Chapter 2

The Roles which the Information and Communications Took and Challenges

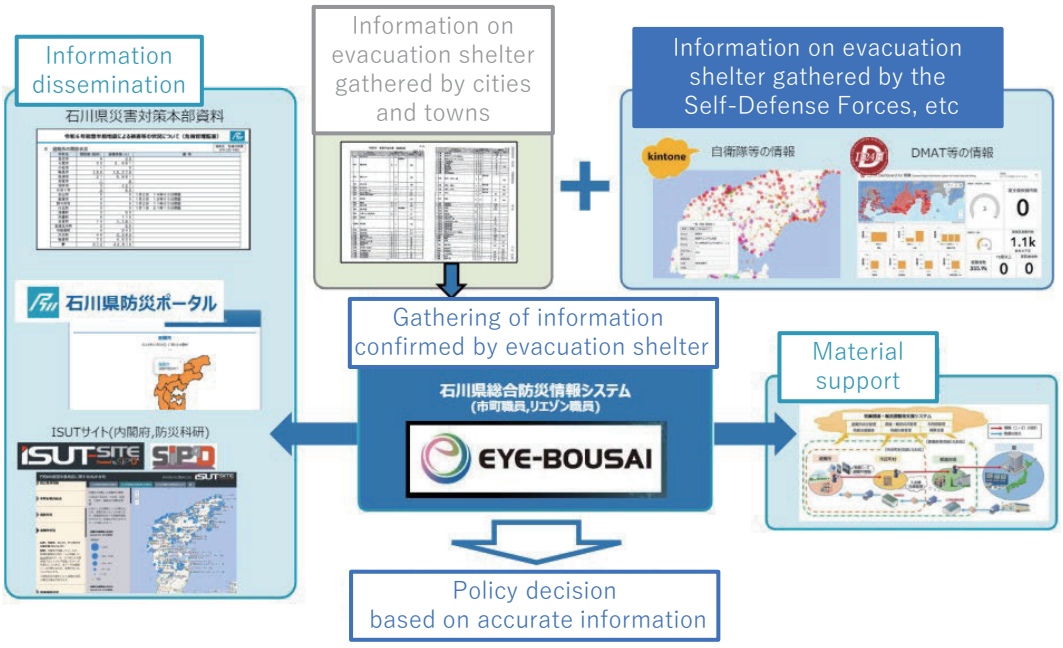
Section 1 Information gathering and dissemination related to the disaster

1. How the information was gathered and collected related to the disaster

(1) Information gathering related to evacuation center

In the Noto Peninsula Earthquake, the access routes to remote areas of Okunoto were partially cut off due to road disruptions, leading to numerous instances of voluntary evacuations and isolated communities. Additionally, municipal employees were also affected by the disaster, making it difficult to accurately assess the situation at evacuation shelters. In response, Ishikawa Prefecture established a platform to consolidate evacuation shelter information collected by municipalities, the Self-Defense Forces, and the Disaster Medical Assistance Teams (DMAT). This platform commenced operations on January 14 and began full-scale operation on January 17, assigning IDs to each evacuation shelter to facilitate integration with other systems **(Figure 1-2-1-1)**. This allowed for the accurate assessment of evacuation shelter information and facilitated a transition to demand-driven support for the procurement of supplies.

Figure 1-2-1-1 Image of a shelter data aggregation and visualization application

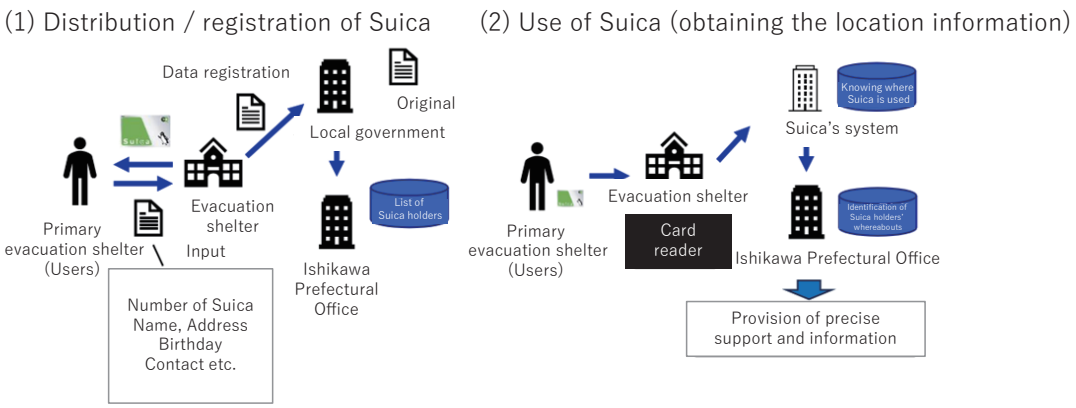


(Source) Material of Ishikawa Prefecture Governor's press conference (January 13, 2024)

(2) Utilization of Suica for evacuee information management

Ishikawa Prefecture distributed Suica cards with unique IDs to evacuees at primary evacuation shelters, linking personal information such as name, address, date of birth, and contact details to the system. When evacuees visited shelters or received supplies, they could use the distributed Suica cards with card readers installed at the shelters to provide accurate information on their needs and facilitate demand-driven supply support **(Figure 1-2-1-2)**. While the Digital Agency had been promoting the use of My Number cards for evacuee information management, the unavailability of card readers prevented their use in the aftermath of the earthquake[1].

Figure 1-2-1-2 Obtaining evacuee information with the use of Suica



(Source) Digital Agency "Initiatives to obtain information on victims by utilizing digital technology in the 2024 Noto Peninsula Earthquake"

(3) Establishment of a database for disaster victims

On February 19, Governor HATA Hiroshi of Ishikawa Prefecture announced the establishment of a disaster victim database for approximately 120,000 residents across the six municipalities in the Noto region. Given the extensive damage and the potential for displaced victims to move across municipalities, the database, containing information on the whereabouts of victims and their specific care needs, is being utilized to provide oversight and support for victims across municipal boundaries.

[1] Summary of Press Conference by Minister for Digital Transformation KONO (January 26, 2024) Digital Agency <https://www.digital.go.jp/speech/minister-240126-01>

(4) Visualization of damage using various data

A Remote sensing

Data observed by satellites is one of the crucial pieces of information for early confirmation and analysis of the disaster-affected areas. Various private companies, including space venture companies, are advancing the publication, provision, and analysis of satellite information. For instance, Axelspace published data observed by its Earth observation platform "AxelGlobe," which is developed and operated using a constellation of small optical satellites, on a special page[2]. They also announced the provision of this data free of charge to government agencies, local governments, and media organizations. Similarly, QPS Research Institute announced that it will provide observation data from its small SAR satellite "QPS-SAR" to government agencies and media organizations, and sequentially provided images for disaster response upon request[3]. Data from both companies is also included in the "Disaster Cross-View of the 2024 Noto Peninsula Earthquake" by the National Research Institute for Earth Science and Disaster Resilience (NIED)[4].

Figure 1-2-1-3 Analysis image of crustal movement with data observed by satellites

解析結果【速報】

2.5次元解析結果 NEW

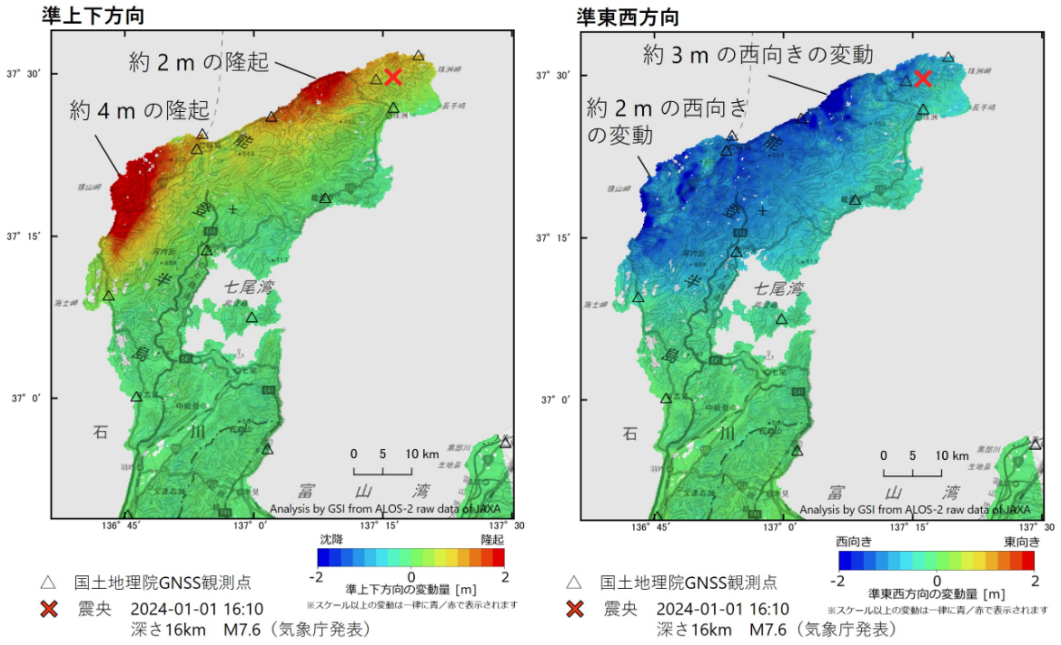


図1 2.5次元解析結果による変動量（2.5次元解析とは）【地理院地図で閲覧】

観測毎の2.5次元解析結果: 1月1日及び2日観測、1月9日及び12日観測、1月3日及び15日観測

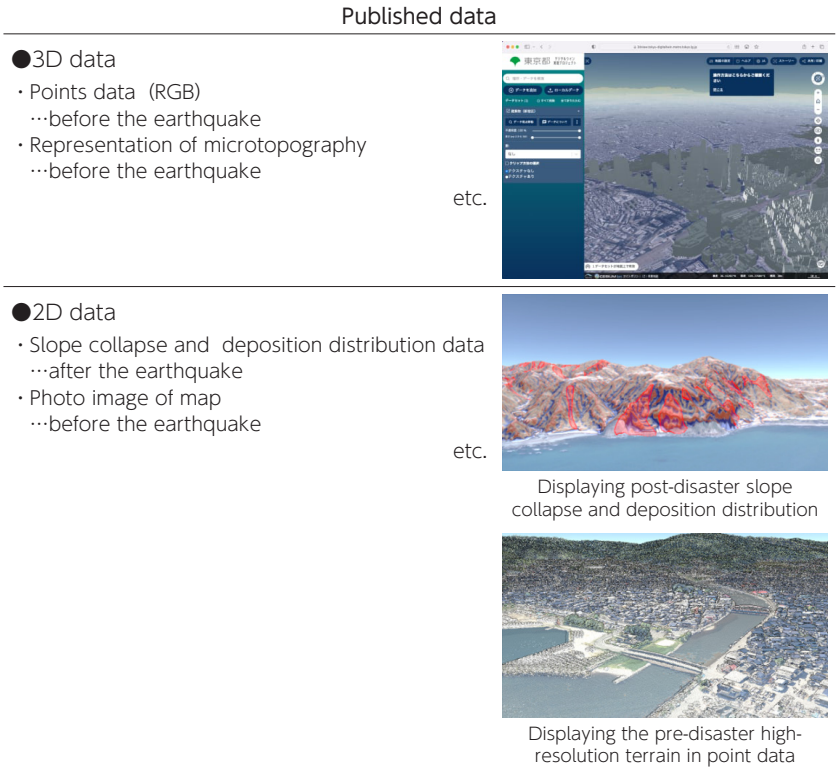
(Source) Geospatial Information Authority of Japan[5]

[2] Axel Globe "The 2024 Noto Peninsula Earthquake Special Page" <https://www.axelglobe.com/ja/the-noto-hanto-earthquake-in-2024>
[3] QPS Research Institute "Providing Satellite Images of the 2024 Noto Peninsula Earthquake Area" <https://i-qps.net/news/1614/>
[4] National Research Institute for Earth Science and Disaster Prevention "Disaster Prevention Cross-view on the 2024 Noto Peninsula Earthquake" <https://xview.bosai.go.jp/view/index.html?appid=41a77b3dcf3846029206b86107877780>
[5] Geospatial Information Authority of Japan "Crustal movement accompanied with the 2024 Noto Peninsula Earthquake by analyzing observed data of "Daichi 2" (updated on January 19, 2024)" <https://www.gsi.go.jp/uchusokuchi/20240101noto.html>

B Visualization of damages using geospatial data

Efforts were also made to visualize the damage situation of the earthquake using geospatial data such as point cloud data and slope collapse/deposition distribution data. In February, the Tokyo Metropolitan Government published geospatial data related to the damage situation of the Noto Peninsula Earthquake on the Tokyo Digital Twin 3D Viewer **(Figure 1-2-1-4)**. This Tokyo Digital Twin 3D Viewer can be viewed on a web browser without any special software, allowing users to see pre- and post-disaster terrain data and damage-related data in three dimensions, and to overlay them for comparison.

Figure 1-2-1-4 Data published in the Tokyo Digital Twin 3D Viewer



(Source) Tokyo Metropolitan Government[6]

[6] Press release by Tokyo Metropolitan Government "Visualization of the damage situation of the Noto Peninsula Earthquake using the Tokyo Digital Twin 3D Viewer" (February 2, 2024)

C Data held by postal offices

Efforts were also made using data held by post offices.

Japan Post, based on a request for cooperation from Ishikawa Prefecture, matched the list of missing persons with the resident data held by post offices, contributing to the refinement of the missing persons list. Additionally, at the request of Ishikawa Prefecture, Japan Post sent direct mail to those who had moved out of the disaster-affected areas based on the change of address notifications submitted to post offices, encouraging them to register their information with the disaster-affected municipalities **(Figure 1-2-1-5)**.

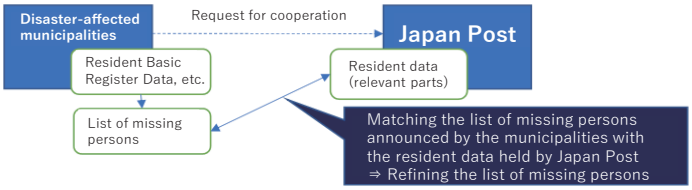
Figure 1-2-1-5 Initiatives to utilize data etc. held by postal offices

【Reference】Cooperation with Disaster-Affected Municipalities Utilizing Data Held by the Post Office

While collaborating with the government and related organizations, we will develop initiatives to cooperate with disaster-affected municipalities based on their requests

【Confirmation of Information on Missing Persons (Early January)】

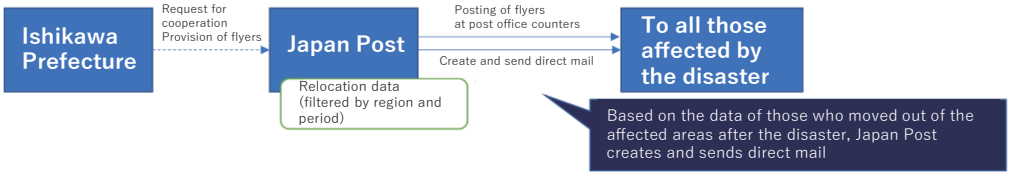
・Based on cooperation requests from affected municipalities, we matched the list of missing persons made public with the resident data held by the post office. By aggregating this information within the municipalities, we refined the list of missing persons.



【Cooperation for Promoting Information Registration (February Term)】

・In the affected municipalities, measures are being implemented to encourage evacuees to register their information with the municipalities, with the aim of providing various support information, such as the issuance of disaster certificates. To promote information registration, Ishikawa Prefecture has requested cooperation from Japan Post.

・At Japan Post, in addition to posting flyers related to information registration at post office counters, direct mail is created and sent to those who have submitted a change of address form to the post office and have moved out of the affected areas after the disaster.



(Source) Japan Post Press Release (March 4, 2024)

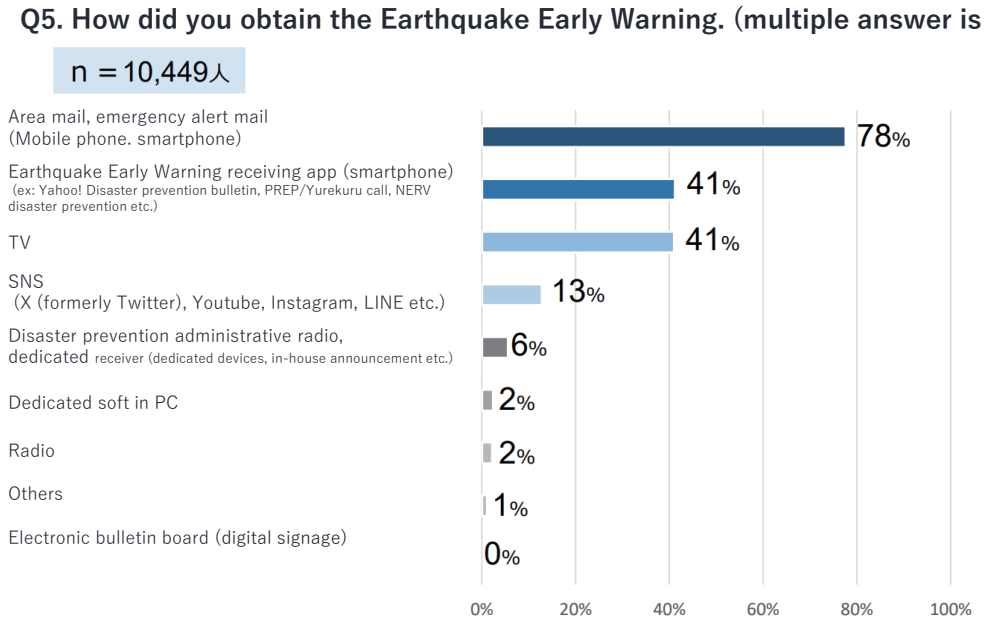
2. How the information was disseminated related to the disaster

(1) Information dissemination during disasters

A Earthquake Early Warning

On January 1 at 4:10 p.m., the earthquake occurred, prompting the Japan Meteorological Agency to issue an Earthquake Early Warning (EEW) for 21 prefectures ranging from the Tohoku region to the Kinki region. Including this instance, the total number of EEWs issued in January was 20. According to a survey by the Japan Meteorological Agency, 78% of people who received the EEW did so via area mail or emergency alert mail on their mobile phones or smartphones[7] **(Figure 1-2-1-6)**.

Figure 1-2-1-6 Ways to obtain the EEW



(Source) Japan Meteorological Agency "Preliminary survey on emergency earthquake early warning for the earthquake in the Noto region of Ishikawa Prefecture that observed a maximum seismic intensity of 7 at around 16:10 on January 1, 2024 - Breaking version –" (March 28, 2024)

Additionally, 61% of those who saw or heard the EEW took some form of action. The actions taken included "bracing themselves on the spot," "trying to get earthquake information via TV, radio, or mobile phone," and "being cautious of falling objects around them."

B Evacuation calls during the disasters (television)

During the disaster, especially when a major tsunami warning was issued, NHK implemented the "calls to protect lives" that have been developed and trained since the Great East Japan Earthquake. This was the first full-scale operation of these calls. Immediately after the major tsunami warning was issued, NHK continuously called out in strong tones using various expressions and phrases that appealed to the emotions of viewers, such as "Protect Your Life," "Remember the Great East Japan Earthquake," and "Call Out to Those Around You, 'a Tsunami is Coming, Flee to Higher Ground.'"

Additionally, Sun TV broadcasted pre-recorded multilingual evacuation calls when a tsunami warning was issued for the northern part of Hyogo Prefecture. The content included messages in Japanese and sign language, as well as English, Korean, Chinese, Vietnamese, Nepali, Tagalog, and Portuguese. Speakers of each language appeared in turn, repeatedly urging viewers with both voice and handwritten signs to "escape immediately to protect your life from the coming tsunami."

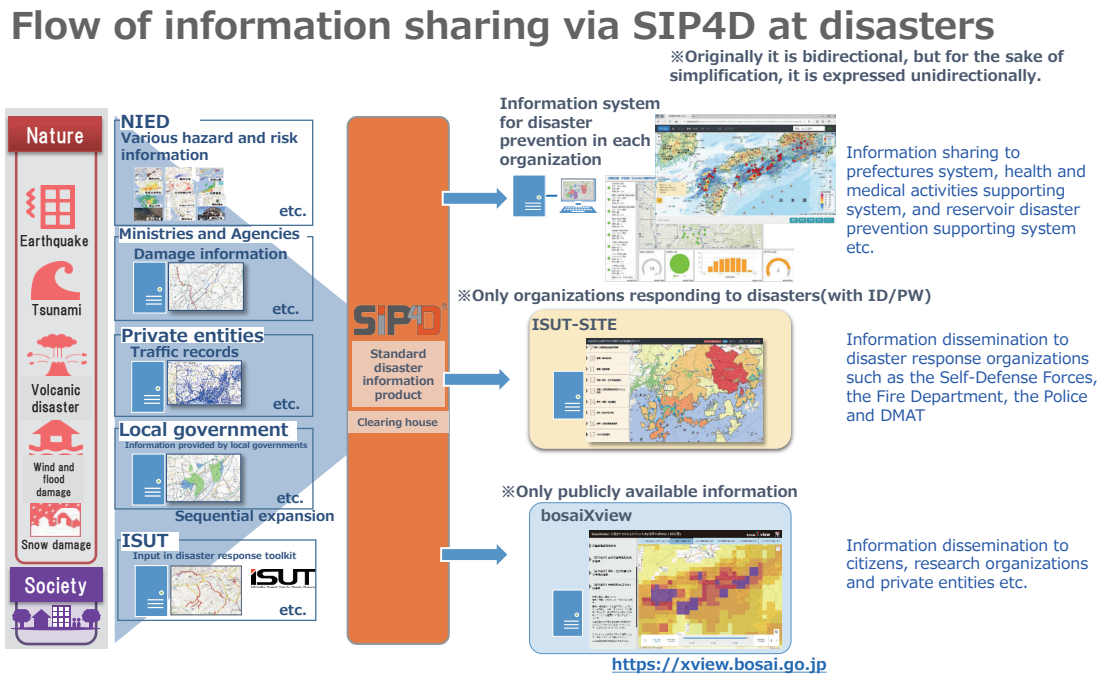
[7] Preliminary survey on emergency earthquake early warning for the earthquake in the Noto region of Ishikawa Prefecture that observed a maximum seismic intensity of 7 at around 16:10 on January 1, 2024 - Breaking version -2024.3.28 Announcement (Japan Meteorological Agency) <https://www.data.jma.go.jp/eew/data/nc/shiryo/pre-survey/2024/20240101-ishikawa-brief.pdf>

(2) Information gathering and dissemination after disasters

A Disaster Cross-View

The National Research Institute for Earth Science and Disaster Resilience (NIED) launched the "Disaster Cross-View for the 2024 Noto Peninsula Earthquake" on January 1. This platform aggregates and disseminates essential disaster response information shared through networks like SIP4D (Shared Information Platform for Disaster Management). The Cross-View provides integrated information on road conditions, life support locations, activities of NPOs, and the communication status of various mobile phone carriers.

Figure 1-2-1-7 Information sharing related to disasters via SIP4D



(Source) National Research Institute for Earth Science and Disaster Resilience "2023 4th Disaster Resilience Co-creation Research Meeting "2024 Noto Peninsula Earthquake" Reporting meeting (March 5, 2024)"[8]

B Information gathering and dissemination by media (disaster situation map)

During the earthquake, newspapers collected photos and information and linked them to maps for public dissemination.

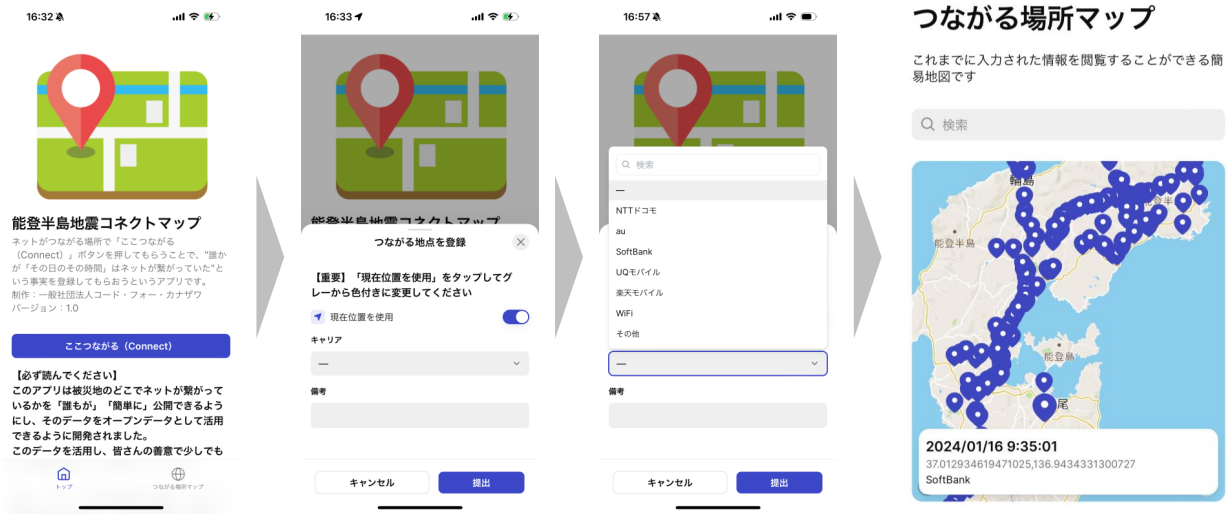
On January 1, Yomiuri Shimbun published the initial version of the "Disaster Situation Map for the 2024 Noto Peninsula Earthquake" on its website. The "Damage Captured by Reporters" section allows users to view photos and descriptions of the disaster areas taken by reporters, linked to a 3D map showing the locations where the photos were taken. The "Damage Classified by Aerial Photos" section visualizes the damage to over 300 buildings, landslides, and fires based on aerial photos taken on January 2, focusing on the coastal areas of Wajima City and Suzu City in Ishikawa Prefecture. The map was updated continuously until January 8, summarizing the first week after the earthquake.

C Information gathering and dissemination by private companies (Noto Peninsula Earthquake Connect Map)

Since the spread of COVID-19, private companies and civic tech organizations have increasingly engaged in information collection and dissemination. This trend continued related to the earthquake, with efforts to aggregate and disseminate information for disaster victims. Code for Kanazawa, a general incorporated association, published the "Noto Peninsula Earthquake Connect Map" as open data on January 7. This map compiled information on "Places with Internet Connectivity" provided by citizens. The registration of new data was halted on February 2 as the internet connection environment improved.

[8] USUDA Yuichiro (Disaster Prevention Information Center/Disaster Prevention Information Research Division, National Research Institute for Earth Science and Disaster Prevention) Material "About ISUT's efforts – Information sharing via SIP4D, bosaiXview, ISUTSITE

Figure 1-2-1-8 Noto Peninsula Earthquake Connect Map



(Source) General incorporated association Code for Kanazawa

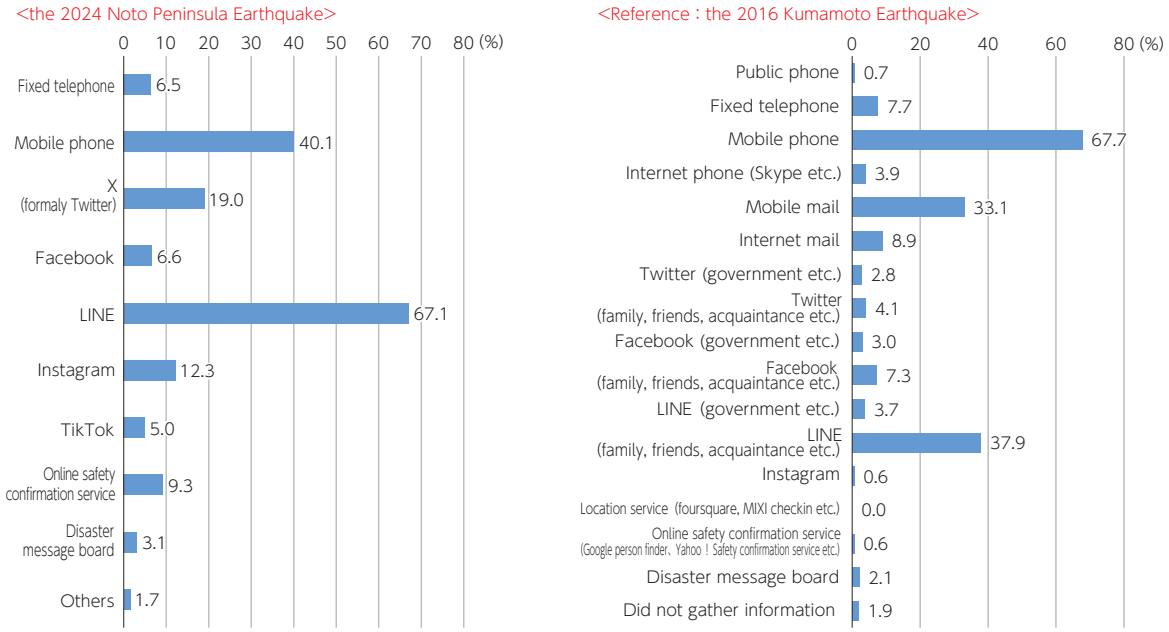
3. How the citizens gathered the information related to the disaster

To investigate how people utilized information and communication tools to obtain earthquake-related information, a nationwide survey was conducted targeting the citizens.

(1) Actions for confirming safety

First, when asked how they confirmed the safety of family, friends, and acquaintances at the time when the Noto Peninsula Earthquake occured, the most common response was LINE (67.1%), followed by mobile phones (40.1%) and X (formerly Twitter) (19.0%). In a survey conducted by the MIC regarding the Kumamoto Earthquake on "methods used for confirming safety," 37.9% of respondents mentioned LINE, indicating that LINE has become a well-established communication tool.

Figure 1-2-1-9 How to confirm the safety of family, friends and acquaintances etc.



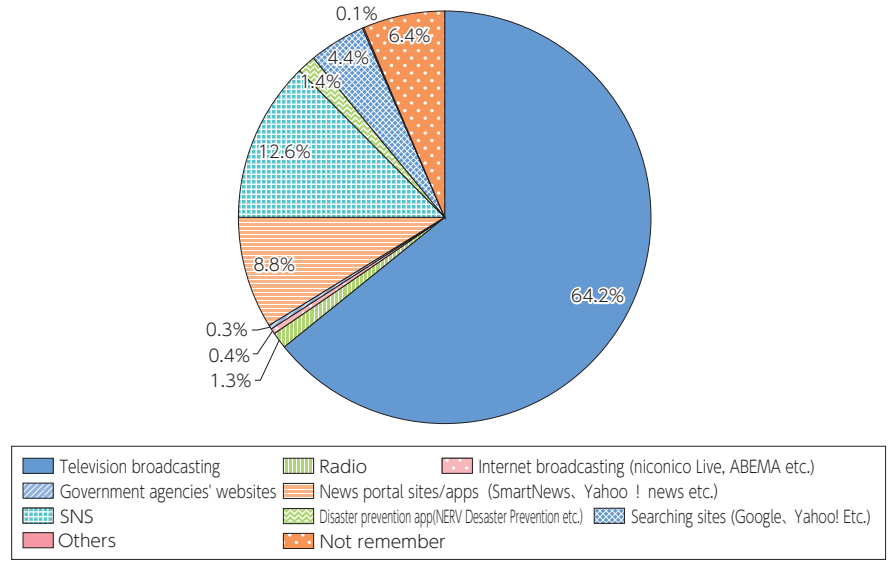
*Among all respondents, the methods used by those who answered "conducted safety confirmation" (n=604) were aggregated.

(Source) MIC(2024) "Research and study on the latest trends in information and communication technology research and development, as well as digital utilization, both domestically and internationally"
MIC(2017) "Survey on the status of ICT utilization during the Kumamoto Earthquake"

(2) Information gathering actions immediately after the earthquake

Next, when asked which media they first accessed after noticing the earthquake, 64.2% of respondents mentioned television broadcasts (NHK and commercial channels combined), which was higher than other options.

Figure 1-2-1-10 Media firstly accessed after noticing the earthquake

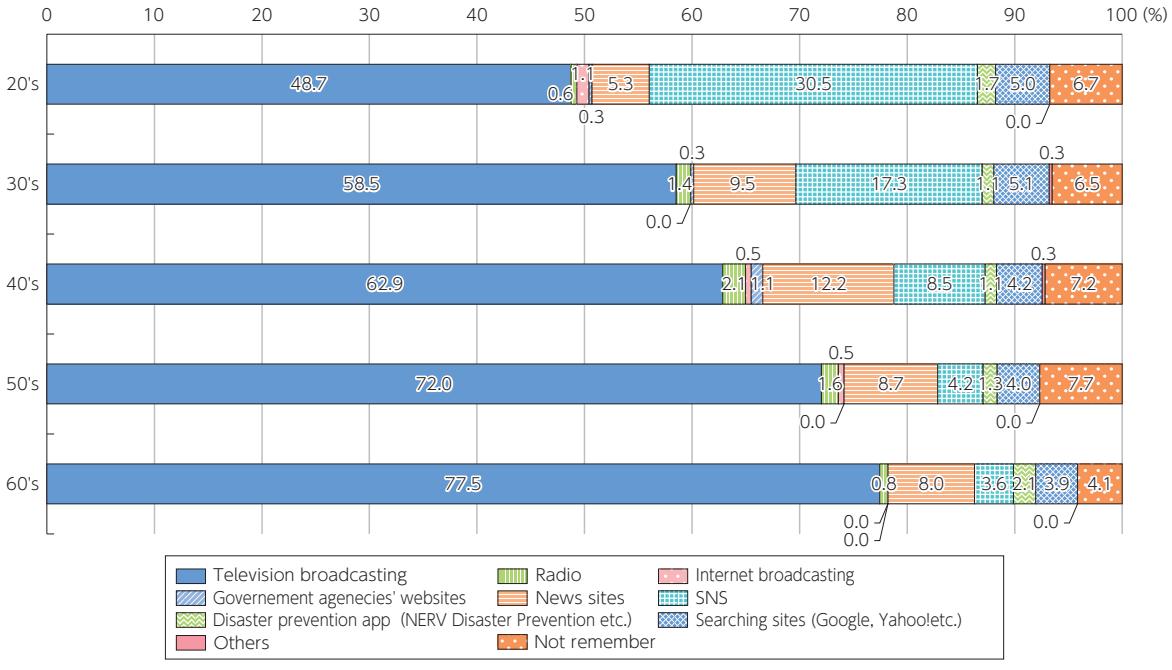


(Source) MIC(2024) "Research and study on the latest trends in information and communication technology research and development, as well as digital utilization, both domestically and internationally"

Figure (related data) Media firstly accessed after noticing the earthquake (by detailed media)
URL: https://www.soumu.go.jp/johotsusintokei/whitepaper/ja/r06/html/datashu.html#f00025
(Data collection)

Looking at the data by age group, television broadcasts were the most accessed across all age groups, with the percentage increasing with age. Among those in their 20s, a high percentage also mentioned SNS (30.5%), with X (formerly Twitter) being the most common.

Figure 1-2-1-11 Media firstly accessed after noticing the earthquake by age



(Source) MIC(2024) "Research and study on the latest trends in information and communication technology research and development, as well as digital utilization, both domestically and internationally"

Figure (related data) Utilized source of information (by purpose, select three options in the order of usefulness)
URL: https://www.soumu.go.jp/johotsusintokei/whitepaper/ja/r06/html/datashu.html#f00027
(Data collection)

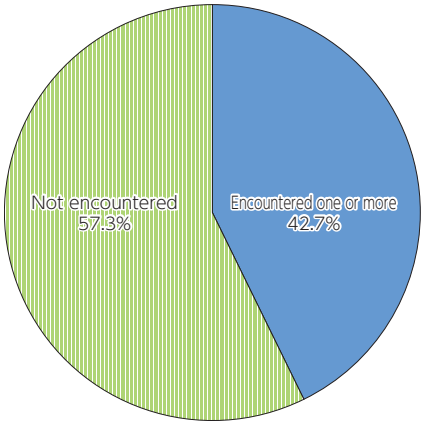
Figure (related data) Utilized source of information (by purpose, whether to feel the earthquake)
URL: https://www.soumu.go.jp/johotsusintokei/whitepaper/ja/r06/html/datashu.html#f00028
(Data collection)

(3) Encountering unverified information

While SNS such as X (formerly Twitter) contributed to safety confirmation and information collection, especially among younger people, these platforms also saw the spread of unverified information, causing confusion.

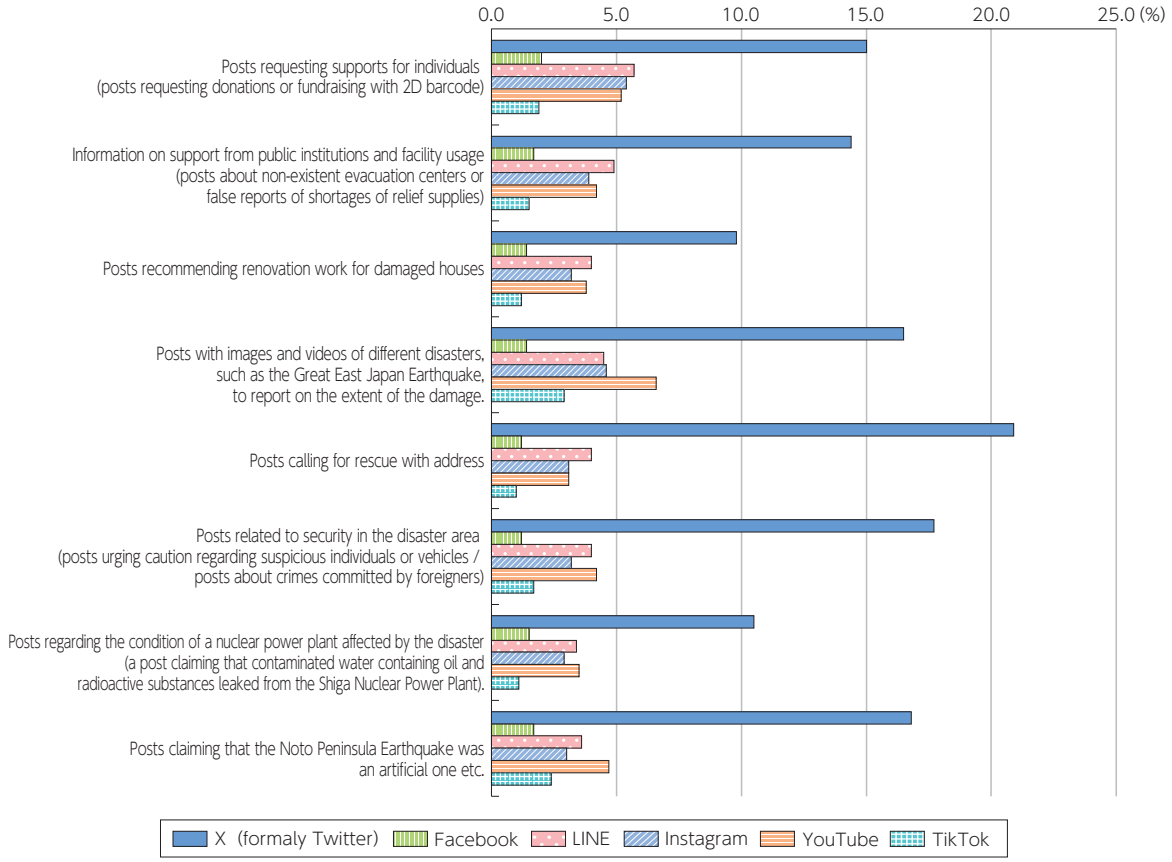
The percentage of respondents who encountered at least one piece of unverified information on SNS was 42.7%, with X (formerly Twitter) having the highest percentage.

Figure 1-2-1-12 Percentage of encountering unverified information on SNS



(Source) MIC(2024) "Research and study on the latest trends in information and communication technology research and development, as well as digital utilization, both domestically and internationally"

Figure 1-2-1-13 Unverified information to encounter by SNS

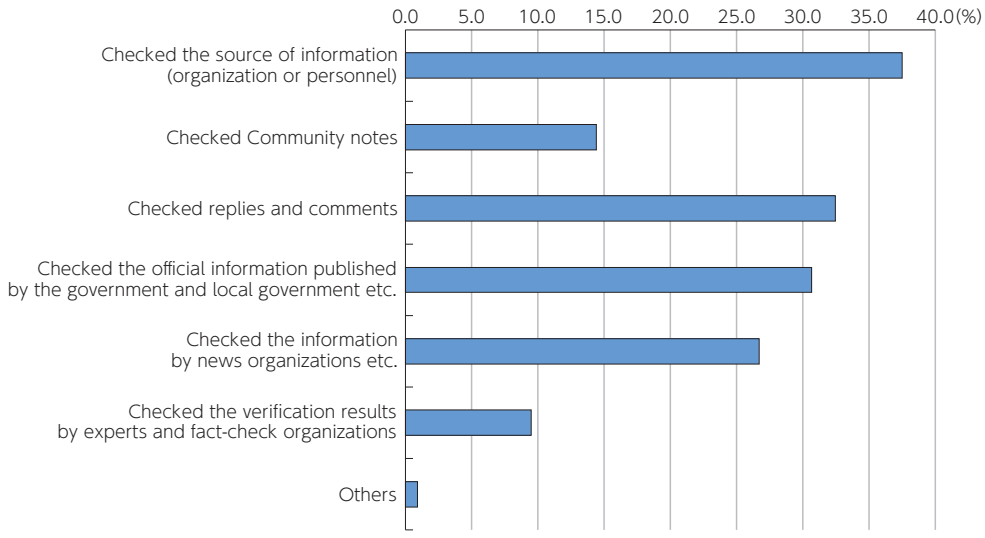


(Source) MIC(2024) "Research and study on the latest trends in information and communication technology research and development, as well as digital utilization, both domestically and internationally"

Next, when asked how they felt about the reliability of the information they encountered, approximately 65% of respondents across various categories answered that they "could not determine its authenticity." Among them, about 30-40% attempted to verify the information.

Furthermore, when those who actually tried to verify the authenticity of the information were asked about their methods, the highest percentage (37.6%) said they "checked the source of the information (organization or individual)." About 30% confirmed the information through official sources or news organizations.

Figure 1-2-1-14 How to check unverified information



(Source) MIC(2024) "Research and study on the latest trends in information and communication technology research and development, as well as digital utilization, both domestically and internationally"

Among those who encountered such information, 25.5% admitted to sharing it with acquaintances or disseminating it to a broader audience. The reasons given for this included "believing the information would be useful to others," "finding the information interesting," and "wanting to alert others to the possibility that the information might be incorrect."

Figure (related data) Reasons why to disseminate the unverified information
URL: https://www.soumu.go.jp/johotsusintokei/whitepaper/ja/r06/html/datashu.html#f00032
(Data collection)

4. Other examples to utilize information and communications

(1) Utilization of drones and robots

In the earthquakes, drones and robots were utilized for assessing damage, conducting rescue operations, and transporting supplies.

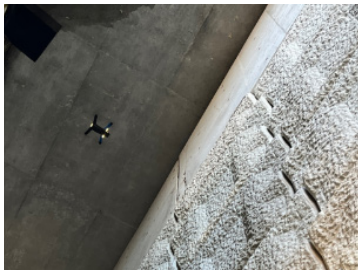
NiX JAPAN and KDDI Smart Drone, upon request from Hakui City in Ishikawa Prefecture, conducted an emergency inspection of bridge damage using drones on January 17. The use of drones allowed for comprehensive imaging even in narrow spaces, enabling immediate confirmation of damage to components such as bearings, piers, and abutments.

Figure 1-2-1-15 Utilizing drones for emergency inspection of bridges


Staffs of KDDI SmartDrone controlling drones


Staffs of NiX JAPAN checking real-time video shot by drone


A part of abutment and bearing shot by drone


Skydio 2+ flying to inspect A part of abutment shot by


A machine to control drone (screen for checking the spots of inspection)


A part of abutment shot by drone

(Source) NiX JAPAN

Additionally, the Japan UAS Industrial Development Association (JUIDA), upon request from Wajima City on January 4, collaborated with five companies including Blue Innovation to conduct initial disaster support activities such as search and damage assessment and supply transportation using drones within the city[9]. For instance, starting January 8, with the cooperation of Aeronext and ACSL, drones were used to deliver medical supplies to shelters in isolated areas. These efforts confirmed the usefulness of drones in rapid initial response at actual disaster sites. However, challenges for future rapid deployment were identified, including issues with obtaining flight permits in designated emergency airspace, functional challenges such as difficulties with weather and long-duration flights, and personnel shortages.

Furthermore, in the disaster area, robot dogs were introduced by the Japan Ground Self-Defense Force to assist in reconnaissance of evacuation routes and guiding evacuees to secondary shelters.

[9] News release by Blue Innovation and others "Regarding the initial disaster support activities of five drone-related companies related to the 2024 Noto Peninsula Earthquake" <https://www.blue-i.co.jp/news/release/pdf/20240208release_bi.pdf>

Figure 1-2-1-16 Guidance support for disaster victims by robot dogs

(Source) Official account in X of Japan Ground Self-Defense Force (January 17, 2024)

(2) Online provision of public services

A Remote services for disaster victims

As an online service for disaster victims, various municipalities provided online applications for disaster certificates, with 5,575 applications submitted by January 21.

Additionally, online medical consultations were offered to connect evacuees in shelters with their primary care physicians. NTT DOCOMO, in cooperation with Ishikawa Prefecture, the Ishikawa Medical Association, the Ishikawa Pharmacists Association, the Ministry of Health, Labour and Welfare, and the MIC, implemented online medical consultations and prescription systems to maintain the community between evacuees and their local doctors in Noto, ensuring the continuation of regional healthcare even in environments away from their homes.

B Remote support for affected municipalities

Remote support initiatives were also conducted for affected municipalities by other municipalities. As part of damage assessment support, Kumamoto City, Hamamatsu City, the NTT East Japan Group, ESRI Japan, and the NTT West Japan Group collaborated to conduct housing damage assessment surveys using drones and 360-degree cameras in Suzu City, Ishikawa Prefecture. The images obtained were used to support damage assessment from remote locations.

Additionally, a system called "Proxy Donations," where other municipalities accept donations on behalf of the affected municipalities through hometown tax intermediary sites, was widely utilized.