel expenses of official firefighters (Institute of Scientific Approaches for Fire & Disaster, n.d.). While Edo’s *hikeshi* were known more, similar associations were recorded in other major cities such as Osaka and Kyoto (Maruyama, 2004). The *machi hikeshi* received no economic compensation and they were considered as the origin of Voluntary Fire Departments in Japan (Hamaguchi, 2020; Institute of Scientific Approaches for Fire & Disaster, n.d.).

When the Meiji government was established in 1868, state-official firefighters were created, but voluntary firefighters persisted and were reorganized under the new system (Haddad, 2010). In 1923, they suffered unprecedented damage with over 142,000 deaths caused by the Great Kantō Earthquake (Kantō dai shinsai), despite the efforts of both official and voluntary firefighters (Institute of Scientific Approaches for Fire & Disaster, n.d.). Later, the mobilization of voluntary firefighters became more prominent during the wars of the 20th century. The military government of that time needed to mobilize voluntary firefighters to form stronger units for civil defense. Consequently, volunteer fire departments, originating from the Edo period tradition, were transformed into *bōgodan*, whose objectives included not only fire protection but also community protection with functions such as escorting, warnings, self-defense, etc., primarily to ensure the citizens’ autonomous survival during bombings (Haddad, 2010; Institute of Scientific Approaches for Fire & Disaster, n.d.).

Japan’s defeat brought an end to the wars in 1945. Under occupation and following recommendations from the General Headquarters of the Allied Forces, a firm division between fire departments and police departments was established, because there were no clear difference between them under the system established during the Meiji period. The new fire department took charge of all matters related to fires, from fire prevention, fire extinguishing, and handling explosive materials to investigating the causes of fires. They were also responsible to coordinate with volunteer fire departments. This was done to shift the concept from passive firefighting to active fire protection (Institute of Scientific Approaches for Fire & Disaster, n.d.). In 1948, the Fire Organization Law (*shōbō soshiki hō*) was enacted. The responsibility for managing fires was transferred to local authorities so that they could develop appropriate fire prevention policies and adapt to the needs of each locality. Official fire departments were established under local authorities, and *bōgodan* were restructured as *shōbōdan*, which are the current volunteer fire departments (Hamaguchi, 2020; Haddad, 2010; Institute of Scientific Approaches for Fire & Disaster, n.d.). However, it is important to note that there is still an indispensable need for close collaboration between voluntary fire departments and official fire departments (Fire and Disaster Management Agency, n.d.b).

3.2. Current role of voluntary fire departments: Fire management and beyond

Presently, voluntary firefighters are individuals aged over 18 residing in a specific community who voluntarily participate in the fire management. However, they are considered as part-time government employees, making them eligible for workers’ compensation. This includes compensation for medical treatment, sick leave, compensatory pensions for injuries and illnesses, compensation for grieving families, funeral compensation, among other benefits. Additionally, they receive financial compensation that covers expenses such as uniform cleaning, consumable material costs, and more. This financial support can amount to approximately 50,000 yen (around 320 euros) per year, though the

specific amount may vary depending on the location (Fire and Disaster Management Agency, n.d.c).

They play a central role in community-based fire and disaster management, especially in the prevention, survival, and recovery of natural disasters, primarily caused by earthquakes and floods. This role has been particularly significant, especially after the Hanshin-Awaji Earthquake in 1995 and the Great East Japan Earthquake in 2011. On those occasions, the official fire departments themselves were severely affected by the catastrophes and could not provide initial assistance properly. This led the affected communities to rely on the principle of mutual community help for survival. Therefore, since then, voluntary firefighters are considered as the pillars of community-based fire and disaster management. The Fig. 2 illustrates that fire incidents are decreasing, while there is a considerable number of incidents related to other natural disasters, although the frequency of these incidents varies significantly from year to year.

Currently, their activities encompass a wide range, from firefighting to fire prevention-related initiatives such as workshops, campaigns, visits to the elderly, among others. They also engage in disaster management tasks, including search and rescue operations, water supply, neighborhood surveillance, cleaning of areas damaged by disasters, etc. (Fire and Disaster Management Agency, n.d.d). Today, the total number of voluntary firefighters is about 818,000, while the approximate number of official firefighters is 167,000 (Fire and Disaster Management Agency, n.d.e).

3.3. Challenges volunteer fire departments are facing

The most concerning issue volunteer fire departments are confronting today is the aging of their members and the lack of young recruits.

As described in Fig. 3, the number of official firefighters increases gradually and moderately. On the other hand, the sharp decline in the number of voluntary firefighters is quite evident. The primary cause is the failure to recruit young members for various reasons. Firstly, young individuals work in large cities and only return home to sleep. It causes a concerning absence of youth during the day in rural areas, making it challenging to rely on their presence (Kobayashi et al., 2018). Additionally, the shift in employment types from self-employed in small businesses, agriculture, fishing, etc., to employees of large corporations, makes it difficult for young people to participate in firefighting

PERIOD	YEAR	HISTORICAL EVENTS	FIRE FIGHTERS' EVENTS
Edo	1650		Establishment of early <i>buke hikeshi</i>
	1657	Meireki big fire	
	1719		Establishment of <i>machi hikeshi</i>
Meiji	1871		Creation of state-official firefighters Recognition of volunteer firefighters (<i>shōbō gumi</i>) under Meiji firefighting system
Taishō Shōwa	1923	Gret Kantō Earthquake	
	1937	Second Sino-Japanese War	Dissolution of Meiji firefighting system
	1939	End of WWII	Establishment of <i>bōgodan</i>
	1945		
	1948		Fire Organization Law
1956		Establishment of <i>shōbōdan</i> Establishment of damage compensation system for volunteer firefighters	
Heisei	1959	Ise Bay Typhoon	
	1969	Tsunami caused by Chile Earthquake	
	1995	Hanshin Awaji Earthquake	
Reiwa	2011	Great East Japan Earthquake	
	2024	Noto Peninsula earthquake	

Fig. 2. Chronograph of *shōbōdan* development and related events

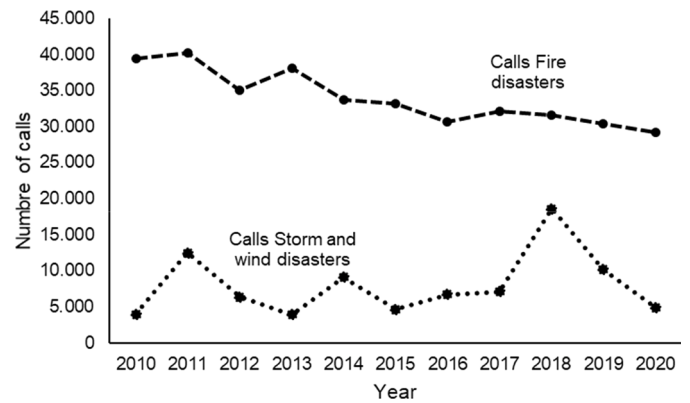


Fig. 3. Evolution of call for service of volunteer firefighters (2010-2020)Note. Fire and Disaster Management Agency, 2021, p.35, modified by author.

activities. Self-employed individuals used to live and work in the same house, in addition to having a more flexible schedule to attend fire incidents. However, such a working condition is no longer possible for current society (Nagata, 2017). Secondly, there is a lack of *gemeinschaft* value, or sense of belonging to community among young people (Nagata, 2017, p.45), or other authors refer to it as a lack of emotional connection (Nakazawa, 2017; Matsushita et al., 2021). Thirdly, Nagata (2017) argues that, ironically, the development of official fire departments has weakened the potentiality of volunteer fire departments since the central government changed its policies to strengthen official firefighters in the 1960s.

Meanwhile, voluntary firefighter members are getting older, leading to more retirements than new recruits coming in. Some volunteer fire departments had to raise retirement ages to fill the vacancies. However, natural disasters are increasing in Japan in recent years (Yamada et al., 2020). Moreover, the catastrophe of the Hanshin-Awaji Earthquake revealed the importance of the role of voluntary firefighters as they saved more lives than official firefighters due to their better knowledge of neighborhood geography and the community in general, including residents' lifestyles. In addition, after the Great East Japan Earthquake, their value was reaffirmed thanks to their immediate and swift action in rescue operations (Nagata, 2017). For the central government, these two earthquakes have been decisive in changing its policy towards fire and disaster management, and now it recognizes the importance of volunteer fire departments once again. Therefore, the lack of members in official fire departments is a serious problem Japanese society is facing.

3.4. Efforts and Possible Solutions

To address the issue of member scarcity, both the central government and local authorities, along with volunteer fire departments themselves, are working to recruit more members. Their strategies and focuses are pointed towards three population groups: women, students, and foreigners.

Firstly, in some rural areas of Japan, a clear gender role separation is still maintained. Since women often assume household tasks, they are ideal for filling the gap left by men working in cities during the day (Fujimoto et al., 2021). An example of the implementation of this strategy is the Niigata City Volunteer Fire Department in Niigata Prefecture. Female members specialize in fire prevention campaigns, visits to the elderly, etc., leveraging their community and personal connections. Additionally, in places like the Tsunagi-machi Volunteer Fire Department in Kumamoto Prefecture, where fishing is a predominant activity, women have always taken on the responsibility of protecting their community while men engage in fishing. The Tsu Volunteer Fire Department in Mie Prefecture is exclusively composed by women and plays a specialized role in visiting the elderly and providing first aid (Fire and Disaster Management Agency, n.d.f). Still, while statistics

show an increase in the participation of women, it barely reaches 5% of the total number of volunteer firefighters (Fire and Disaster Management Agency, n.d.f). Incorporation of women is expected to create an inclusive and close-knit environment in volunteer fire departments (Haddad, 2010).

Secondly, there is hope in university and technical school students to sustain the activities of volunteer fire departments. The strategy involves recruiting young people in the volunteer fire departments near their universities or training centers. In this way, it is assumed that they can participate in firefighting and other rescue activities when these events occur during the day. To encourage this practice, the government has sent notifications to all public and private universities to promote student participation in volunteer fire departments and asks them to facilitate student affiliation as volunteer firefighters. Some local authorities, such as Kyoto Prefecture, are supporting the creation of student firefighting clubs. Additionally, activities that students can carry out have been limited to less risky operations to facilitate their participation (Nagata, 2017). Furthermore, a Volunteer Fire Department Activity Recognition System for Students was implemented in 2016. Through this certificate, students can accumulate merits that will be useful in their job-hunting, since experience in volunteer fire departments demonstrates the capacity of teamwork and contributions to fire risk management in the company where they plan to work (Gamagori City, 2022). Thanks to these efforts mentioned above, student participation in volunteer fire departments is increasing and currently represents approximately 5% of the total members (Fire and Disaster Management Agency, n.d.g). However, it is still unclear whether companies consider the recognition sufficiently when hire new employees (Nagata, 2017). Additionally, some localities cannot take advantage of the human power of students since not all cities and towns host universities and vocational training centers, thus there are still obstacles to overcome to promote the participation of young people.

Finally, there are possibilities to incorporate foreigners into volunteer fire departments, but this option is still not explored sufficiently yet. Although there is still no systematic study on the participation of foreigners in volunteer fire departments, there are reports of some specific cases, such as the Kucchan Volunteer Fire Department in Hokkaido Prefecture (Hokkaidō shōbō kyōkai, 2019). The potential of foreigners residing in Japan can be significant, as they can provide much-needed work force contribution. Moreover, they will be able to perform other tasks that Japanese members may not be able to carry out, for instance, attending to foreign victims, serving as interpreters and mediators, among other duties. Furthermore, promoting participation of foreigners is essential due to the increasing number of immigrants and foreign tourists in the country. However, there are several obstacles to overcome. Firstly, since voluntary firefighters are considered as part-time government employees, foreigners willing to participate in the volunteer fire departments are required to obtain permanent residence or long-term stay visas. This limits the participation of foreigners residing in Japan for short periods or foreign students. Secondly, proficiency in the Japanese language is necessary in order to communicate with community residents and understand orders from other firefighters (Hokkaidō Abutagun Kucchanchō, 2019; City of Yokohama, 2022). Thirdly, foreigners must accept the inability to engage in activities involving the exercise of public authority (Hokkaidō Abutagun Kucchanchō, 2019; City of Yokohama, 2022). This limitation does not apply to Japanese members, thus to some foreigners, it may appear to be unfair to foreign applicants. Finally, the general culture of volunteer fire departments remains hierarchical, traditional, discriminatory, and undemocratic (Haddad, 2010; Konishi, 1998). Indeed, the City of Yokohama (2022) clearly states as one of the requirements "(foreign applicants must) accept that you cannot aspire to a position higher than group leader." In this regard, it is urgent for Japanese society to be aware of the need to incorporate foreigners into volunteer fire departments and to establish a system that encourages their participation, similar to what has been created for students.

3.5. A case study: Gamagōri shōbōdan Branch No. 5

To verify the data and information presented above and obtain a comprehensive understanding of the actual situation of volunteer fire departments, the author conducted a field study in the Mizutake District of Gamagōri City in Aichi Prefecture, from April 2015 for two years. This study was part of a broader research project focusing on neighborhood associations. Gamagōri is a small city with a historical involvement in textile production, agriculture, and fishing. Currently, it faces serious challenges related to an aging population and a noteworthy increase in foreign immigrants employed in small factories. The Mizutake District, situated in the northern part of the city is characterized by the development of residential areas that intermingle with traditional houses, mandarin orange fields and dense forests.

Gamagōri City is geographically divided into nine neighborhoods, each equipped with a volunteer fire department branch (with the exception of the commercial port area, which falls under the direct administration of the official fire department). All neighborhoods have one to three warehouses (indicated in blue on the map on the right of Fig. 4) to store tools and fire trucks. These warehouses typically have fewer resources than official ones. In total, there are 347 members aged between 19 and 60 throughout Gamagōri.

The city actively promotes student recruitment, utilizing the Recognition of Activities of Volunteer Fire Departments for Students system. Furthermore, it has established an own system to commend local business that encourage their employees to participate in volunteer fire departments activities, awarding recognition badges to display at their establishments. The city estimates that 70% of volunteer firefighters are employees of these businesses, and this trend is expected to increase (Gamagori City, 2018). While the awarded businesses may not gain practical advantages, they can emphasize their contribution to society through this recognition. To date, four companies have received this recognition, which is valid for two years (Gamagori City, 2018). Not only Gamagōri City but also other cities in the Higashi Mikawa region (comprising eight cities and towns in the eastern part of Aichi Prefecture) have implemented their own policies to promote the activities of volunteer fire departments, known as *Honokuni shōbōdan ōen jigyō* (Program to promote volunteer fire departments in Honokuni). Thanks to this initiative, volunteer firefighters in this region can enjoy discounts and services at affiliated stores (Gamagori City, 2020).

In the specific case of the volunteer fire department branch No. 5 in Mizutake District, training sessions were conducted approximately once a month in Chūō Park. During the field study, the author did not find any female, student, or foreign members. Concerning women, it was observed that they already assumed other responsibilities in various community associations such as the Neighborhood Association, the

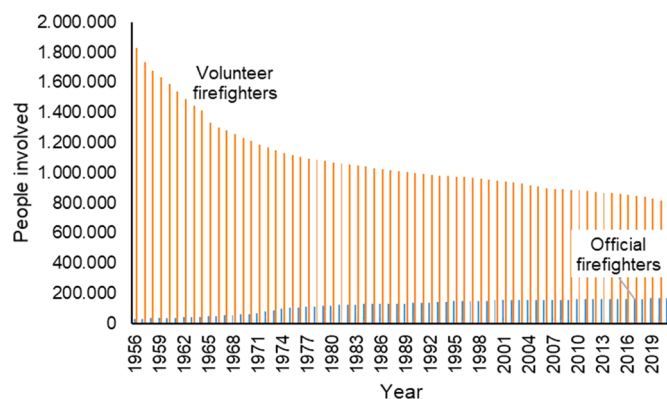


Fig. 4. Change of total numbers of official and volunteer firefighters (1955-2021)

Note. Composed by author, based on Fire and Disaster Management Agency, 2021, p.70.

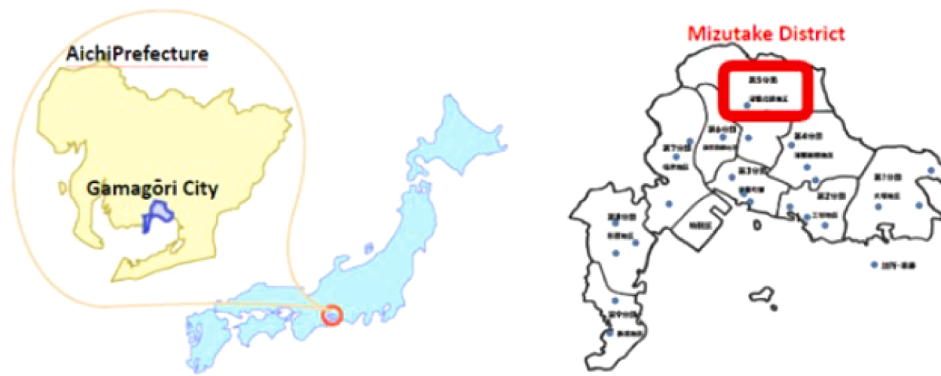


Fig. 5. Scheme of the location of Gamagōri City and Mizutake District
Note. Gamagōri City, 2015, 2023.

Women's Group, the Parent-Teacher Association (PTA) of their children's schools, and the Children's Association, among others. Consequently, it was nearly impossible for them to take on additional tasks. The author also could not identify student members, likely due to the absence of a university or higher education institution in the area. Regarding foreigners, although several foreigners lived in the district, the author did not encounter any foreign members during the study. According to an interview with the owner of a foreigner's residence, rental contracts were typically managed and signed among the companies where the foreigners worked and the property owners. This system did not encourage foreigners to engage with the community they lived in, let alone participate in local associations such as the neighborhood association and volunteer fire department. This was unfortunate, as there may have been foreigners interested in contributing to the activities of the volunteer fire department, but the presence of foreign residents were completely unnoticed.

On the other hand, similar to women, volunteer firefighters were perceived as overloaded with multiple responsibilities in various community associations such as the Neighborhood Association, the PTA, and the Shinto Shrine Group, among others. This burden seemed more pronounced in the case of the volunteer fire department, as members needed to be in good physical condition to participate in firefighting activities and disaster management. However, only a limited number of residents met these requirements compared to other local associations. Recruitment campaigns for new members were held during local events such as at the Community Sports Festival. The author observed that entire community was aware of the desperate need for more members, but there were really no more candidates. Incorporating new members was physically impossible unless they were new residents who had just moved to the area, met the suitable profile for the volunteer firefighter, and were willing to participate. On the positive side, it was noted that, being a small group, there was a strong sense of belonging among volunteer firefighters, along with a feeling of pride and moral obligation to community they lived in.

On October 25, 2015, the author coincidentally encountered a fire in the Mizutake District, specifically at the Anraku Temple, where volunteer firefighters played an indispensable role in extinguishing the fire. The Anraku Temple, established in the early 16th century as a Buddhist temple, stored several important cultural assets including ancient writings and Buddhist sculptures. The incident occurred on a sunny, dry, and windy day, coinciding with the celebration of a well-known Autumn Festival in another coastal district of Gamagōri City. Consequently, a substantial number of police officers and official firefighters were deployed to ensure the safety of that festival. Meanwhile, a resident of the Anraku Temple began burning fallen leaves in the temple's backyard, a common autumnal practice in Japan. However, due to the strong winds, the fire rapidly spread to the central part of the temple and then to the whole temple. The blaze persisted from morning until night,

resulting in the near-total destruction of the entire temple complex, including the central building, the residence of the monks and their families, the commemorative hall, the bell tower, among other structures Fig. 6. Fortunately, there were no fatalities, but several cultural assets were lost.

Due to the coinciding of the Miya Festival, one of the largest events in Gamagōri City, and the fact that many official firefighters were on duty that day, the Gamagōri City Fire Department had a reduced availability compared to usual circumstances. Fortunately, the volunteer firefighters from Branch 5 of the Mizutake District were conducting training in Chūō Park, located approximately 500 meters from Anraku Temple. Upon noticing smoke and hearing cries from local residents, the volunteer firefighters promptly headed to Anraku Temple to begin initial firefighting efforts before the arrival of official firefighters. The volunteer firefighters possessed a good understanding of the geographical conditions and the structure of the Anraku Temple, which enabled them to contain the fire in critical areas and prevent further spread. Despite nearly all buildings in Anraku Temple being reduced to ashes, the fire did not extend to nearby houses or the nursery located just behind the temple. The volunteer firefighters utilized all community channels to manage the crowds gathering to observe the situation.

However, the volunteer firefighters expressed regret that, due to the magnitude of the fire and the severely limited resources at their disposal, they were unable to quell the fire as quickly and efficiently as desired, failing to salvage even a small portion of this historically significant temple, that was, indeed, very importance for the Mizutake District. In summary, this incident serves as an illustrative example of the effectiveness of a community-based volunteer firefighting unit, while simultaneously highlighting the physical limitations, since, after all, volunteer fire departments are not official fire department and they cannot afford to handle fires that exceed their capacity.

3.6. Current challenges and final remarks

Despite their extensive history and central role in present-day Japan, volunteer fire departments are confronting a significant challenge: a shortage of members to sustain their activities. Despite campaigns promoted by both the central government and local authorities to attract more young people, particularly women and students, their efforts are insufficient to maintain a prepared force in the event of fires and other disasters. This challenging context was observed during the author's field study, although it also revealed the willingness, enthusiasm, and community confidence in volunteer fire departments. However, there is a distinct lack of individuals of suitable age to recruit due to low birth rates and the aging of the population in contemporary Japanese society. In light of this, a part from recruiting foreigners, alternative approaches must be explored to address the issue of membership shortage.

In fact, Nagata (2017) suggests promoting the creation of



Fig. 6. Anraku Temple Fire
Note. *Genchi gazō*, 2021.

extracurricular fire management activities for primary school students to involve them in the community-based fire management from an early stage. This idea stems from his fieldwork observation in Germany, where community-based fire management is well advanced, despite the fact Germany facing similar social problems to those in Japan. He points out that involving children in community-based fire management enables them to not only acquire necessary knowledge of fire management but also integrate the issue of fire management into their daily live, fostering their continued participation in volunteer fire departments when they become adults. While situating fire management in the same context as extracurricular activities such as joining a swimming club, karate training, or piano lessons appears beneficial and inspiring, some concerns remain, including the increased burden on volunteer firefighters to care for young members and the running costs of such youth fire clubs, among other obstacles.

Moreover, while not explicitly highlighted in the case of the Mizutake District, several other volunteer fire departments are witnessing a substantial decline in membership willingness. This decline is attributed to shifts in the lifestyles and moral foundations of Japanese citizens, making it challenging to allocate time to community affairs due to work, family, and individual reasons as well as the capitalist and individualist values. This issue is not exclusive to Japan but it extends to other places such as the United States (Simpson, 1996). In the United States, volunteer fire departments were originally typical feature of rural areas, yet they are facing challenges since the emergence of working middle-class employees in countryside are no longer inspired by the civic commitment and volunteer activities. Nevertheless, other studies confirm the altruism and professionalism among volunteer firefighters (Henderson & Sowa, 2018; Thompson III & Bono, 1993). To adopt to the modernization of society, welcoming the middle-class employees as well as foreign residents, volunteer fire departments need to embrace a more democratic approach to their traditional culture. Haddad (2010) provides successful examples of the democratization of some Japanese volunteer fire departments in her study. However, these struggles have

already manifested in the Mizutake District's volunteer fire department. Therefore, it appears that a more profound transformation in the nature of volunteer fire departments might be necessary.

In this context, it becomes evident that the community-based model of fire and disaster management in Japan has reached a critical point, requiring a systemic reform. In the case of Japan, two potential solutions merit consideration for improving the situation of volunteer fire departments. Firstly, the integration of Information and Communication Technology (ICT) into disaster and fire management could prove instrumental. For instance, the incorporation of Virtual Reality to replace in-person group training for firefighters has shown promise. In fact, volunteer firefighters used this method during the COVID-19 pandemic when on-site drills were restricted. Taking advantage of recent ICT advancements, this tool could offer flexibility in training schedules and locations, allowing combining fire management tasks with work and family commitments. The second proposal is, although somewhat ironic, to shift away from the concept of "community" management and move towards "collaborative" management of fires and disasters. Within this framework, all individuals and institutions must be ready to collaborate in emergencies, regardless of their locations and professions. An illustrative example is the application called *Commutas* (Epson Avansys Corporation, 2023). This application facilitates cooperation between volunteer fire departments and official institutions such as fire departments, police, local authorities, etc. It enables the sharing of critical information about fires, including the number of personnel and fire trucks arriving at the scene, the location of fireplugs and water intake points near the fire, and the extent of damage, among other details. In this way, a diverse workforce can be mobilized quickly and efficiently to respond to fires and disasters. Additionally, assistance from volunteer firefighters of nearby departments can be promptly requested if needed. In summary, to address the challenge of a shortage of volunteer firefighter members, transitioning from the notion of managing fires and disasters solely through community efforts to active collaboration with other institutions and communities may emerge as an

optimal solution for contemporary Japanese society.

4. Conclusions

In this study, we have explored the history, tradition, and centrality of fire management led by volunteer fire departments in Japan, a country where people coexist with continuous threats of disasters, not only from fires but also from natural disasters. The significant issue of the shortage of members in these departments has been highlighted, primarily caused by the diminishing young population in Japan, despite efforts to encourage the inclusion of women, students, and foreigners. Through the fieldwork conducted in the Mizutake District of the city of Gamagōri, we confirmed the crucial importance of volunteer firefighters, while simultaneously acknowledging the difficulty of recruiting new members. Finally, we proposed the introduction of ICT tools and collaboration beyond the community as solutions to the current challenges faced by volunteer fire departments in Japan.

Although each location requires its unique strategies to manage fires and disasters, it is universally acknowledged that in the face of a catastrophe, human beings are powerless. Therefore, mutual assistance and collaboration are essential for prevention and preparedness to combat these unexpected events. Indigenous wisdom from numerous places has taught that community members must support each other to survive fires and disasters. However, not only in Japan but also in many societies, these "local communities" of coexistence are diminishing due to demographic, cultural, work-related, or personal reasons, while the threats of natural forces remain an increasingly serious reality. It is imperative to continue researching how we can supplement the lack of community-based fire and disaster management.

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Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Data availability

No data was used for the research described in the article.

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