

Thinking about How to Reduce Disaster Risks at the National and Community Levels

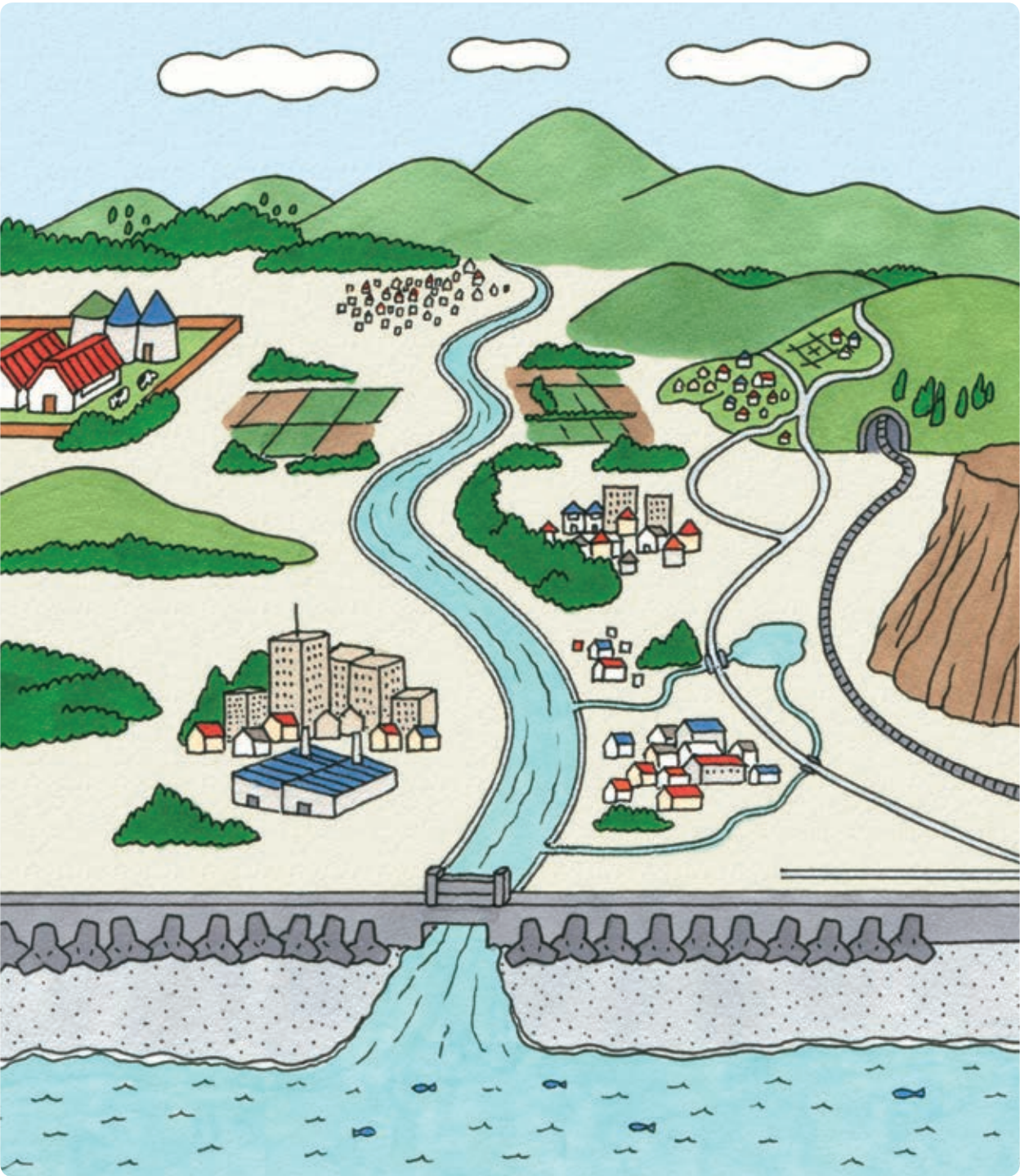


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Learning how to reduce disaster risks at national and community levels

Learning to think about what we can do to protect the nation and communities from disasters, such as earthquakes and heavy rains

We receive various gifts from nature.



List nature's gifts.

.....

.....

.....

.....

.....

.....

We cannot live without these gifts from nature.

When heavy rain occurs...

Mudflows

Large amounts of earth and water flow like a torrent through mountain valleys, as shown in the picture at right.



July 2009: Damage caused by heavy rain in Chugoku and northern Kyushu; near the Sabayama Tunnel on National Route 262 in Hofu City, Yamaguchi (Institute of Scientific Approaches for Fire & Disaster)

Floods

Towns and farmland flood due to a breach in a levee or the flooding of a river. Damage to underground malls is particularly serious!



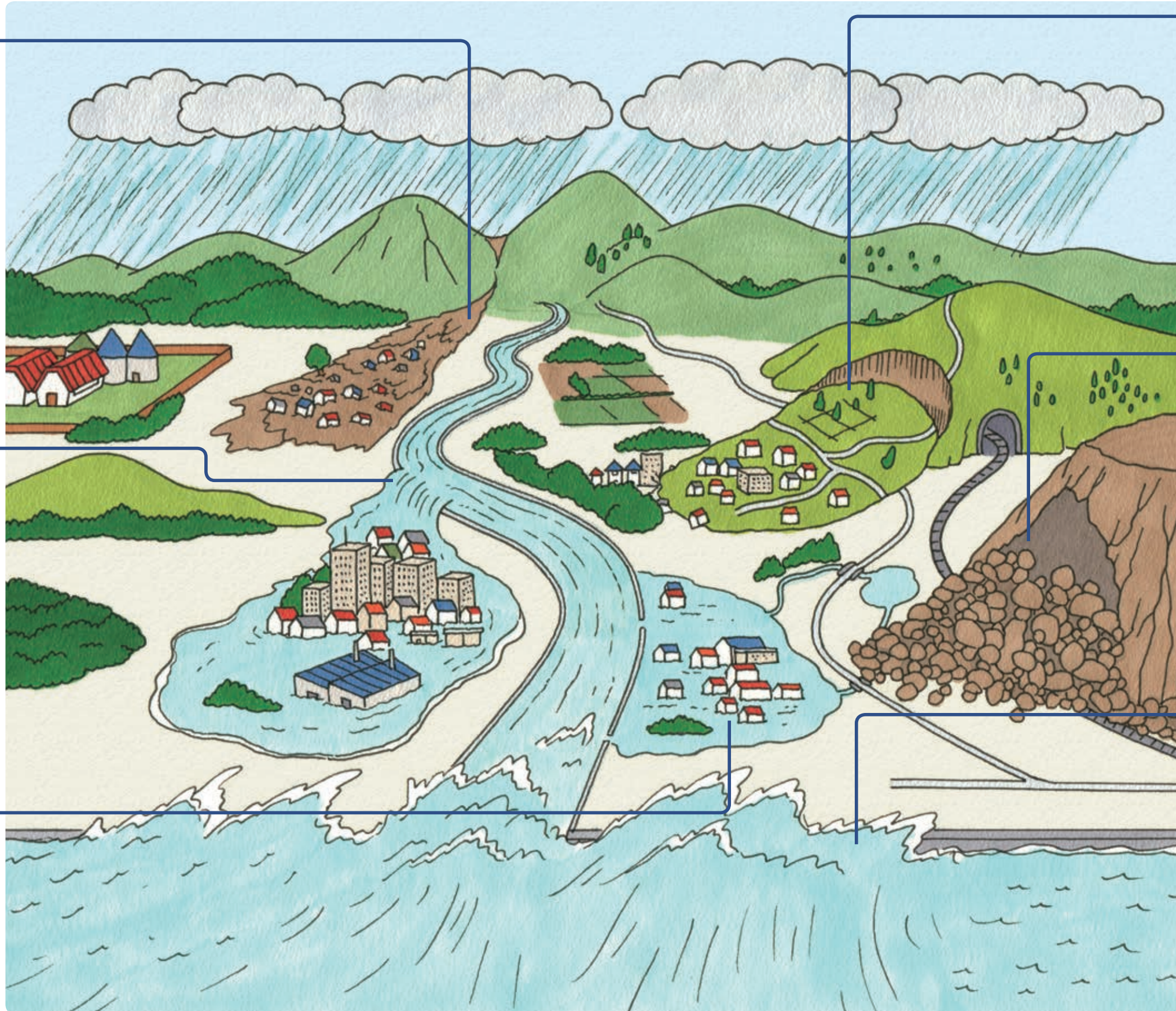
June 1999: Flood; Fukuoka City (Ministry of Land, Infrastructure, Transport and Tourism)

Inland floods

Heavy rain in urban areas does not drain properly into rivers or drainage systems and causes flooding. This is a typical urban calamity caused by heavy rain.



2007: Damage caused by Typhoon No. 9; Ohira District, Numazu City (Numazu Office of Rivers and National Highways, MLIT)



Landslides

Slopes soften due to rainfall and slide.



1995: Great Hanshin-Awaji Earthquake (landslides caused by the earthquake); Nishinomiya City (Institute of Scientific Approaches for Fire & Disaster)

Cliff failures

Rainfall can cause the sudden failure of steep cliffs.



2008: Iwate-Miyagi Inland Earthquake; cliff failure at Yuhama Onsen (Sendai City Fire Station)

Tidal waves

Strong low pressure causes tidal waves, in which seawater flows into coastal areas and farmland.



September 2003: Damage caused by Typhoon No. 14; near Omisaki, Shimane (Izumo Office of Rivers)

Mudflows, floods, landslides, cliff failures, tidal waves, etc. can damage homes and kill large numbers of people.

When a big earthquake occurs.

Landslides and cliff failures

An earthquake may cause landslides and cliff failures, damaging roads and houses.



1995: Great Hanshin-Awaji Earthquake (rockfalls); Rokkosoan Driveway (Kobe City)

Collapse

Old wooden houses are most likely to suffer damage or collapse. Tall buildings may also collapse, crushing many people to death.



1995: Great Hanshin-Awaji Earthquake; western part of the northern district of JR Shin-Nagata Station (Kobe City)

Blackouts

When power plants, substations, and power lines are damaged, surrounding areas experience blackouts.

Tsunamis

Lowlands are vulnerable to tsunamis. A large tsunami could overflow low levees and reach several kilometers inland.



2011: Great East Japan Earthquake; Wakabayashi, Sendai City (Sendai City)

Infrastructure damage

Power poles, buildings, bridges, and expressways, etc. can be damaged, blocking traffic.



1995: Great Hanshin-Awaji Earthquake; collapse of the Hanshin Expressway at Fukaehonmachi (Kobe City)

Fires

Large fires can occur in areas with many wooden houses, killing many people.



1995: Great Hanshin-Awaji Earthquake; 6-chome, Futaba-cho (Kobe City)

Tsunamis

A large tsunami can come upstream in rivers several to tens of kilometers.

Liquefaction

Due to quakes, reclaimed land liquefies, expanding damage in coastal areas.



2011: Great East Japan Earthquake; damage to a manhole in the Takasu District, Urayasu City (Institute of Scientific Approaches for Fire & Disaster)

Fires

If an oil tank is damaged, a large fire can break out in a coastal area.



2011: Great East Japan Earthquake; fire at Cosmo Oil's Chiba Refinery in Ichihara City, Chiba (FY2014 White Paper on Fire and Disaster Management)

Earthquakes, tsunamis, landslides, etc. damage houses, buildings, roads, and railroads and cause fires. Many people can be killed, power and gas supplies can be suspended, many factories shut down and communication systems can be disrupted.

What will happen to the nation and communities if we are unprepared for a large earthquake or heavy rain?

Immediately after a disaster

Imagine what can happen based on what you have learned so far.

Many buildings collapse.



An underground mall floods.



Power supplies are suspended and telephones, communication equipment, and other electrical appliances cannot be used.



Many people are injured and cannot receive proper treatment due to a lack of doctors.



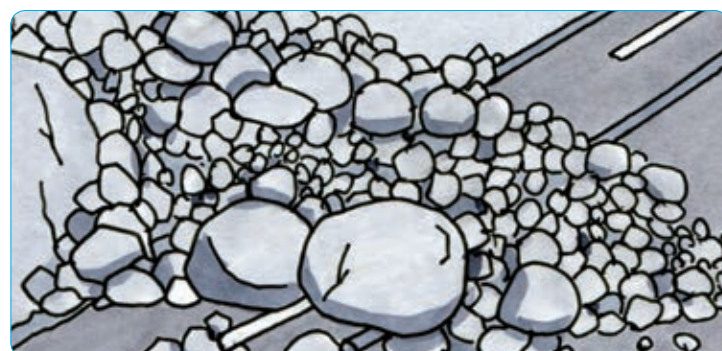
A large fire breaks out.



Ordinary life becomes impossible as gas and water supplies are suspended. Even toilets do not work.



Roads and railroads are blocked (no help arrives).



Many people are killed.



For some time after a disaster

Imagine life for some time after a disaster.

Many people lose their homes.



People who lose their homes have to live in shelters.



Affected areas face shortages of doctors, nurses, drugs, food and water.



If damage to power plants, factories and farmland is significant, power, food and other materials will also become scarce.



Power and gas are unavailable for some time.



Factories are shut down, which may cause companies to go bankrupt and leave workers unemployed.



People cannot use cars due to gasoline shortages.



If these situations last for long periods of time, an increasing number of people living in shelters may lose their lives.

Physically disabled people, elderly people, women, children, and foreigners are particularly vulnerable. The number of earthquake-related deaths from the Great East Japan Earthquake (i.e. the recognized number of people who succumbed to illness and subsequently died while living in shelters) was 3,089 as of the end of March 2014.

If significant damage is caused to power plants, factories and farmland, supplies of power, food, and other materials will become scarce even **outside the affected areas.**

Long-term aftermath

The greatest threat posed by a disaster lies in its aftermath. It may be difficult, but try to imagine the aftermath of a disaster.

- Transportation, such as the Shinkansen, will be unavailable for a long time, and various businesses will be delayed...
- Expressways, etc. will be obstructed for a long time, and distribution will be disrupted...
- Ports will be closed for a long time, halting trade...
- Power and gas supplies will be insufficient and factories will shut down...

As a result,

Japan as a whole will suffer a recession.

Business, distribution, trade, factory production, etc. will all be suspended and...

Many companies will lose money.
Wages will decrease.
Companies will go bankrupt and many workers will lose their jobs.

This economic situation is called a recession.

The recession will be more serious in disaster-affected areas.

If the situation persists for a long time,

- Disaster-affected areas may be abandoned.
- Japan as a whole may fail to recover and go into decline...

Japan may become an unimaginably poor country.
(Wages further decrease and many people are unable to find stable work.)
Japan's international standing may decline, negatively affecting diplomacy.
(Japan may be disadvantaged in negotiations with other countries.)

Tax revenue may decrease significantly and Japan may lack the funds to take measures such as disaster prevention, education, social welfare, and national defense, etc.

Let's consider what we can do to avoid such a miserable future.



Hints

Disaster prevention measures are sometimes placed in the following three categories. Consider and write down what we can do in each category by making reference to the following pages.

Self-help efforts:

Protect yourself.

Mutual assistance:

Helping each other as part of a community, etc.

Public help:

The government and administrative organs offer help.

Disaster-resilient nation and communities (1)

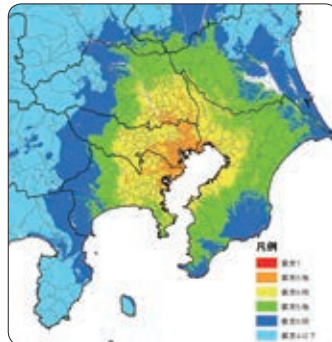
What do you know about disasters?

In order to reduce disaster risks at the national and community levels, everyone must understand that a disaster is sure to occur some day and imagine what will happen in the event a disaster occurs. When you meet this requirement, you can escape a disaster.

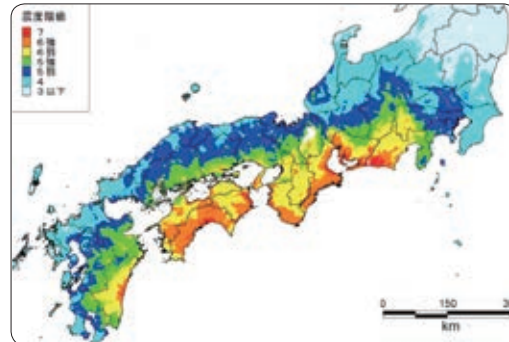
Self-help efforts:

Expected major earthquakes: Nankai Trough Giant Earthquake and Inland Earthquake in Tokyo

● Areas expected to be hit by the Inland Earthquake in Tokyo: a major earthquake is expected to hit the capital area, the center of Japan's government and economy. The probability of such an earthquake occurring within the next 30 years is scientifically predicted to be 70%. At worst, such an earthquake is predicted to result in approximately 20,000 deaths and economic losses of 96 trillion yen (approx. 20% of Japan's annual GDP).



● Areas expected to be hit by the Nankai Trough Giant Earthquake: the giant earthquake is expected to be accompanied by a large tsunami, resulting in 320,000 deaths and economic losses of 220 trillion yen (approx. 40% of Japan's annual GDP) at worst. The probability of such an earthquake occurring within the next 30 years is scientifically predicted to be 70%.



Let's think. 🗣️

How can we improve the public's understanding?

Earthquake-resilient buildings

Sturdily built homes, office buildings, stations and factories may not be damaged by earthquakes. Individuals, companies, and governmental organizations should try to ensure that their buildings are more earthquake-resilient.

Self-help efforts:

Public help:

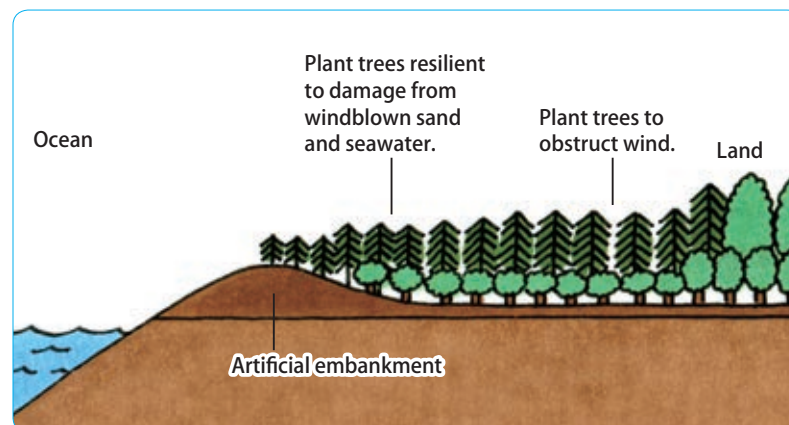


Let's think. 🗣️

How can we promote this kind of construction work?

Construction of levees near water to protect towns

Levees constructed in coastal areas and on riverbanks can prevent floods caused by tsunamis and tidal waves and protect towns. Both concrete levees and earthen levees with trees planted on them are effective.



Earthen levees with trees
(natural levee with an artificial embankment and planted trees)

Let's think. 🗣️

What should we take into account when considering the construction of a levee?

Facilities for avoiding tsunamis and evacuation drills

In low-lying areas without areas of higher elevation, facilities for avoiding tsunamis will be constructed.

Tsunami towers are examples of such facilities. Residents should conduct evacuation drills to prepare for tsunamis. It is also important to offer cooperation to physically disabled and elderly people who cannot take refuge themselves and create towns based on the idea of universal design in which anyone can easily find refuge.

Mutual assistance:

Public help:

Public help:

Self-help efforts:



Where a dam exists to protect towns from floods and landslides

A large capacity dam can store rainwater even in the event of heavy rain and allow it to flow more gradually, preventing floods downstream. A check dam in a valley where mudflows are apt to occur can protect downstream towns from mudflows.

Public help:



Check dam
(protects towns from mudflows)



Advanced level

Replacements should be prepared for many things.

Damage to anything important may cause chaos which can be avoided by preparing replacements. For example...

● Business partners

If there is only one supplier of a material and this supplier sustains damage, a factory will be forced to cease all production.

● Private power generation equipment

Hospitals, factories, and broadcast stations have to cease operating if an earthquake causes a blackout. They can continue operating if they have their own power generation equipment.

● Roads and bridges

If there is only one road and/or one bridge accessing an area, damage to it will cause serious consequences because residents will be unable to evacuate or receive help.

● Railways

Damage to the Tokaido Shinkansen, for example, would throw the Japanese economy into chaos. This could be mitigated by constructing another Shinkansen line.

[Replacement for an expressway]

Double network with the Tomei Expressway and the New Tomei Expressway

The Tomei Expressway, which runs from Tokyo to Nagoya, has a problem in that various coastal portions of it could be blocked by tidal waves, etc. In order to solve this problem, the New Tomei Expressway was constructed inland where the risk of damage by earthquakes, tsunamis, or tidal waves is considered to be smaller. The New Tomei Expressway has already been partially opened and a double network with the Tomei Expressway was formed to allow the sharing of traffic. When a disaster occurs, the New Tomei Expressway will function as an alternate route for evacuation and emergency transportation.



Move various facilities from dangerous places to safer places.

Self-help efforts:

Public help:

First, determine what places are dangerous, and move things to safer places. Completing this can make the nation and communities disaster-resilient. Dangerous places include...

- 1 Coastal areas highly vulnerable to tsunamis (especially those without levees)
- 2 Areas near rivers highly vulnerable to flooding (especially those without dams or levees)
- 3 Towns highly likely to be hit by earthquakes (especially those with buildings vulnerable to earthquakes)
- 4 Reclaimed land (i.e. land that shakes a great deal and liquefies)
- 5 Bottoms of steep cliffs (which may easily collapse)
- 6 Valley floors (especially those without check dams and highly vulnerable to mudslides)

Let's think. Consider which facilities should be moved to make the nation and communities disaster-resilient.

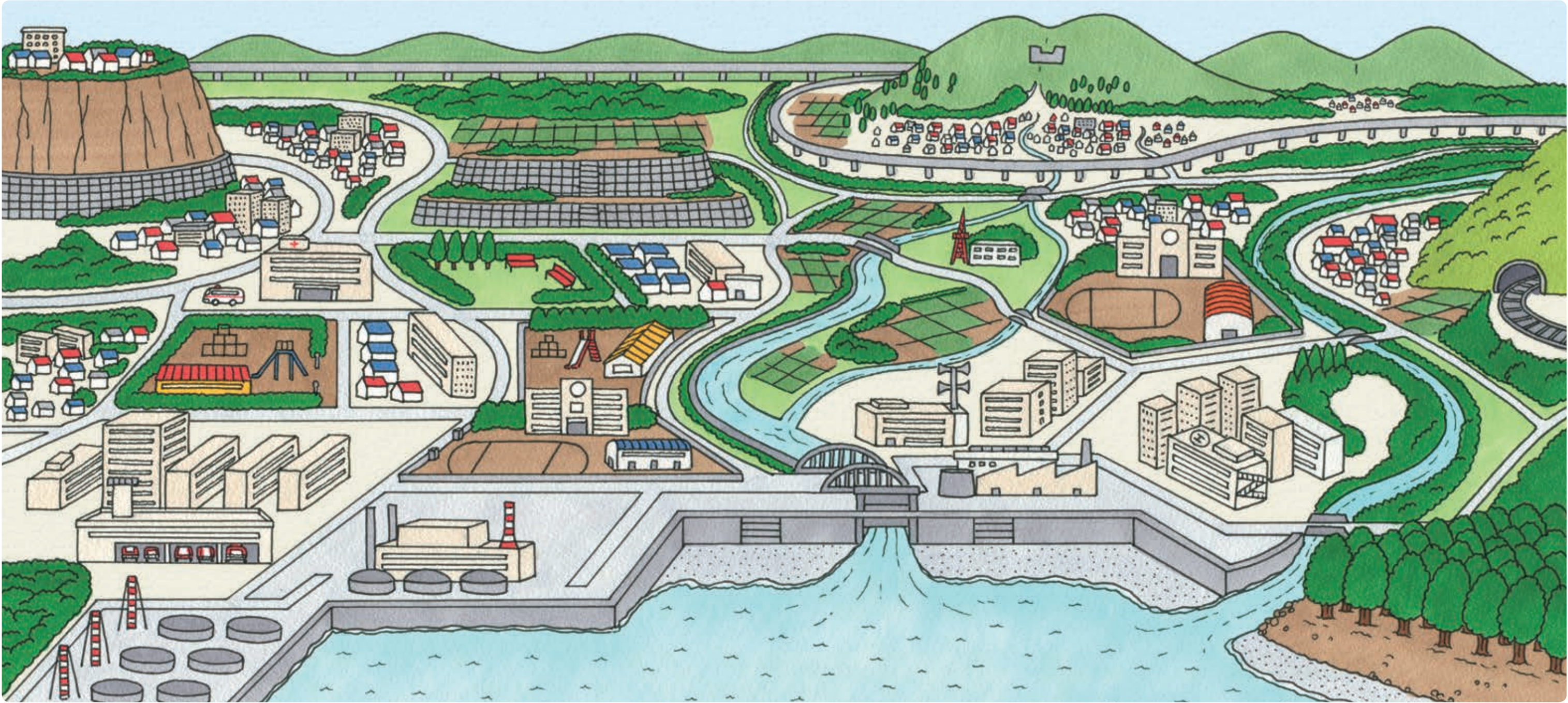
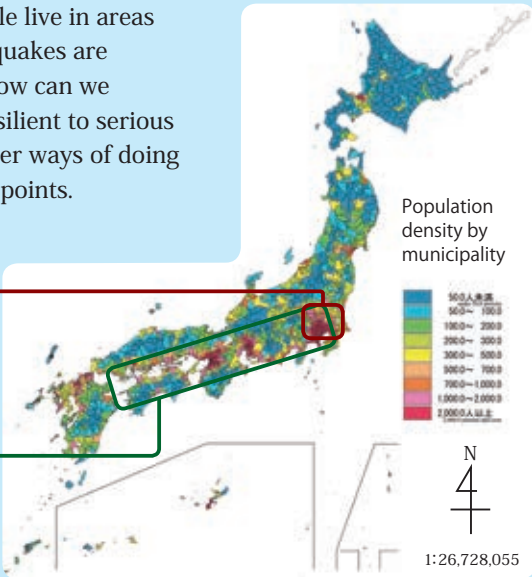
- Point 1 We can't move everything at once, so which facilities should be moved first?
- Point 2 If it is impossible to move a facility, how can its disaster-resistance be improved? Make reference to the preceding page in answering this question.

Advanced level

In Japan, many people live in areas where serious earthquakes are expected to occur. How can we make Japan more resilient to serious earthquakes? Consider ways of doing so from various viewpoints.

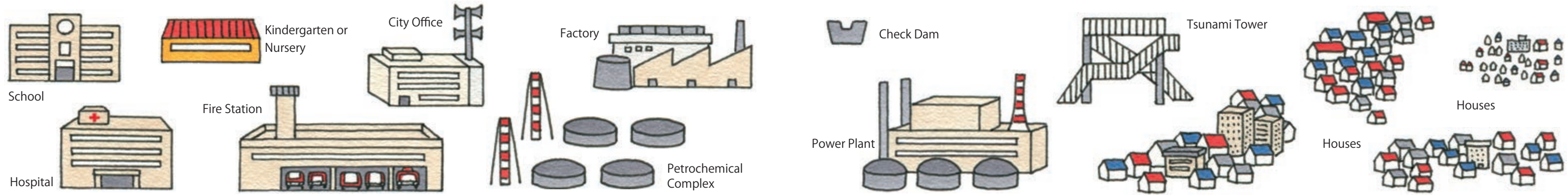
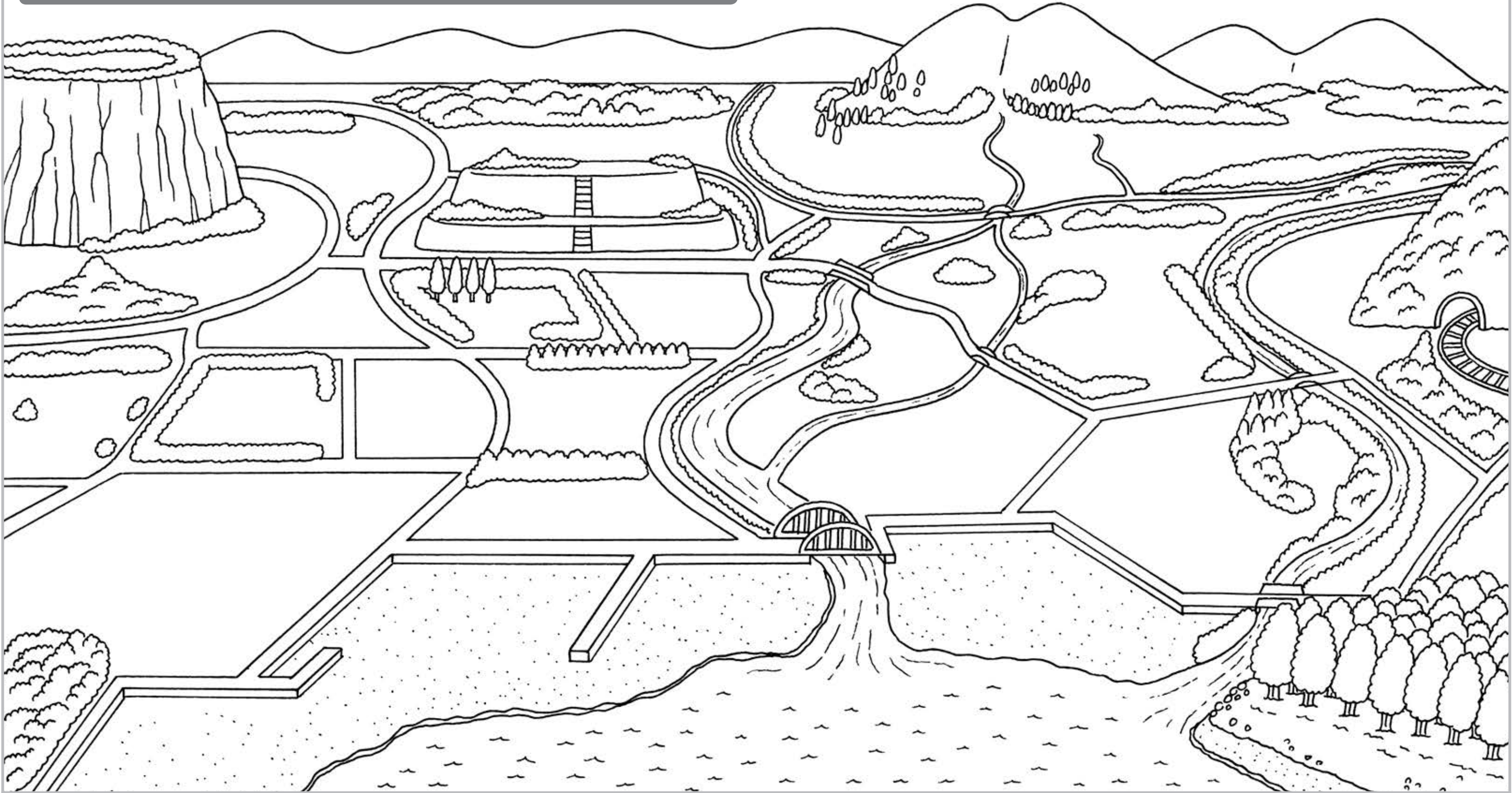
Areas expected to be affected by the Inland Earthquake in Tokyo: home to nearly 30% of the total population of Japan.

Areas expected to be affected by the Nankai Trough Giant Earthquake: home to nearly 70% of the total population of Japan.



Create a disaster-resilient town (worksheet)

Copy and paste pictures of schools and hospitals, etc. below on the blank map to create a safe, disaster-resilient town. Draw any other facilities you think necessary, such as levees and bridges.



Disaster-resilient nation and communities (3)

People offer help.

Mutual assistance:

Public help:

Even if a disaster occurs, when people offer help, many disaster victims can survive and recover and reconstruction work can proceed smoothly. The roles of the firefighters, policemen, Self-Defense Force personnel, government workers, construction workers, etc. are significant and mutual cooperation among neighbors is also very important. However, remember that it is most important that you protect yourself.

Self-help efforts:

Let's think.

Read the following stories and consider important factors in making your town more disaster-resilient.

- When the Great East Japan Earthquake occurred, many people were killed by the resulting tsunami. This means that most tsunami victims were still alive immediately after the earthquake. If they could have escaped from the tsunami, they might not have been killed.

Self-help efforts:



- At the time of the Great Hanshin-Awaji Earthquake, many people were trapped under the wreckage. Most were rescued by their neighbors.

Mutual assistance:



- The Self-Defense Forces conducted relief operations after the Great East Japan Earthquake. However, immediately after the earthquake, roads to affected areas were blocked with rubble and even the Self-Defense Forces could not pass. Personnel from local construction companies worked to remove the rubble with construction equipment and cleared the roads. Many had lost family members due to the tsunami. Personnel from local construction companies have also rescued disaster victims in other disasters, such as mudslides, heavy snow, and floods.

Public help:



Advanced level

Everyone should at all times consider how to reduce disaster risks at the national and community levels while taking people particularly vulnerable to disasters into account.

It is important for everyone to consider how to reduce disaster risks at the national and community levels from their own perspectives.

Each of us should consider and discuss appropriate measures to make the nation and communities disaster-resilient with parents, school teachers, and members of communities likely to be affected by disasters, including physically disabled and elderly people, as well as company workers, government workers, and politicians. We should implement various measures and conduct periodic evacuation drills to prepare for disasters.

Let's think.

Consider what can be done to ensure that we remain focused on these important issues at home, in school and within companies and government organizations.

Column A story about a fire in stacks of ripened rice straw and its aftermath

Outline of the story

On November 5 (old calendar), 1854, a large tsunami caused by the Ansei-Nankai Earthquake hit Hiro-mura in the Kishu Domain (presently Hirogawa-cho, Wakayama). The village headman, Goryo Hamaguchi, set fire to ripened rice straw that had just been harvested to guide villagers stranded in the dark to the heights. His sacrifice of his own property saved the lives of many villagers.

* This story was included in a Japanese fifth grade elementary school textbook from 1937-1946.



Goryo Hamaguchi
(Source: Hirogawa-cho Board of Education)

Post-disaster recovery and reconstruction efforts

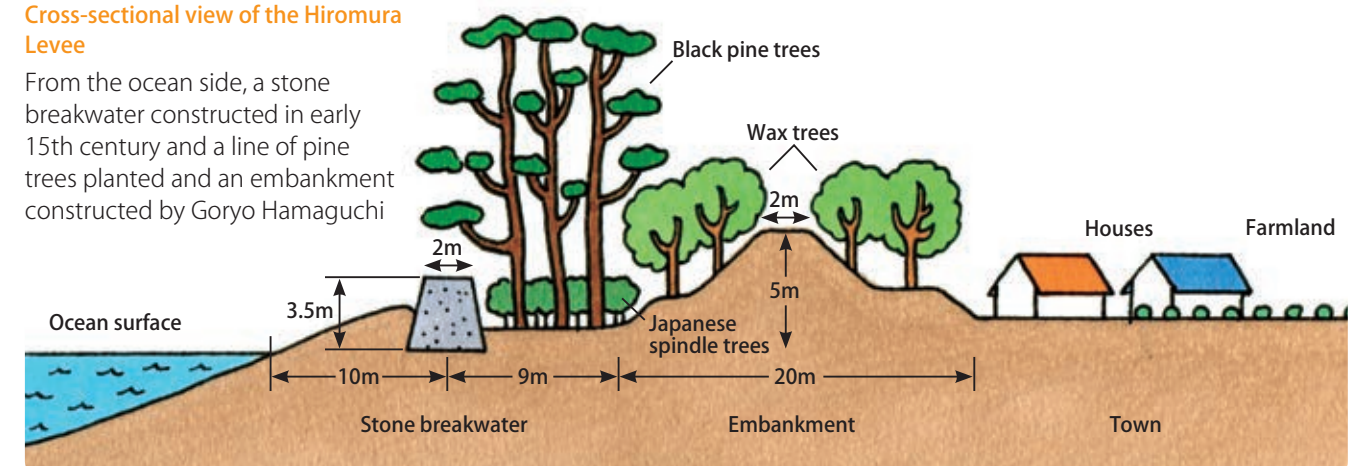
After the disaster, Goryo Hamaguchi built houses and provided them to disaster victims. Furthermore, he decided to invest large sums of his own money to construct a levee and paid daily wages to disaster victims who engaged in construction work to prevent them from moving out of the village. A 5 meter high, 600 meter long levee was completed in four years. At the time of the Showa-Nankai Earthquake in 1946, the Hiomura Levee, which still remains as it was first constructed, protected most of the village from a large tsunami.

Efforts to protect the levee

In 1903, 50 years after the 1854 Tsunami, volunteers from the village of Hiomura reinforced the levee to honor the memory of the tsunami victims and recall the great deeds of Goryo Hamaguchi. This marked the beginning of the Tsunami Memorial Festival, and since then, in November every year, local elementary school and junior high school students reinforce the levee and participate in other events to repair it and raise public disaster prevention awareness.

Cross-sectional view of the Hiomura Levee

From the ocean side, a stone breakwater constructed in early 15th century and a line of pine trees planted and an embankment constructed by Goryo Hamaguchi



Reference: Cabinet Office (Disaster Management) : http://www.tokeikyoku.or.jp/bousai/inamura-top_j.htm
Inamura no Hi no Yakata : <http://www.town.hirogawa.wakayama.jp/inamuranohi/>

National Resilience Promotion Office, Cabinet Secretariat

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Reviews of Supplementary Reading Materials for Learning How to Reduce Disaster Risks at the National and Community Levels

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