

Local disaster management plan and evacuation plan

Capacity Development for Flood Risk Management with IFAS
ICHARM, Tsukuba, Japan, 11 July 2013

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Acts related flood countermeasures

Disaster Countermeasures Basic Act (1961)

To protect life of the people is mandated by municipalities (City, Town and Village). The nation and prefectures are in the position to support them. Ministerial departments and prefectures are responsible for elaborating their own disaster management plans, provided these are in line with the Basic Disaster Management Plan. Likewise, municipalities develop their plans in line with their corresponding prefecture's plan

River Act (1964, 1997)

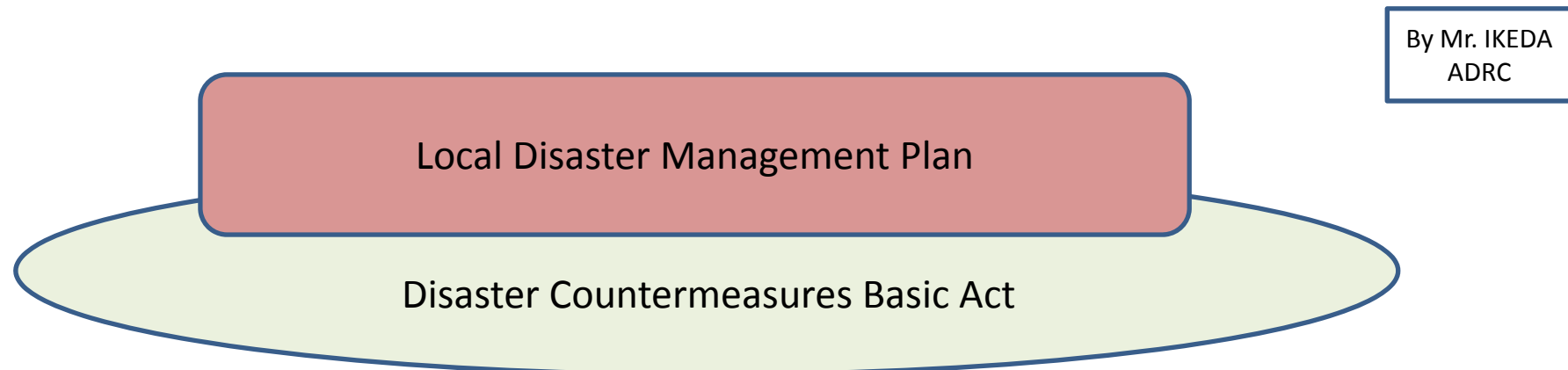
This is at the core of flood control legislation.

This law is to reorganize the role of the river administrations and to change the conventional section-by-section river management into a more integrated approach. It was then amended in 1997 to take into account economic and social changes, to emphasize the need for sound river environments, and to incorporate the opinions of local residents through river improvement planning systems. the River Law is for specifically on flood prevention structural measures. This law is in charge by MLIT.

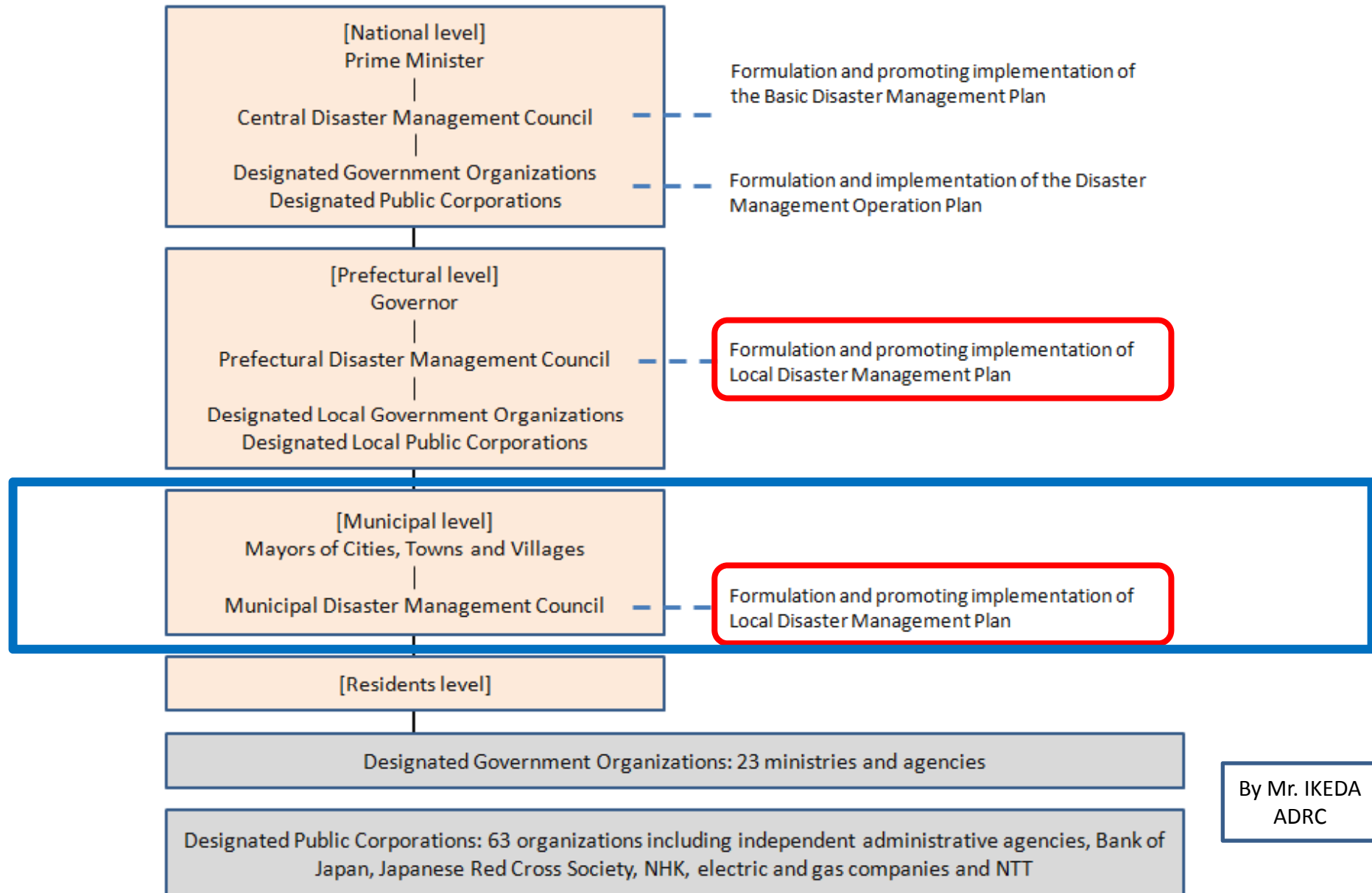
Flood-fighting Act (1949, 2005)

Flood forecasting and warning are required for certain rivers . Focuses on flood-fighting activities at the local level in reaction to flood events. Municipalities that include potential flood areas are required by revised law to prepare and disseminate flood hazard maps on the basis of maps of flood-prone areas created by the MLIT and the prefectures.

- In Japan, the **Disaster Countermeasures Basic Act** was enacted in 1961.
- Each Prefecture / City has own the **Local Disaster Management Plan** which is developed based on above Act.
- the **Local Disaster Management Plan** shows detailed activity in Pre-disaster, post disaster and Emergency Response such as SOP.



Outline of the Disaster Management System in Japan



Location of Hanyu City

—Hanyu City—

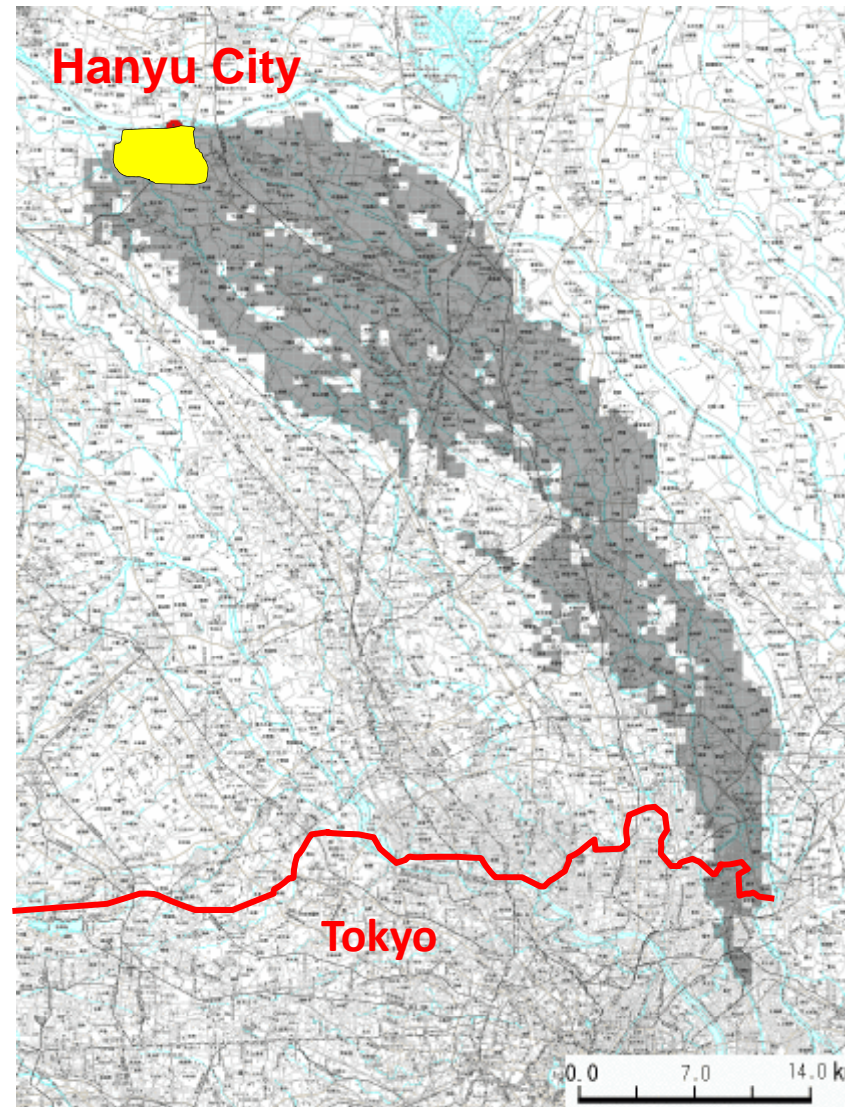
Hanyu City lies in a flat plain with its commercially developed downtown area. The city is surrounded by rich rice fields. Its northern border runs along Japan's second longest Tonegawa River (length: 322km, width: 720m~1,000m).



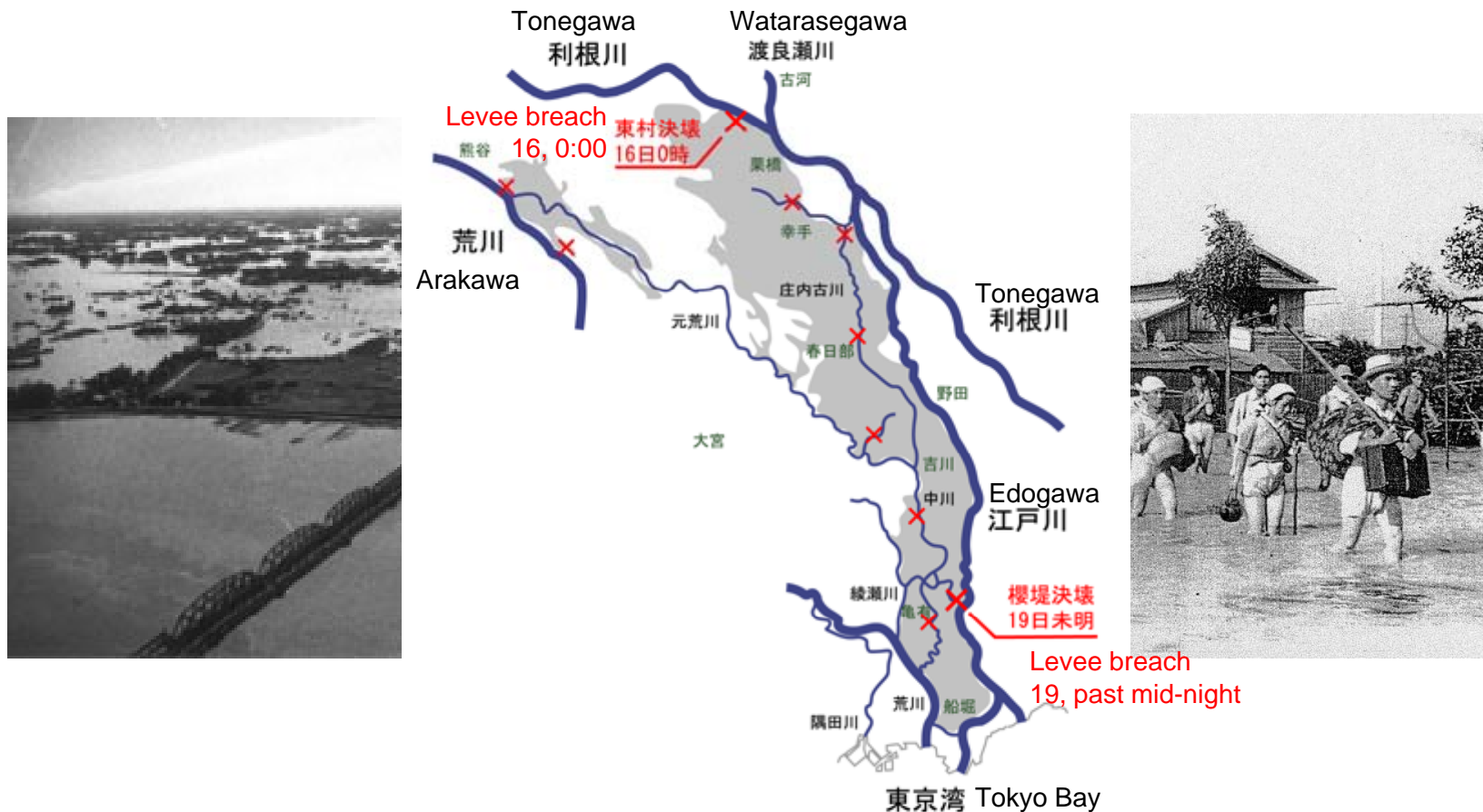
Hanyu City may be entirely flooded if a once-in-200-year rainfall hit the Tonegawa inundation risk area (i.e., a 3-day total rainfall of 318mm over the Tonegawa basin and the Hattajima upstream area). The city suffered a tremendous damage in 1947, when a large typhoon hit the area, causing a levee breach in neighboring Otone Town.

Tonegawa Flood Simulation

Inundation Area



Flood damage by a large typhoon in 1947



The floods caused by this typhoon killed 1,077 people with 853 missing and 1,547 injured. Also, 9,298 houses were damaged and 384,743 flooded. A total of 12,927ha of farmland was either washed out or buried. Still in a confusion after WW II, the Kanto area suffered tremendous damage with 400,000 people affected in total.

Content of Local disaster management plan (Hanyu City)

Part 1: General Provisions, Etc.

Chapter 1: Overview of Hanyu City Regional Disaster Prevention Plan

Chapter 2: Organizations Related to Disaster Prevention

Part 2: Earthquake Disaster Response

Chapter 1: Earthquake Disaster Prevention

Chapter 2: Emergency Earthquake Disaster Response Plan

Chapter 3: Earthquake Disaster Restoration and Recovery Response Plan

Chapter 4: Response Measures Plan to Accompany Tokai Earthquake Warning Declaration

Part 3: Wind and Flood Damage Response

Chapter 1: Disaster Prevention Plan

Section 1: Flood Damage Prevention Plan : 4

Section 2: Plan Regarding Establishment of Disaster Communications Network

Section 3: Plan Regarding Establishment and Inspection of Facilities and Equipment Pertaining to Disasters

Section 4: Plan Regarding Drills: 5

Section 5: Disaster Prevention Plan

Section 6: Disaster Prevention Education Plan

Section 7: Plan Regarding Enlightenment of Disaster Prevention Knowledge

Section 8: Disaster Prevention Activities Outpost Plan

Section 9: Evacuation Plan : 9

Section 10: Stockpiling of Supplies, Equipment and Materials

Section 11: Establishing Medical Treatment Network, Etc.

Section 12: Hydrological Data Acquisition Plan:

Section 13: Matters Regarding Disaster Prevention Measures for Schools, Hospitals, Factories, Offices, Commercial Facilities, Etc.

Section 14: Disaster-Preventive Urban Development Plan

Section 15: Matters Regarding Disaster Prevention Measures for Cultural Assets

Section 16: Establishment Plan Network for Ensuring Safety of Necessary Relief Parties in Time of Disaster

Section 17: Large-Scale Disaster Prevention Plan

Content of Local disaster management plan (Hanyu City) cont'd

Chapter 2: Emergency Disaster Response Plan

Section 1: Mobilization Plan

Section 2: Emergency Activities Plan

Section 3: Disaster Information Communications Plan

Section 4: Disaster Public Relations Plan

Section 5: Evacuation Plan: 9

Section 6: Applicable Plan under Disaster Relief Act

Section 7: Food Supply Plan

Section 8: Supply Plan for Clothing, Daily Essentials and Other Supplies

Section 9: Water Supply Plan

Section 10: Emergency Medical Treatment and Midwifery Care Plan

Section 11: Plan for Placement of Emergency Provisional Housing and Emergency Repairs for Disaster-Affected Residences

Section 12: Epidemic Prevention Plan

Section 13: Animal Protection in Times of Disaster

Section 14: Sanitation Plan

Section 15: Plan for Searching and Rescuing Disaster Victims and Storing and Burying Remains

Section 16: Obstruction Removal Plan

Section 17: Transport Plan

Section 18: Labor Supply Plan

Section 19: Emergency Response Plan for Transportation

Section 20: Emergency Disaster Response Plan for Public and Transportation Facilities

Section 21: Response Plan for Educational and Cultural Assets

Section 22: Accepting Support

Section 23: Fire Prevention Plan

Section 24: Self-Defense Force Dispatch Request Plan

Section 25: Flood Fighting Plan: 23

Section 26: Emergency Disaster Response Plan for Electrical Facilities

Section 27: Emergency Disaster Response Plan for Telecommunications Equipment

Section 28: Mutual Support and Cooperation Plan

Section 29: Ensuring Safety of People in Need of Aid during Disaster

Chapter 3: Disaster Restoration Plan

Part 4: Accidental Disaster Response

Example of evacuation advice (order) system in Japan

In case of Hanyu City, Saitama prefecture

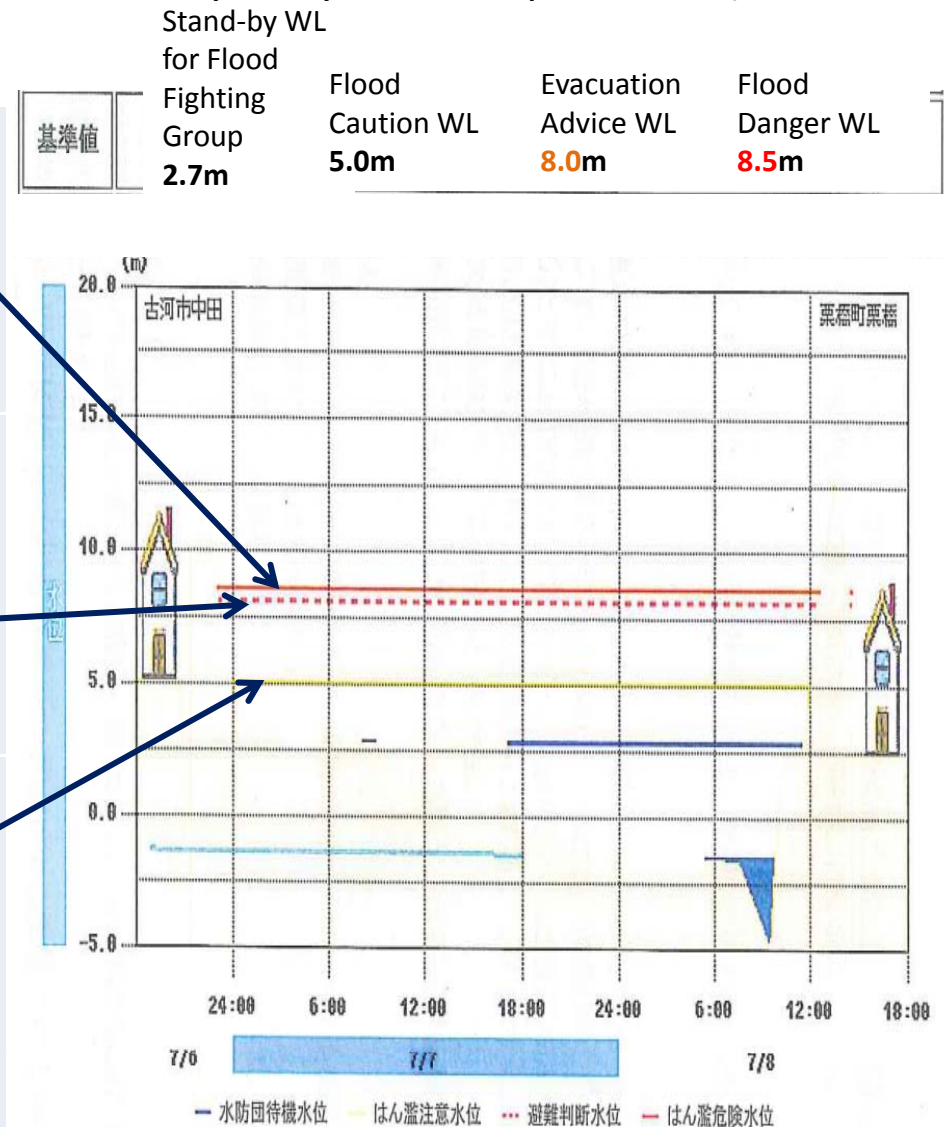
	Situation when Issuing advices or orders	Requested Actions to Residents
Advice on preparing evacuation (evacuation advice to those who need assistance)	<ul style="list-style-type: none"> There is a need to start evacuation for those who need more time for evacuation, such as people needing assistance in emergency situations. 	<ul style="list-style-type: none"> Those who need assistance in emergency situation should start evacuation to designated evacuation places (members who will assist those people should also start assisting) Other people should start preparations for evacuation, such as contacting families, preparing disaster kits.
Evacuation Advice	<ul style="list-style-type: none"> There is a need to start evacuation for ordinary people and when possibility of human damage is clearly expected. 	<ul style="list-style-type: none"> Those who can make ordinary evacuation actions should start evacuation to designated evacuation places
Evacuation Order	<ul style="list-style-type: none"> Expectation of human damage is apparently very high, due to the fact such as (1) predictive phenomena were observed, (2) Situations is different lining besides river banks, etc. Human damage already reported 	<ul style="list-style-type: none"> Those who are making evacuation must finish evacuation immediately. People who have not yet evacuated must immediately take evacuation actions, when there is no time, must at least take any actions to protect their own lives.

Criteria of issuance of evacuation advice (order)

Based on nearby WL station

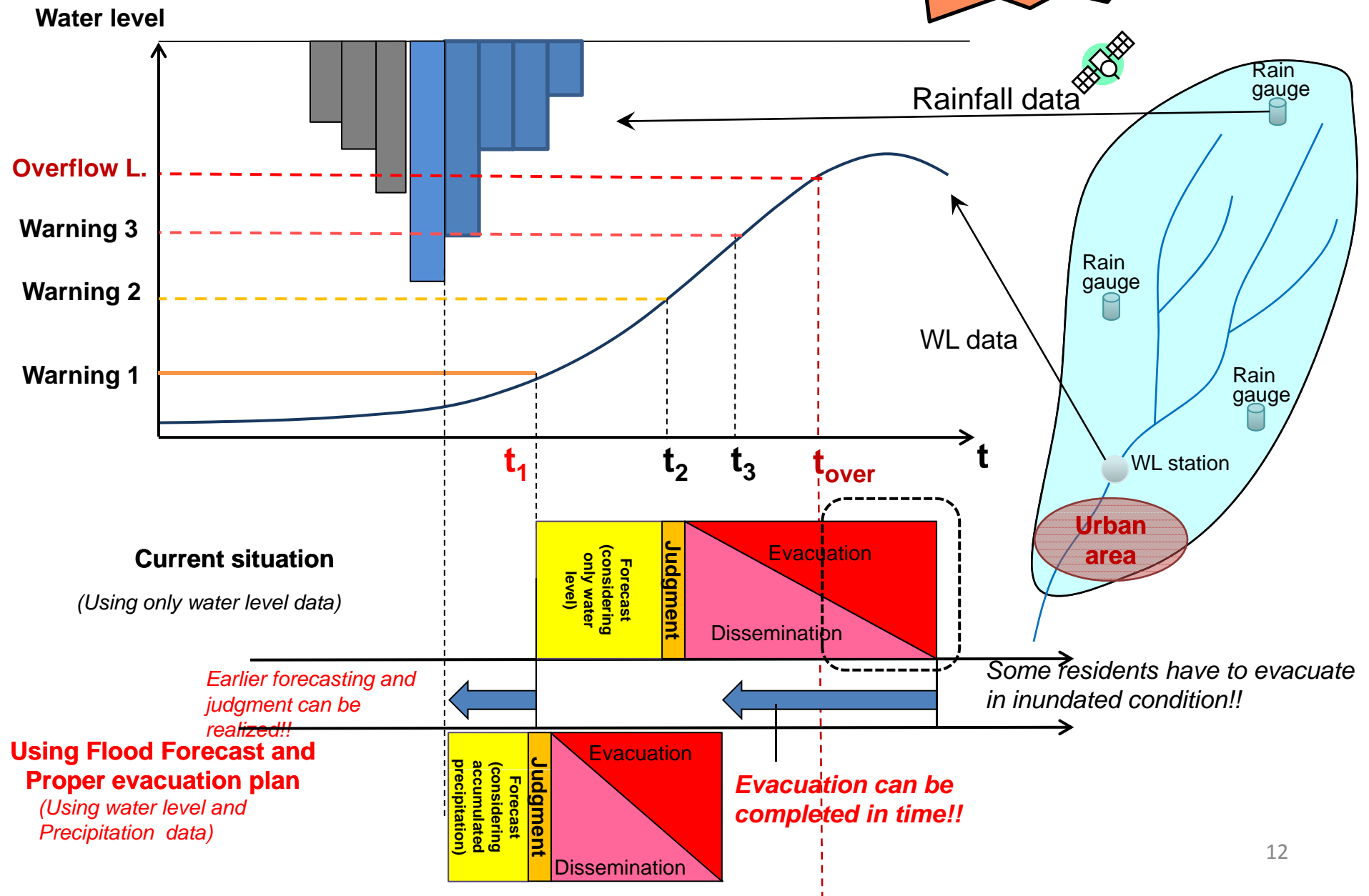
(In case of Hanyu City, Saitama prefecture)

Evacuation Order	<p>Dyke breach was reported</p> <p>* Water Level has reached 8.5m and still expected to rise</p>
Evacuation Recommendation	<p>* Unusual phenomenon reported on flood management facilities (which could cause leakage, dyke breach, etc.)</p> <p>* Water Level has reached 8.0m and still expected to rise</p>
Advice on preparing evacuation (evacuation advice to those who need assistance)	<p>* Water Level has reached 5.0m and still expected to rise</p>



With Rainfall & Flood Forecast

How to do in order to be in time



Flood Hazard Map

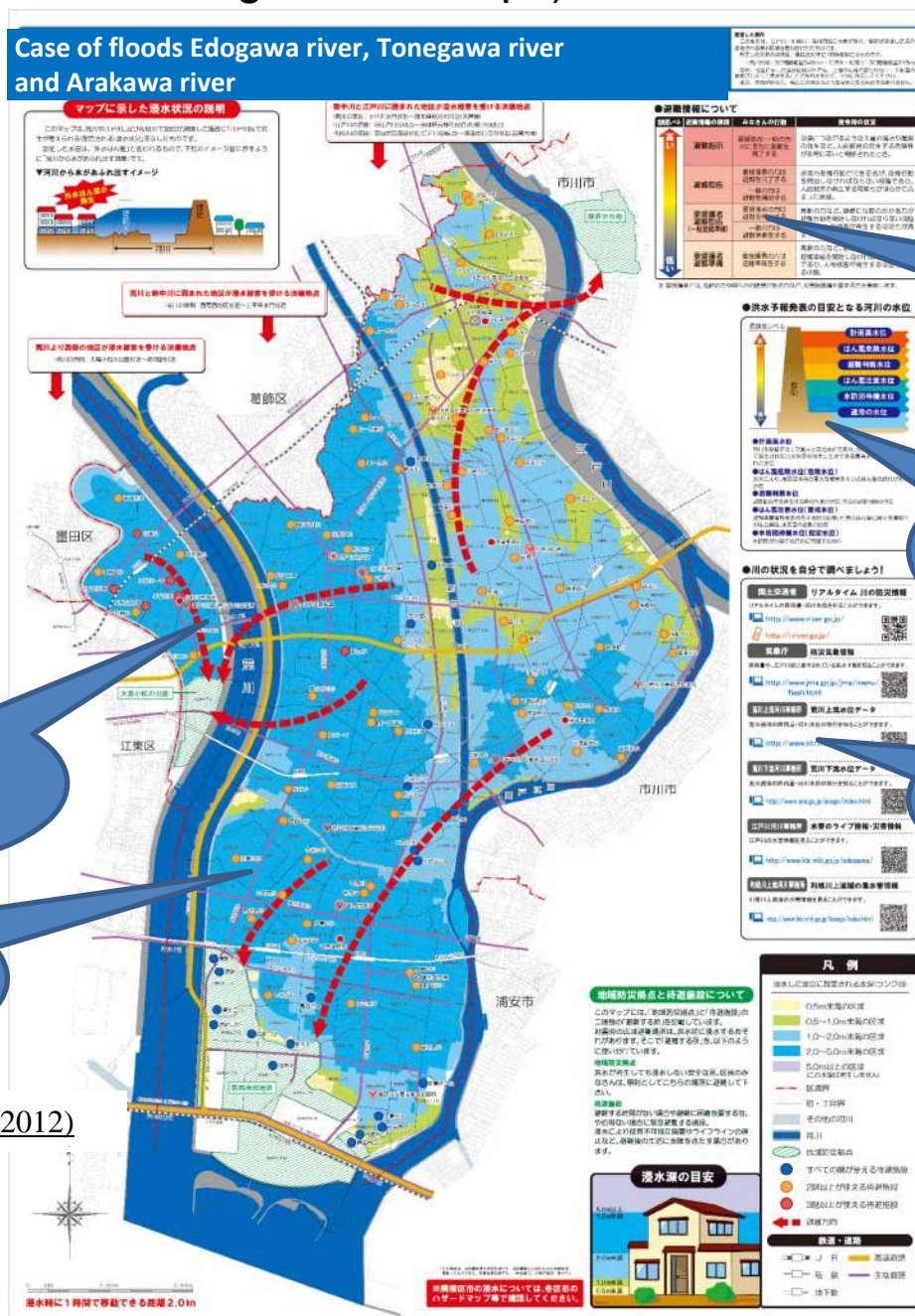
- The “Flood Hazard Map” herein referred to is a map that graphically provides information on inundation (predicted inundation areas, inundation depth, etc.), as well as on evacuation (location of evacuation refuges, evacuation routes, dangerous spots on evacuation routes, etc.) in an easy-to-understand format. The goal is to quickly evacuate local residents in a safe and proper manner in the event of floods. The map is produced and publicized through a joint effort by those in charge of disaster prevention and those in charge of rivers and hydrology in the respective local municipalities.
- Flood Hazard Maps shall be prepared principally by the local disaster prevention division of the respective municipalities, in close cooperation with the local residents, qualified experts, NGOs and other pertinent bodies.

Evacuation countermeasures (preparing and distributing hazard maps)

As material intended to contribute to evacuation when a flood occurs, cities, towns, and villages prepare maps (flood hazard maps) which present inundation districts, inundation depth, and evacuation sites, underground shopping areas, etc. and methods of transmitting flood predictions, etc. based on predicted inundation districts provided by the national or prefectural governments, and distribute these maps to all their residents.

Indication of evacuation direction

Indication of predicted inundation districts and inundation depths



Evacuation information

Flood prediction Announcement criteria

Contact points Administrative bodies etc.

※Creating flood hazard maps (As of 31/Mar/2012)

Designated : 1342 municipalities

Already created : 1265 municipalities

**Reference;

All Municipalities in Japan : 1742

Flood Hazard Map Manual March 2003

This manual describes in brief the background, purpose, production and distribution of Flood Hazard maps, as well as their verified effectiveness and current usage in Japan. Realistic questions on the evacuation of local residents in the event of flood are clarified, and the practical and effective usage thereafter of Flood hazard Maps is reviewed in turn.

The features and characteristics of rivers, flooding mechanisms, social framework, viewpoints on flood protection, collaboration of river management and residents, and the background and circumstances of Flood Hazard maps of Japan might be different from those of other countries. The experience gained from use of Flood Hazard Maps in Japan would be of significant use to other countries as well, provided the maps are used according to the specific circumstances of the respective countries.

<http://www.internationalfloodnetwork.org/index.html>

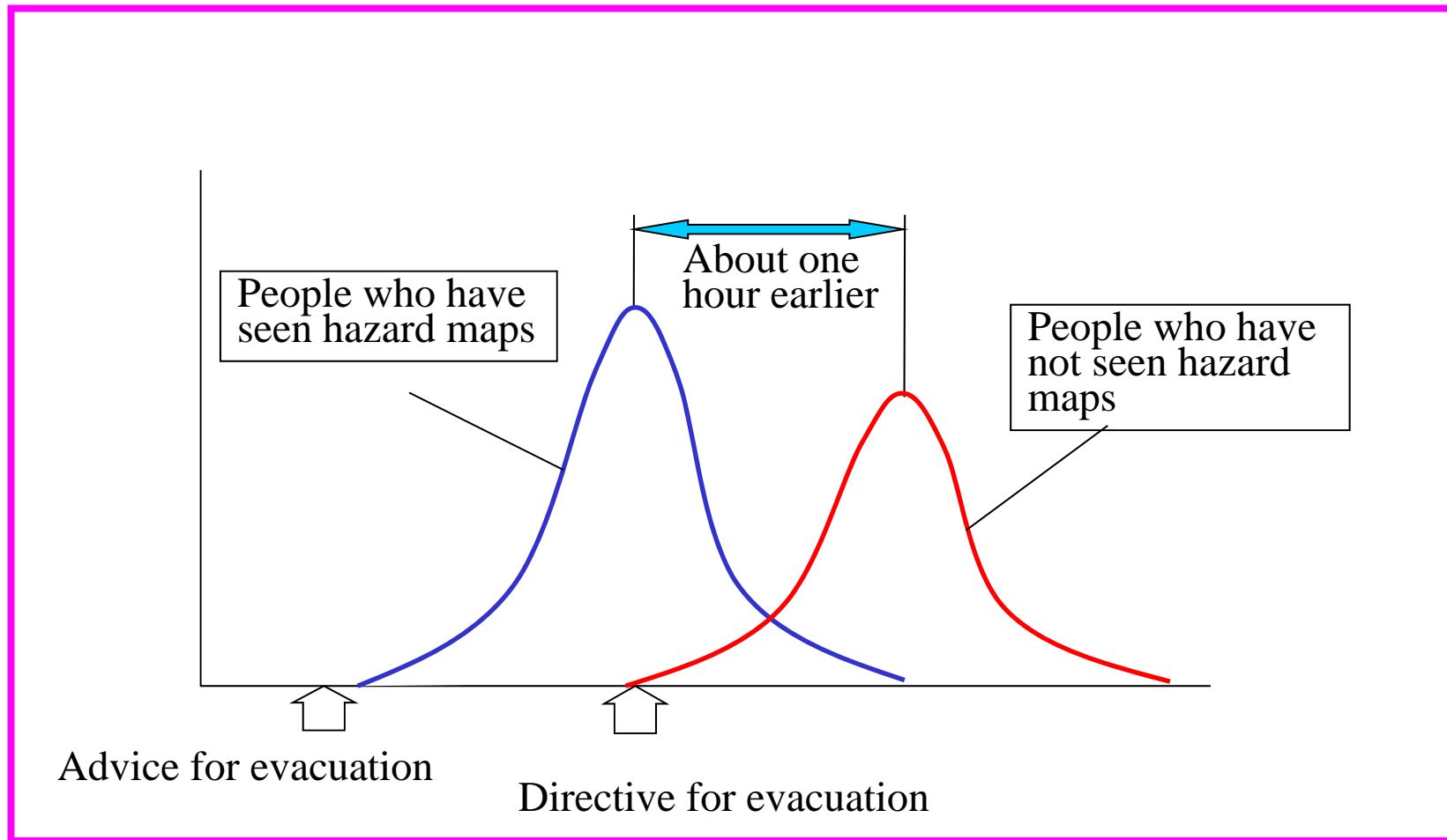
Manual for Making Flood Hazard Map Ubiquitous

The aims of this manual are to promote the further dissemination of flood hazard maps, to create a heightened sense of risks, and better awareness of shelters in case of floods in each community. To enable residents to appreciate the real risk of floods in their areas, this manual provides guidelines for the creation of Ubiquitous Flood Hazard Maps and signs providing flood-fighting information that can be displayed in communities.



Preparation and promotion of flood hazard maps

People who have seen hazard maps start evacuation about one hour earlier than those who have not



From Dr. Nakao

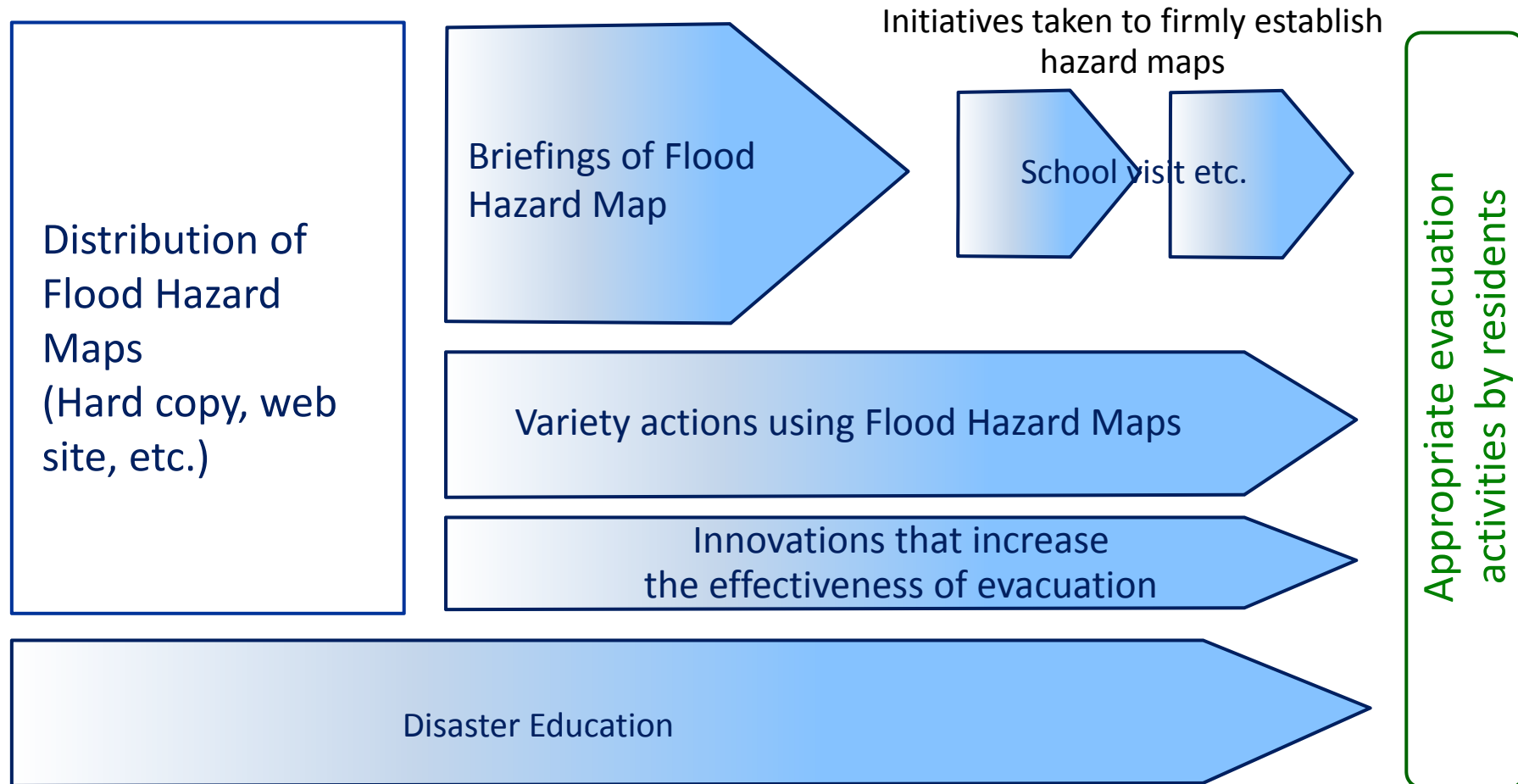
Situation for the use of Hazard Map and intention in Japan (numbers of interviewed person)	2007.1 (1757)	2009.12 (1944)
	%	%
I had already confirmed disaster risk management information by Hazard Map	24.9	31.2
I tried to confirm DRM information by Hazard Map, but I cannot find the map	3.9	3.3
I never confirmed DRM information by Hazard Map, but I wish confirm future.	56.5	49.1
I never confirmed DRM information by Hazard Map, and I have no intention to confirm this.	7.7	9

Citizens' measures to prepare a flood and wind	2009
Mark all that apply. 1944 adult persons were interviewed in Japan	
	%
Preparing Portable radio, Maglite/flashlight, Drugs and medicines	49.7
Intentionally collecting information rerated Typhoon, heavy rain, etc.	39.9
Preparing stock of food and drinking water	27.3
Predetermine the evacuation place (near school, community center etc.) and route to evacuate	26.9
Arranging one's valuables for emergency bringing out	22
Predetermine correspondence procedure in the family	21.8
Regular cleaning of drainage, fixing flying stuff surrounding the house	18
Confirming flood prone area and dangerous area	13.9
Strengthening roof tiles, windows and etc.	11.1
Others.	0.6
Nothing special countermeasures	25.3
I don't understand questions	0.7

Category	Local Residents	Local Municipalities
Everyday life	<ul style="list-style-type: none"> - Consider proper land-use patterns and water-resistant buildings suited to the flood vulnerability of the area 	<ul style="list-style-type: none"> - Review urban planning and land-use patterns that are resistant to flood
	<ul style="list-style-type: none"> - Prepare emergency kits, emergency food, etc. - Prepare boats and other appropriate means of evacuation 	<ul style="list-style-type: none"> - Update disaster-prevention and flood-fighting plans of the area - Review refuges and evaluation routes - Update specific assistance plan to evacuate or rescue the vulnerable (elderly, handicapped, sick, injured, etc.)
	<ul style="list-style-type: none"> - Identify proper communication channels and systems for information on evacuation - Organize voluntary disaster prevention units 	<ul style="list-style-type: none"> - Update communication channels and systems for information on evacuation - Develop voluntary disaster prevention units
	<ul style="list-style-type: none"> - Learn about past inundation history and risks of inundation of the local area - Organize educational sessions on potential flood damage, preparedness and evacuation 	<ul style="list-style-type: none"> - Promote education on disaster prevention and conduct evacuation practice drills - Publicize importance of disaster prevention and preparedness

Category	Local Residents	Local Municipalities
Emergency situations	- Confirm proper refuges, evacuation routes, emergency kits, etc.	- Identify flooded areas, inundation depth, location of refuges, and evacuation routes
	- Evacuate independently, following weather forecast, flood-related information, emergency warnings, etc.	- Provide information on weather forecast and flood forecast
	- Assist in evacuation of those vulnerable to floods	- Support and rescue those vulnerable to floods
	- Evacuate to proper refuges through safe routes, following advisory and imperative evacuation warnings	- Provide continuous flood-related information on evacuation - Set up refuges - Issue advisory and imperative evacuation warnings - Direct evacuation

Initiatives that should be taken in conjunction with the preparation of a hazard map



Disaster prevention education using flood hazard maps [1]

Junior high school curriculum guideline (*society, geography*) 2 (2) d) (*Surveying nearby regions*) (excerpt)

“Pupils shall deepen their understanding and interest in the land where they live and discover local problems, (omitted) and shall master the basics of geographical organization methods or presentation methods.”

(Interpretation) As local problems, (omitted) pupils shall consider questions such as, does a hazard map create a community in which local residents are protected against population scale

What is Flood Hazard Map?

The map with assumed inundation depth, location of evacuation shelters, evacuation route and other useful information. The map assembled based on the Flood Defense Law

※Creating flood hazard maps
(As of 31/Mar/2012)

Designated : 1342 municipalities

Already created : **1265 municipalities**

**Reference;

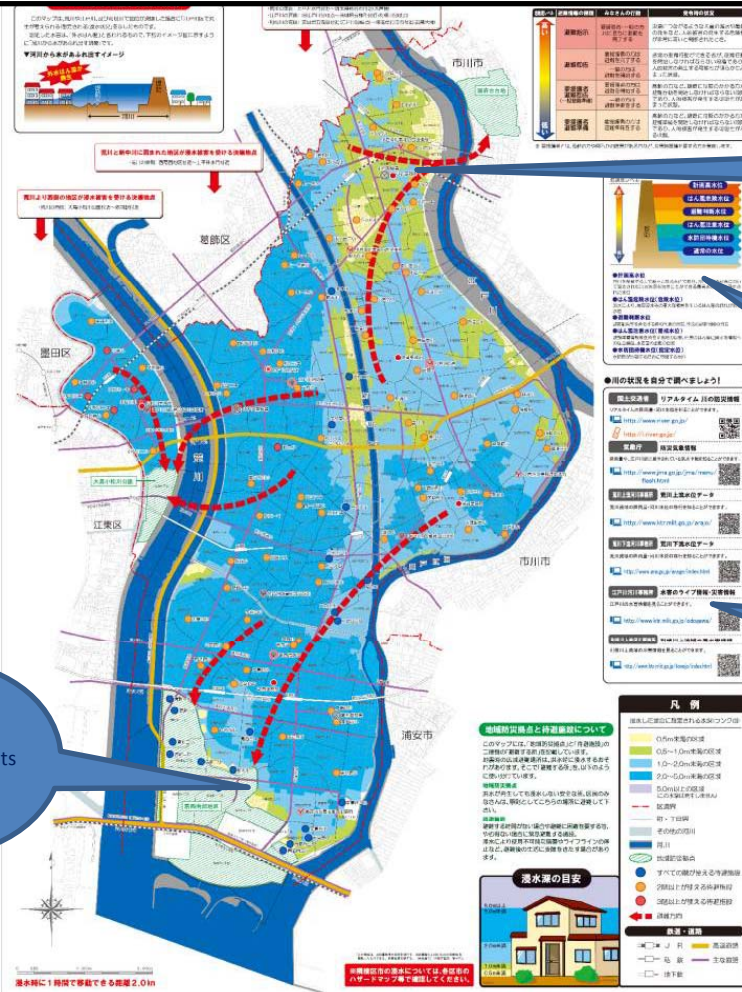
All Municipalities in Japan : 1742

Indication of
predicted
inundation districts
and inundation
depths

Evacuation
information

Flood prediction
Announcement criteria

Contact points
Administrative bodies
etc.



Disaster prevention education using flood hazard maps [2]

Junior high school curriculum guideline (society, geography) 2 (2) d (Surveying nearby regions) (excerpt)

“Pupils shall deepen their understanding and interest in the land where they live and discover local problems, (omitted) and shall master the basics of geographical organization methods or presentation methods.”

(Interpretation) As local problems, (omitted) pupils shall consider questions such as, does a hazard map create a community in which local residents are protected against population scale

○Example that hazard maps are used in class



Gathering flood hazard maps about districts near school zones either in printed form or through the internet.



Checking evacuation sites or dangerous locations etc. by walking through the town



Presenting local problems on maps for each school zone
Exchanging views

※ Flood hazard maps are, under the Flood Defense Law, distributed in printed form, and are also provided using the internet or by other methods, simplifying their collection as educational material for locally rooted disaster prevention education use.

You can find hazard maps around Japan through the Hazard Map Portal Site of MLIT <http://disapotal.gsi.go.jp/index.html>

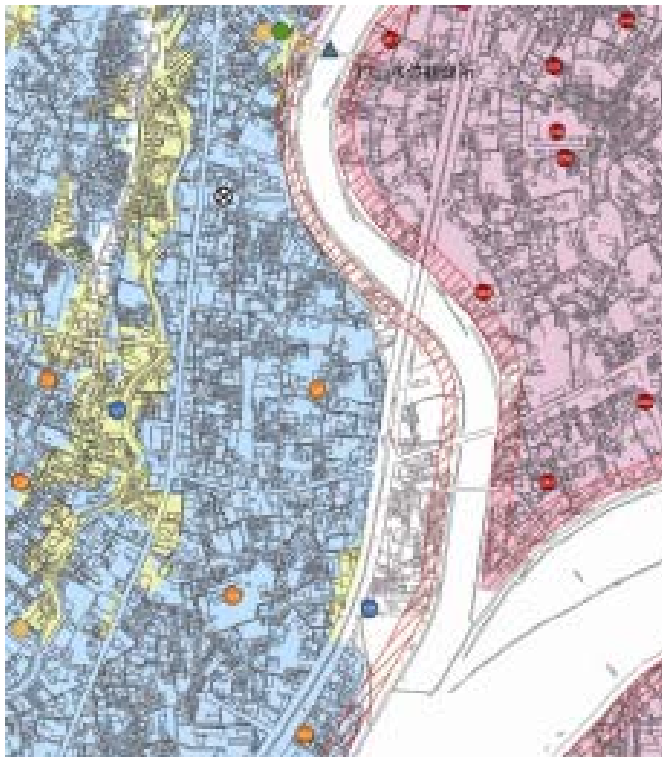
Disaster prevention education using flood hazard maps [3]

Junior high school curriculum guideline (science 2nd field 2 (7) b)(benefit of nature and disaster) (excerpt)

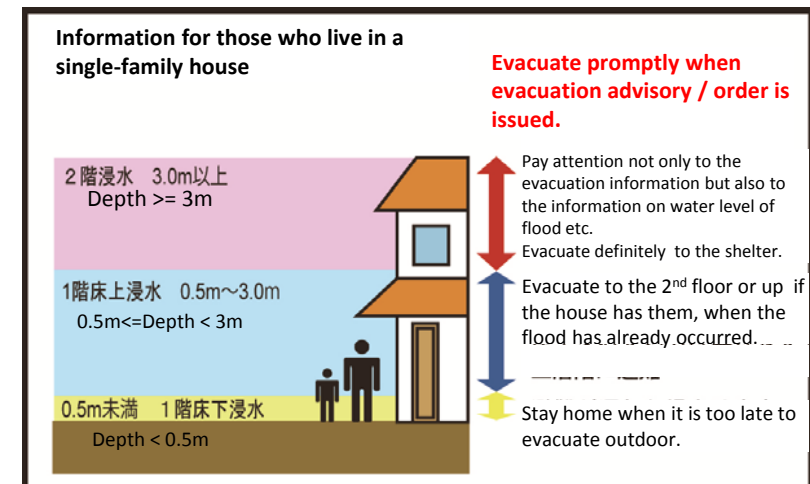
“They shall investigate the benefits and disasters etc. which nature brings, grasp these from multiple perspectives and comprehensively to consider how nature and humans mutually interact.”

(Interpretation) “To study disasters, also consider linking them to global scale climate change etc. and consider them linked to action to mitigate disasters.”

For example, considering “Importance of advance evacuation (danger of evacuation during an inundation)” based on information obtained from flood hazard maps.



Flood hazard map (image)



- Evacuation site where all floors are usable
- Evacuation site where 2nd floor and up are usable
- Evacuation site where 3rd floor and up are usable



Zones where homes are in danger of collapsing during a flood

Disaster prevention education using flood hazard maps [4]

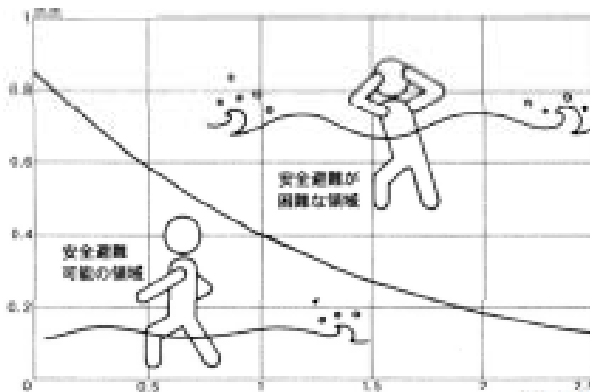
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For example, considering “Importance of advance evacuation (danger of evacuation during an inundation)” based on information obtained from flood hazard maps.

When flood depth reaches 0.5m (knee-deep of adult), it is difficult to walk through flood water even though flood velocity is 0.7m/s.



【The area where it is possible to evacuate walking through flood water】 according to the data concluded from experiments on walking through water using experimental channel and pool

(source: “Flood of Tone river”, Suga, 1995)



A man waiting for rescue on a road flooded
(Northern Kyushu heavy rainfall in Jul. 2012 Yanagawa City, Fukuoka Pref.)
[Photo/Mainichi Shimbun]

Disaster prevention education using flood hazard maps [5]

Junior high school curriculum guideline (science 2nd field 2 (7) b)(benefit of nature and disaster)(excerpt))

“And regarding “disasters”, they shall investigate using records, documents etc. to touch on local disasters.”

(Interpretation) Regarding floods, for example, based on records and reports, organizing the characteristics of the June-July seasonal rain front (baiu), typhoons, melting snow, etc. that cause floods, and in the case of a river where a levee has been breached, the characteristics of its inundation region and soil, to consider their relationships with various kinds of disasters.

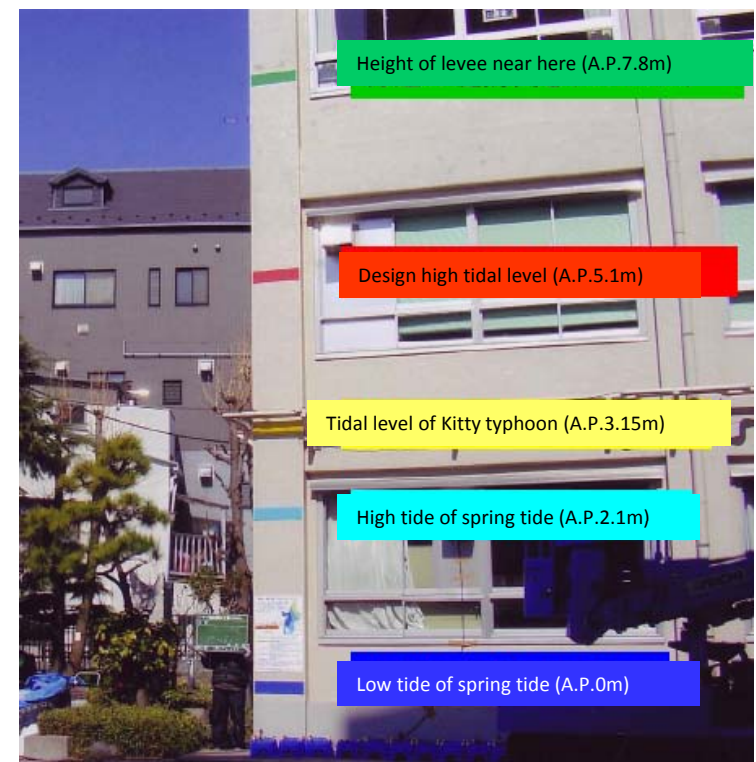
For example, studying the natural characteristics of Japan, where population and assets are concentrated on land at high risk of flooding, by investigating flood markers.



Flood mark Takeo City, Saga Pref.
(expected flood depth (2m), sign of shelter)



Water level of Arakawa river is displayed in real time
/ water levels of past flood are shown
(in front of the Edogawa ward office, Tokyo)



Tidal levels are shown on the school building of
Komatsugawa primary school, Edogawa ward
(source: Edogawa ward)

Disaster prevention education using flood hazard maps [6]

Junior high school curriculum guideline (health and physical education) 2 (3) c)(prevention of damage) (excerpt)

“It is possible to prevent many cases of damage by natural disasters by “preparing for disasters and by evacuating safely”.

(Interpretation) They will be able to understand that it is necessary to clarify disaster information by obtaining advance information, watching TV or listening to the radio, and so on

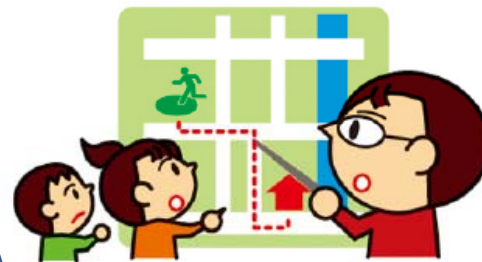
They can study how to prepare for disasters and to evacuate safely by using flood hazard maps.

Prepare and keep supplies to take with you in an emergency



Source: flood hazard map of Sanjo City

Know the evacuation route and the shelter



Make your mind up to evacuate promptly



Alert your neighbors



Source: flood hazard map of Sanjo City

Prepare the minimal necessary to take out



Source: flood hazard map of Edogawa ward

Precaution

Walk evacuation route actually to confirm safe condition



Use your flood hazard map to confirm your evacuation site and to check for dangerous places.

Look for the right information



Get information

Evacuate immediately after an evacuation advisory is issued



After your surroundings have been inundated, it is dangerous to leave your home, so do not evacuate in that situation.

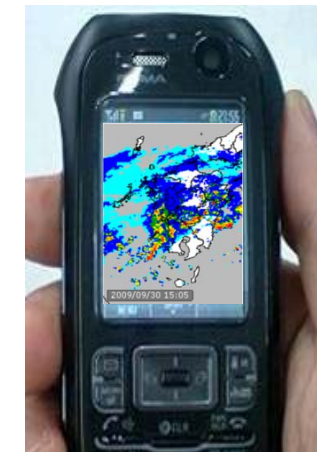
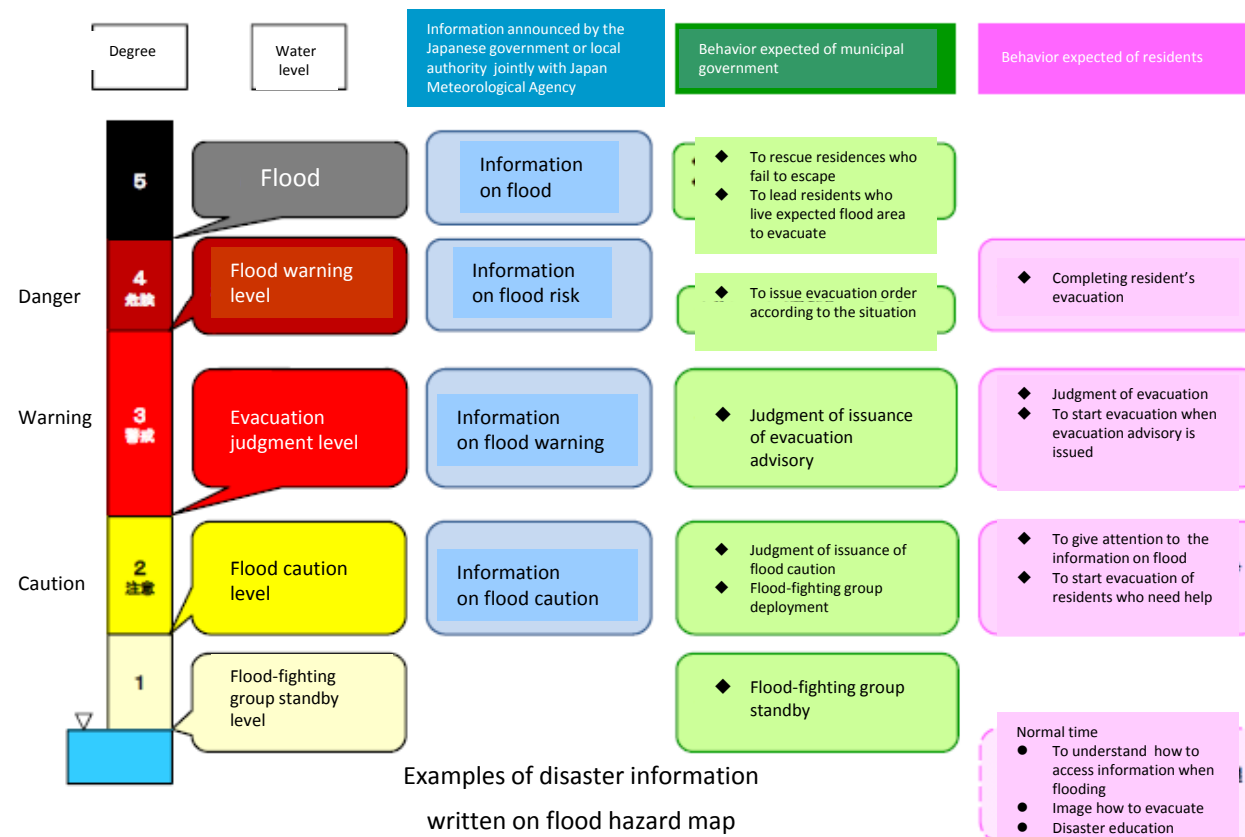
Be prepared to evacuate

Disaster prevention education using flood hazard maps [7]

Junior high school curriculum guideline (health and physical education) 2 (3) c)(prevention of damage)(excerpt)

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(Interpretation) They will be able to understand that it is necessary to clarify disaster information by obtaining advance information, watching TV or listening to the radio, and so on

A flood hazard map presents inundation depths and evacuation sites and under the Flood Defense Law, also presents methods of transmitting flood predictions etc. so it can be used as material to clarify disaster information.



▼Disaster Prevention
Information on rivers
Mobil version
<http://i.river.go.jp/>



Disaster Prevention Information on rivers

Disaster prevention education using flood hazard maps [8]

Junior high school curriculum guideline (health and physical education) 2 Guidance with physical exercise and health

Efforts shall be made to appropriately provide guidance to promote dietary education and improve physical strength, guidance concerning safety, and guidance concerning the maintenance and improvement of mental and physical health in schools, not only during time allotted for health and physical education, but through technical arts and home economics, and special activities according to the characteristics of each subject.”

Junior high school curriculum guideline (special action) 2 (3) health safety and physical education event (excerpt)

(Interpretation) “As health and safety and physical training events, (omitted) evacuation training or disaster defense training (omitted) etc. are considered.”

“Full consideration shall be given to guidance such as the significance of protecting the safety of oneself and others from accidents and disasters.”



Disaster prevention camp in Mitsuke City in August 2012 (To confirm the evacuation route using flood hazard map by Nakino elementary school students)



Kiso three rivers estuary basin flood fighting drill in May 2012 (Tsumidonou (placing sandbags) implemented by Miwa junior high school students)

Disaster prevention education using flood hazard maps [9]


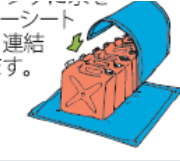
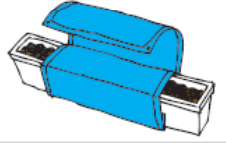

Junior high school curriculum guideline (*technology ·home economics*) 2 C Clothing life, dwelling life, and independence (2)(*excerpt*)

“b) Shall learn how to order interior environments considering the safety of the family and shall be able to devise appropriate ways of living.”

(Interpretation) Regarding safety inside rooms shall, considering accidents inside homes and their causes, including natural disasters, understand methods of managing safety, such as preparing for disasters and methods of preventing accidents, to be able to devise ways of living safely.”

How to reduce flood water inundating the house


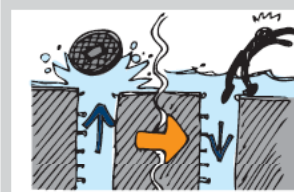


簡易水防工法は、ご家庭にある物を使って家屋への浸水の流入を防ぐ方法です。水深が浅い段階では有効です。玄関などの出入口のみならず、床下への浸水の防止も重要です。

<p>Use of simple water bags with a cardboard box</p> <p>水を入れて閉めます。これをダンボール箱に入れ、連結して使用します。</p> 	<p>Use of plastic containers and a picnic blanket</p> <p>入れ、レジャーシートで巻き込み、連結して使用します。</p> 
<p>Use of planters and a picnic blanket</p> <p>す。</p> 	<p>Use of water stop</p> <p>出入り口を長めの板などを使用し、浸水を防ぎます。</p> 

Knowledge when evacuating inside or outside the house

(source : flood hazard map of Sanjo City)

Precaution when being forced to walk in flood

<p>■ 長い棒をつえ代わりにして、水の中の障害物に注意しましょう。</p> 	<p>■ 深い浸水だとマンホールに気づかず、吸い込まれてしまう場合があります。</p> 
<p>■ はぐれないようにお互いの身体をロープで結んで避難しましょう。</p> 	<p>■ 切れた電線など、危険な場所には近寄らないようにしましょう。</p> 



Simple flood prevention measures implemented by women's fire protection club in Kuki City (Tone river flood fighting drill in May 2012)

Reference

- Hanyu City Local Disaster Management Plan
- Flood Hazard Map Manual March 2003
- White Paper on Disaster Management, Japan 2013 (in Japanese)
- Disaster Prevention Measures at Chikusei City 2012 for IFAS training 2013

Thank you for your attention