ONLINE TSUNAMI SEMINAR

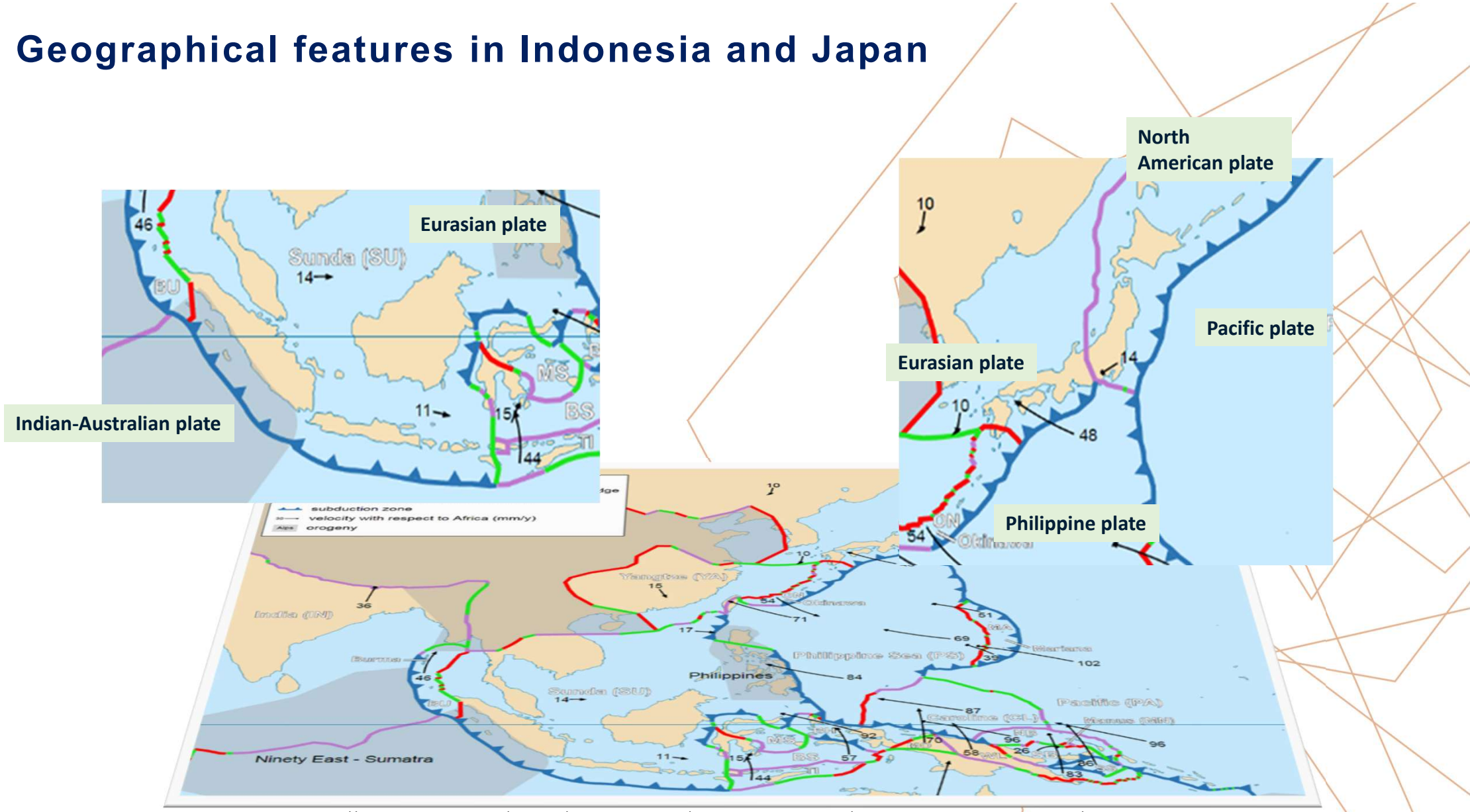
DRR efforts at local level for the next Earthquake and Tsunami

-Comparison between Japan and Indonesia-

Asian Disaster Reduction Center (ADRC)

Makoto IKEDA

Geographical features in Indonesia and Japan



https://socialsci.libretexts.org/Courses/Mizzou_Academy/World_Geography_A_B/09%3A_East_and_Southeast_Asia/9.02%3A_Natural_Hazards_in_East_and_Southeast_Asia

Basic statistic data in Indonesia and Japan

	Indonesia	Japan
Land Area	1,900,000 km² (14th largest)	378,000 km² (62nd largest)
Population	Approx. 276 million (4th largest)	Approx. 123 million (11th largest)
Population Growth Rate	Around 0.7% (increasing)	Around -0.5% (declining)
Capital City	Jakarta (moving to Nusantara since 2024)	Tokyo
GDP (Nominal)	Approx. 1.6 trillion USD (16th)	Approx. 4.2 trillion USD (3rd)
GDP per capita (Nominal)	Approx. 6,000 USD	Approx. 34,000 USD
Main Industries	Manufacturing, mining (coal, nickel), agriculture, tourism	Manufacturing (automobiles, electronics), services, finance
Life Expectancy	Approx. 72 years	Approx. 84 years
Elderly Population (65+)	**Approx. 7%**	**Approx. 29%**

Large-scale EQ and Tsunami in Indonesia and Japan (since 2000)

Indonesia	Japan
	Sep 2003 Tokachi-Oki Earthquake
Dec 2004 Indian Ocean Earthquake and Tsunami	**Oct 2004** Niigata Chuetsu Earthquake
May 2006 Central Java Earthquake	
	Jul 2007 Niigata Chuetsu Offshore Earthquake
Sep 2009 Padang Earthquake	
Oct 2010 Mentawai Islands Earthquake and Tsunami	
	Mar 2011 Great East Japan Earthquake (GEJE)
2014 Questionnaire survey	
	Apr 2016 Kumamoto Earthquake
Aug2018 Lombok Earthquake Sequence	
Sep 2018 Central Sulawesi Earthquake	**Sep 2018** Hokkaido Eastern Iburi Earthquake
Nov 2022 Cianjur Earthquake	
	Jan 2024 Noto Peninsula Earthquake

Purpose of research and Target area in Indonesia and Japan

Target area

(Indonesia) Sukabumi and Pelabuhan Ratu, West Java Province

(Japan) Hirono-town, Iwate Prefecture

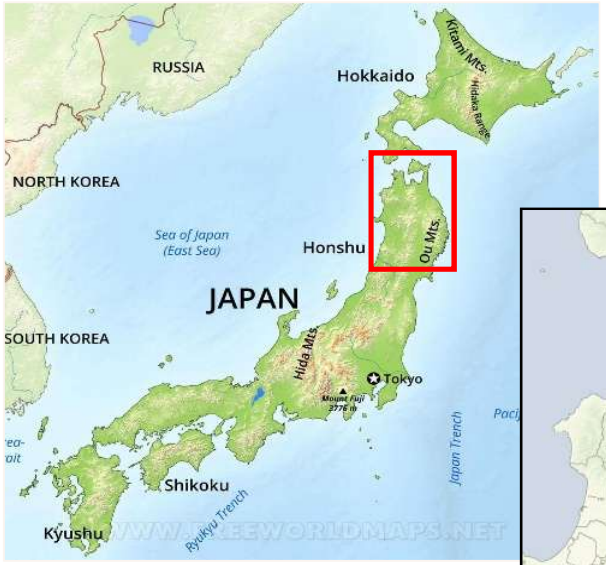
Research

・Conducting a questionnaire survey on residents' disaster awareness

・Confirming disaster countermeasures for the next disaster

・Examined challenges and suggestions for improvement DRR in Indonesia and Japan

DRR effort at community in Japan (Hirono-town)



Population	**approx. 13,430 (2025)**
Area	approx. 302.92 km²
Population density	approx. 44.3 / km²
Elderly Population (65+) - Hirono town -	**approx. 45.0 % (2024)**
Elderly Population (65+) - Japan -	**approx. 29.0 % (2023)**

DRR effort at community in Japan (Hirono-town)

Great East Japan Earthquake (Mar 2011)

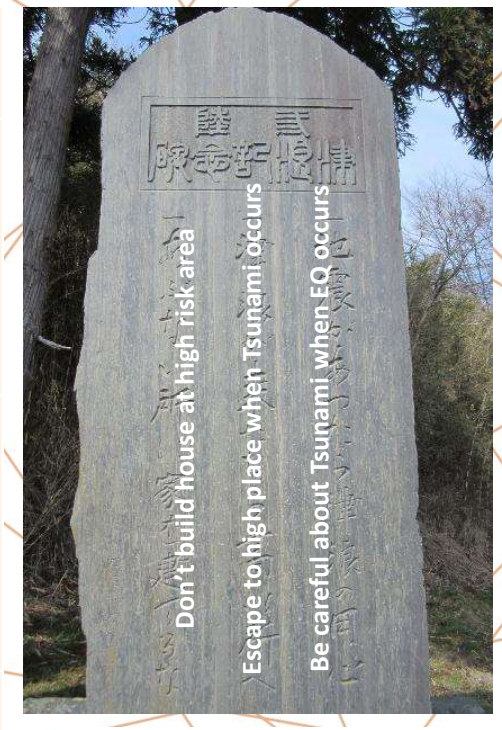
https://blog.tsdo.net/upload/detail/image/2011-3-15-18-thumbnail2.jpg.html

Hirono Town was the only municipality along the Sanriku coast with zero human casualties at the GEJE.

DRR effort at community in Japan (Hirono-town)

Past major disasters which hit in Hirono-town

Year	Name	Magnitude	Maximum Tsunami Height	Casualties (Dead/Missing)
1896 (Meiji 29)	Meiji Sanriku Earthquake	M8.5 (estimated)	38.2 m (Taro, Miyako, Iwate)	Approx. 22,000
1933 (Showa 8)	**Showa Sanriku Earthquake**	**M8.1**	**28.7 m (Omoto, Iwaizumi, Iwate)**	**Approx. 3,000**
2011 (Heisei 23)	Great East Japan Earthquake	M9.0	40.1 m (Aneyoshi, Miyako, Iwate)	Approx. 18,400 (nationwide)



Monument (established in 1934)

DRR effort at community in Japan (Hirono-town)

Evacuation route (maintaining by community people)

DRR effort at community in Japan (Hirono-town)

Emergency Supply Warehouse at community level

DRR effort at community in Japan (Hirono-town)

津波対策について

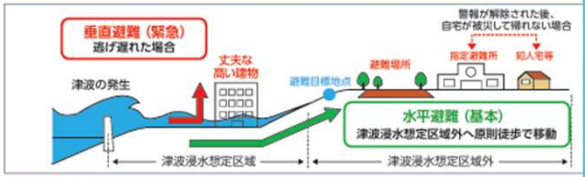
津波警報・注意報の分類と、とるべき行動

種類	発表基準	発表される津波の高さ 数値での発表 （津波の高さ予想の区分）	発表される津波の高さ 巨大地震の場合の発表	想定される被害と取るべき行動
大津波警報	予想される津波の高さが高いところで3mを超える場合。	10m超 （10m＜予想高さ） 10m （5m＜予想高さ≦10m） 5m （3m＜予想高さ≦5m）	巨大	木造家屋が全壊・流失し、人は津波による れに巻き込まれます。 ただちに高台や高くて丈夫な建物などの な場所へ避難してください。
津波警報	予想される津波の高さが高いところで1mを超え、3m以下の場合。	3m （1m＜予想高さ≦3m）	高い	標高の低いところでは津波が襲い、浸水 が発生します。人は津波による流れに巻 まれます。 ただちに高台や高くて丈夫な建物などの な場所へ避難してください。
津波注意報	予想される津波の高さが高いところで0.2m以上、1m以下の場合であって、津波による災害のおそれがある場合。	1m （0.2m≦予想高さ≦1m）	―	海の中では人は速い流れに巻き込まれ、ま 養殖いかだが流失し小型船舶が転覆し ただちに高台や高くて丈夫な建物などの な場所へ避難してください。

津波からの避難

10m～20m	3階建ての建物（あるいは3階部分まで）が完全に水没する
5m～10m	2階建ての建物（あるいは2階部分まで）が水没する
3m～5m	2m以上から木造家屋のほとんどが全壊する
0.5m～3m	津波に巻き込まれた場合、ほとんどの人が亡くなる
～0.5m	避難行動がとれなく（動けなく）なる

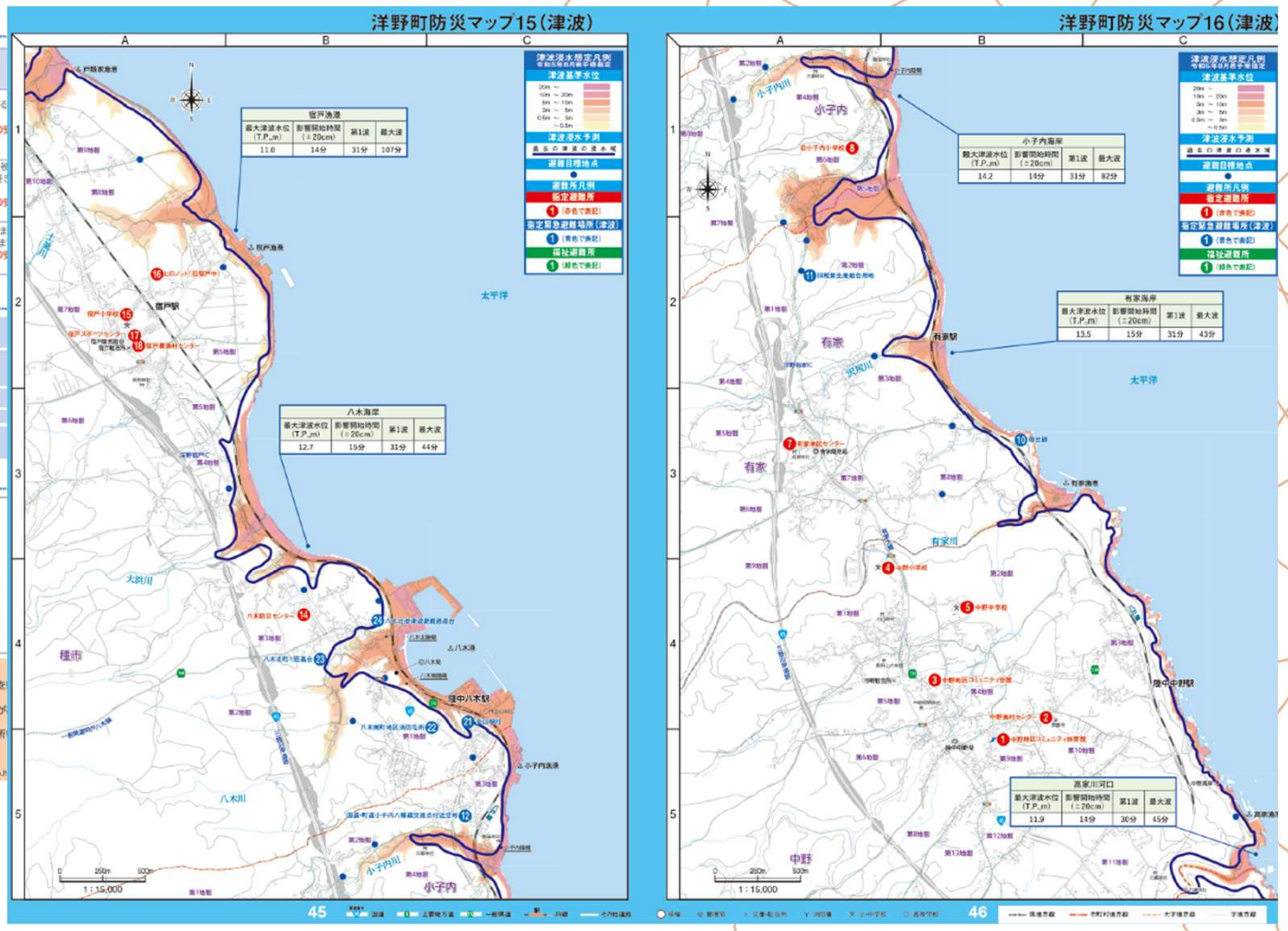
津波の特性と避難行動のポイント



津波から命を守るためのポイント

・震源が陸地に近いと津波警報・注意報が津波の襲来に間に合わないことがあります。強い揺れや弱くても長い揺れを
たときは、すぐに避難を開始しましょう。
・津波の高さを「巨大」と予想する大津波警報が発表された場合は、東日本大震災のような巨大な津波が襲うおそれが
ます。直ちにできる限りの避難をしましょう。
・津波は沿岸の地形等の影響により、局所的に予想より高くなる場合があります。ここなら安心と思わず、より高い場所
指して避難しましょう。
・津波は長い時間くり返し襲ってきます。津波警報・注意報が解除されるまでは、避難を続けましょう。

参考：気象庁 HP（https://www.data.jma.go.jp/svd/eqev/data/joho/tsunamiinfo.h

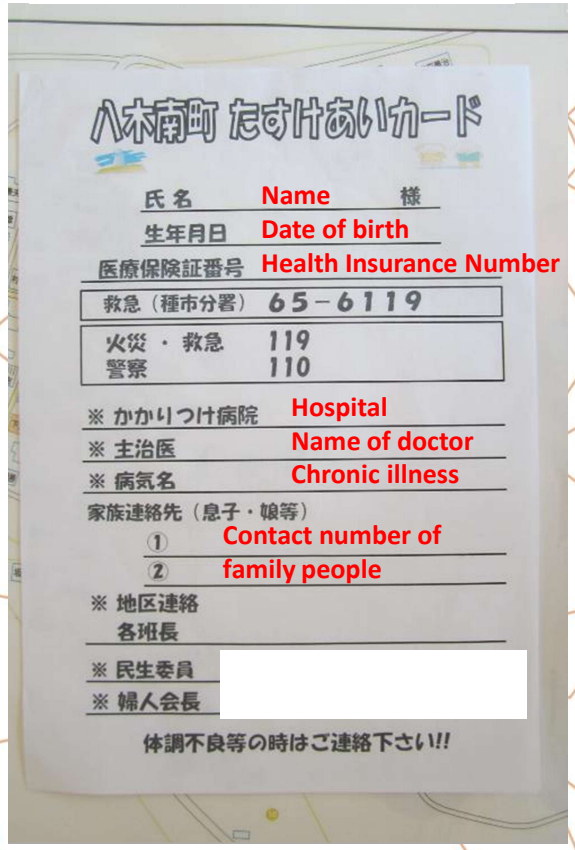


Hazard map which is provided by municipality

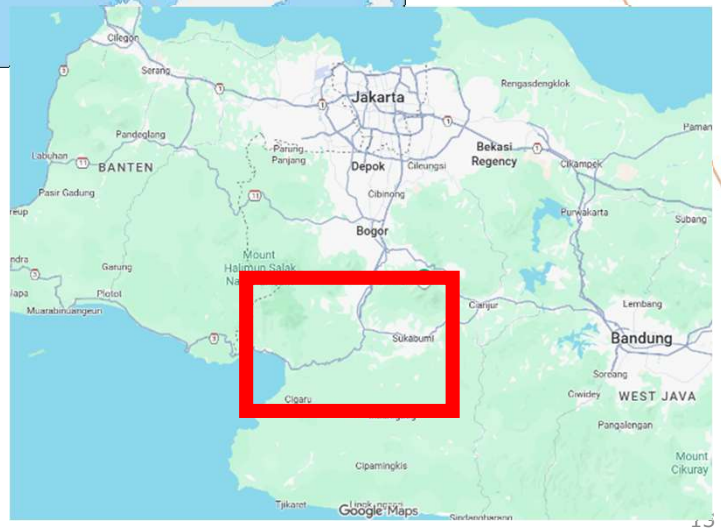
DRR effort at community in Japan (Hirono-town)

Hazard map which is provided by community

Personal information card



DRR effort at community in Indonesia (Sukabumi)

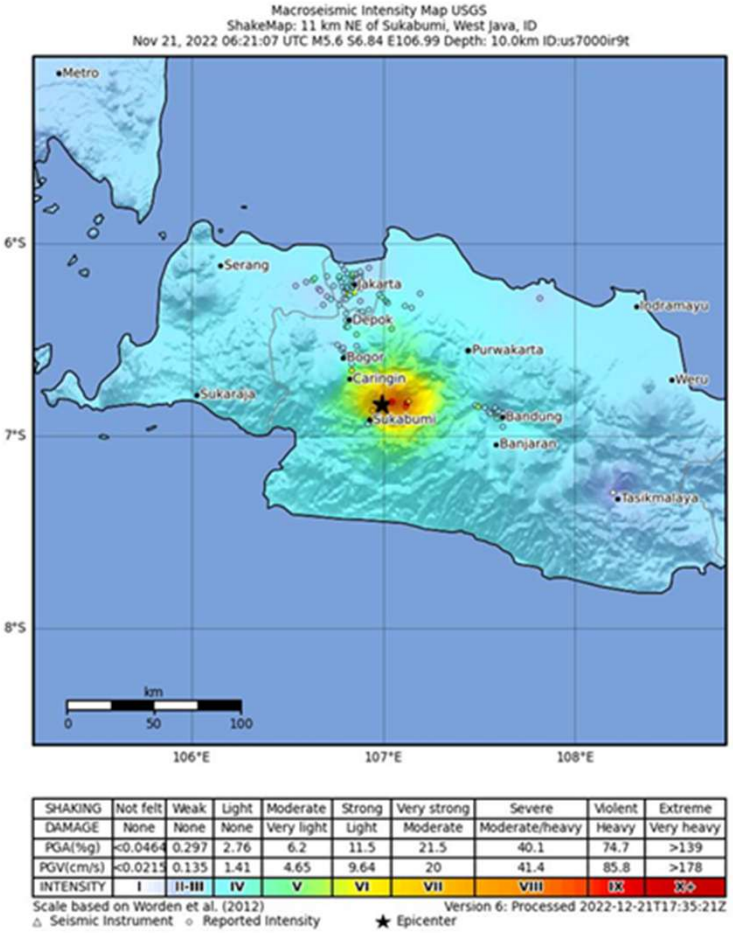


Population	**approx. 346,325 (2023)**
Area	approx. 48.31 km²
Population density	approx. 7,300 / km²

Sukabumi is a city and regency located in West Java Province, Indonesia. The regency is the largest in Java in terms of area, covering mountainous, coastal, and agricultural regions. Sukabumi City, situated within the regency, serves as its administrative and economic center.

DRR effort at community in Indonesia (Sukabumi)

Cianjur Earthquake (2022)



SHAKING	Not felt	Weak	Light	Moderate	Strong	Very strong	Severe	Violent	Extreme
DAMAGE	None	None	None	Very light	Light	Moderate	Moderate/heavy	Heavy	Very heavy
PGA(%g)	<0.0464	0.297	2.76	6.2	11.5	21.5	40.1	74.7	>139
PGV(cm/s)	<0.0215	0.135	1.41	4.65	9.64	20	41.4	85.8	>178
INTENSITY	I	II-III	IV	V	VI	VII	VIII	IX	X+

Scale based on Worden et al. (2012) Version 6: Processed 2022-12-21T17:35:21Z
△ Seismic Instrument ○ Reported Intensity ★ Epicenter

Date: November 21, 2022

Time: Around 13:21 local time
Epicenter: Near Cianjur Regency, West Java, Indonesia
Depth: About 10 km (shallow earthquake)
Magnitude: 5.6 (USGS)

Fatalities: 331 people
Injured: More than 7,700
Displaced:

Approximately 62,000 people

https://www.jiji.com/jc/d4?p=eqi211-jpp043626391&d=d4_disaster

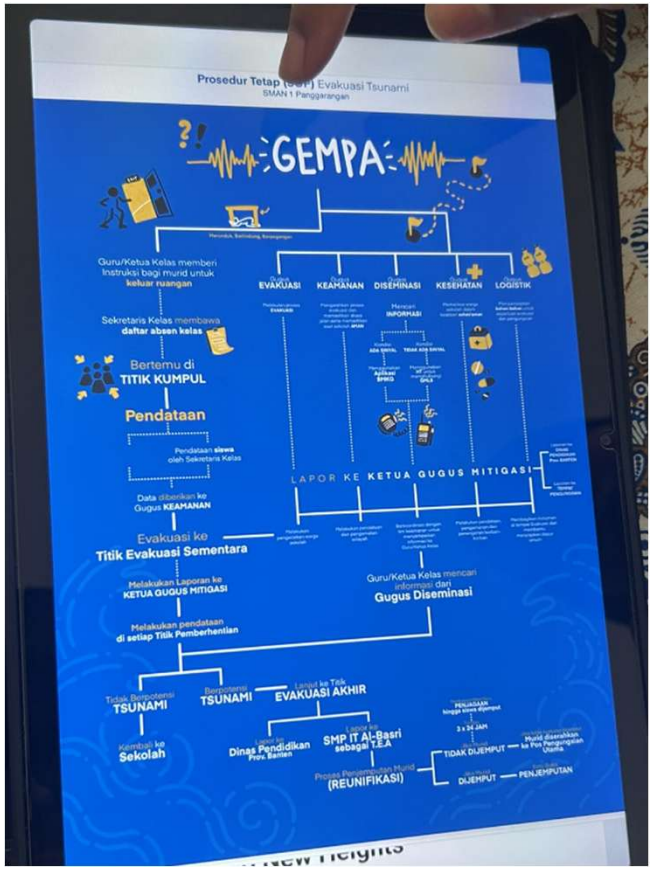
DRR effort at community in Indonesia (Pelabuhan Ratu)

Tsunami signboards in town

DRR effort at community in Indonesia (Lebak Regency)

Tsunami information board in front of Mosque (for sharing knowledge to people)

DRR effort at community in Indonesia (School in Lebak Regency)



SOP in case of EQ (at school level)

Hazard map on the wall at school

EEWS system at school

Questionnaire survey in Indonesia and Japan (2014)

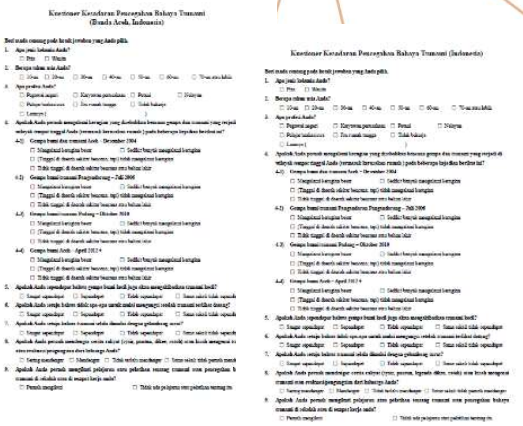
2004
Indian Ocean Earthquake and Tsunami (Banda Aceh)

2011
Great East Japan EQ (Hitono-town)

2022
Cianjur Earthquake (Sukabumi)

2014

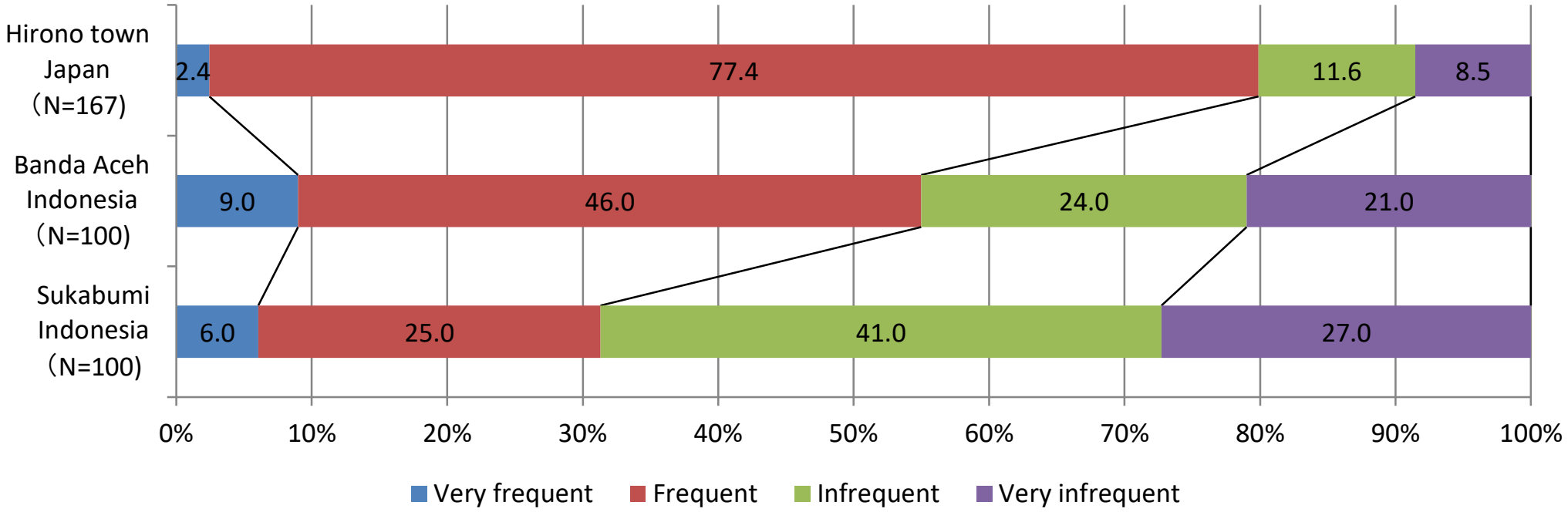
Questionnaire Survey for residents in Indonesia and Japan (Banda Aceh, Sukabumi, and Hirono-town)



Included 30 questions
- personal information, experience of past disaster, disaster knowledge, participation of DRR activity, etc.

Questionnaire survey in Indonesia and Japan (2014)

Do you participate in tsunami evacuation drills at your office, school, or community?

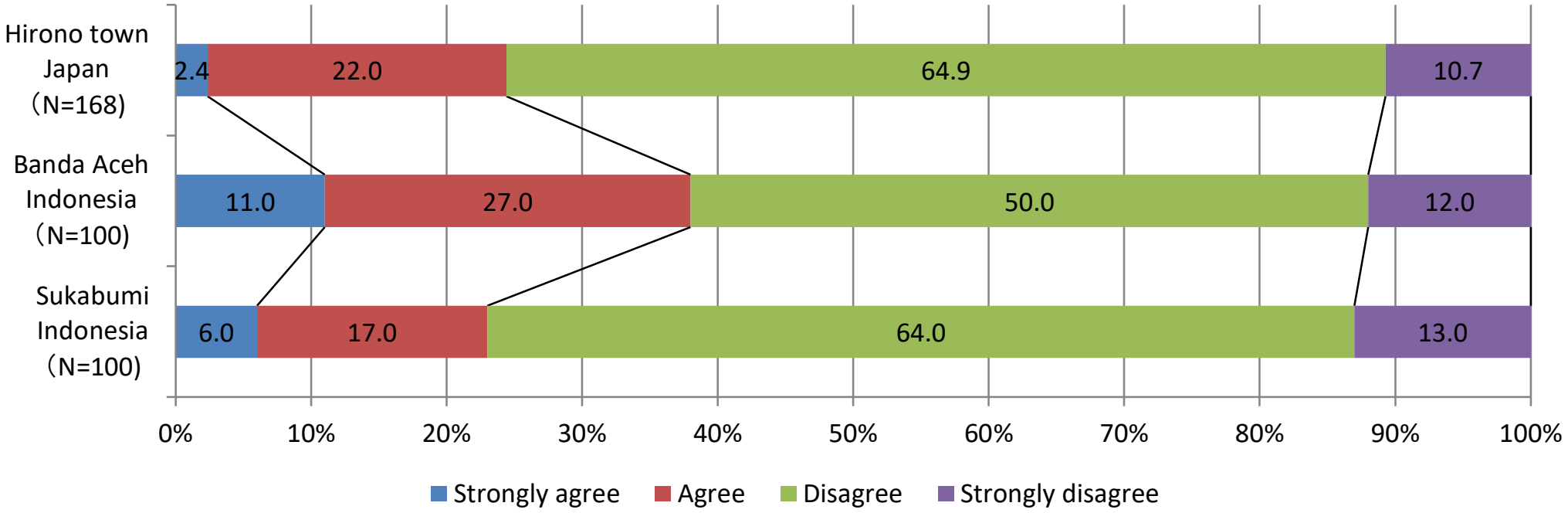


(Hirono town) So much chance to patriciate for drills based on experience of GEJE in 2011.

(Sukabumi) There is not enough chance to participate for drills.

Questionnaire survey in Indonesia and Japan (2014)

Do you actually find participating in evacuation drills burdensome?

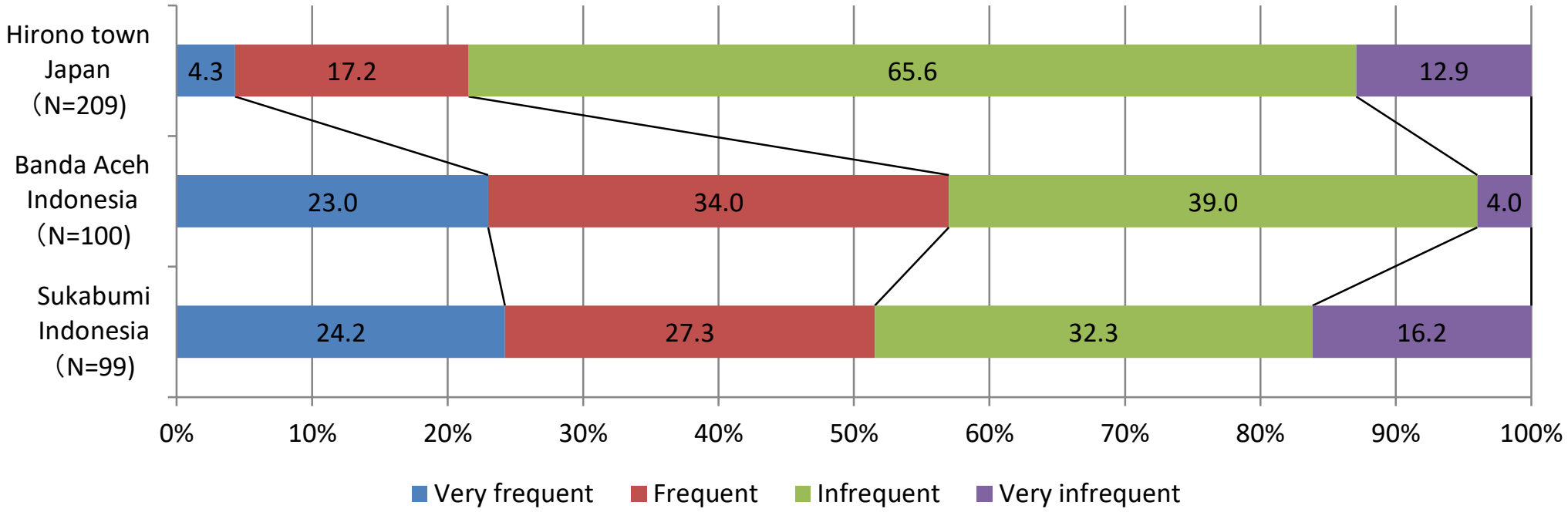


(Hirono town) Participation for drill is usual thing based on continues experience of past disasters.

(Banda Aceh) There were so many drills after 2004. People feel a burden for participation.

Questionnaire survey in Indonesia and Japan (2014)

Do you discuss tsunamis and tsunami evacuation with your family?

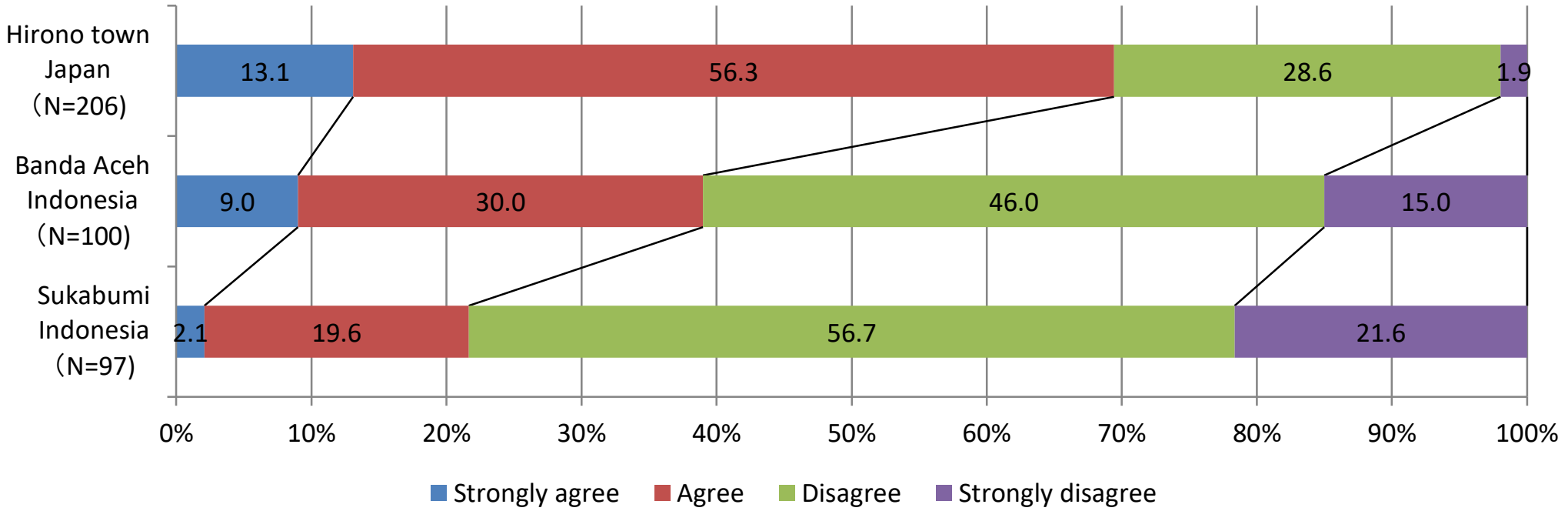


(Hirono town) Lack of discussion at home. One of reason is aging society.

(Sukabumi and Banda Aceh) Strong relationship and much communication in Indonesia.

Questionnaire survey in Indonesia and Japan (2014)

Do you think a massive tsunami will occur in your area in the near future? (Sense of risk)



(Hirono town) Continuous DRR activities due to much experience of past disasters.

(Banda Aceh) Getting decrease a sense of risk. It is already passed around 10 years after 2004 Tsunami.

Challenges in Indonesia and Japan

(JAPAN)
The aging society is an issue in Japan. Especially, the aging rate is even higher in rural area. It is important for community people to consider advanced DRR activities and **mutual support in case of disasters**.

(INDONESIA)
Indonesia has experienced numerous disasters, and various DRR activities are being promoted in places like Sukabumi as of 2025. On the other hand, challenges remain in hardware aspects such as **establishing EEWS** and improving the **seismic resistance of buildings.**

(BOTH)
At the community level, **there is also a reliance on volunteer-based activities for DRR.** (without sufficient funding)

Conclusion and Suggestions

- **Residents' disaster awareness is thought to temporarily increase following actual disaster experiences** (such as the Cianjur Earthquake).
- Disaster education, evacuation drills, and developing hazard map are considered effective for maintaining heightened disaster awareness.
- Securing consistent funding (**Investment in Disaster Risk Reduction**) is crucial for sustaining these activities.
- **Investment is effective not only in soft measures but also in developing early warning systems.**