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AYUBOOWAN

All living being may have a long life

ADRC VR FY2016B-Research Report

Final Presentation

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Presentation Outline

- Places visit during VR 2016B program
- Research Topic
- Early Warning System In Sri Lanka
- Early Warning System In Japan
- *Research Design*
- *Methodology*
- *Data Collection*
- Category of Data collected
- *Data Evaluation Method*
- *Limitation of the Research*
- *Evaluation of data*
- *Conclusion*
- *Recommendations*

Places visit during my stay

- DRI museum
- Memorial walk 17th Jan -GHAE
- Portopia Hotel for the Disaster Reduction Alliance program.
- University of Kobe, Research center for urban safety and security.
- Tsunami/ storm surge disaster prevention station in Midosuji.
- Ouji, Kamenose Landslide.
- Osaka Castle,
- Kaeru Caravan at JICA office
- National Museum of Ethnology.
- JMA - Kobe local Met Office.
- DRI museum library
- HONJO BOSAIKAN LIFE SAFETY LEARNING CENTER.
- Akihabara Viainn Hotel.
- Tsukuba, NIED with JICA team

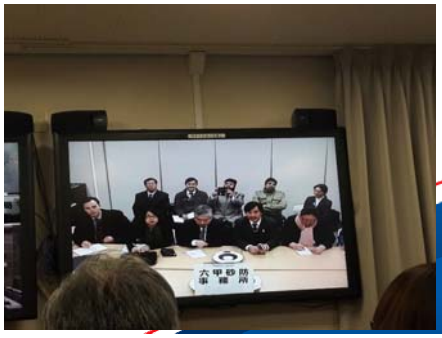
- Lager scale EQ simulator and world largest rain fall simulator
- Landslide and slop failure early warning and new instruments has introduced by OSASI TECH Company with their pilot project.
- Mitsubishi corporation Insurance.
- JMA HQ Museum
- Visit of Cabinet office and Tokyo RINKAI Disaster Prevention Park
- Hyogo police and Hyogo Disaster Management Centre
- Osaka city Abeno life safety learning centre
- River tide gate operation, Shirinashigawa flood gate
- Miki city area and Midorigaoka. Dondo Dam
- e-defense NIED.
- Oldest siphon water transport system, INSARG training area with fire department and stadium allocated with DM relief stored facilities.
- Hyogo prefectural University.

- Landslide Monitoring - Kobe university.
- Field visit - preparation of hazard map
- Visit Tsurukabuto bokomi
- Community tsunami drill in Wakinohamakaigandori
- Rokko sabo office of MLITT
- Yakigahara sabo dam.
- Awaji Island
- Kyoto University Uji campus
- Ujigawa Open Laboratory, DPRI, Kyoto University
- Kobe to Sendai
- Nakano Tsunami Evacuation tower.
- Ishinomaki Visit
- Ishinomaki community center
- Tohoku University
- Sendai city government
- Tsunami affected Takekoma, Natori area





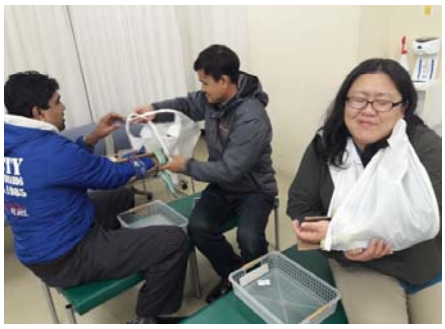
















国立民族学博物館
National Museum of Ethnology
総合研究大学院大学





巨大地震・津波が発生する
南海トラフの立体地形





月完成予定







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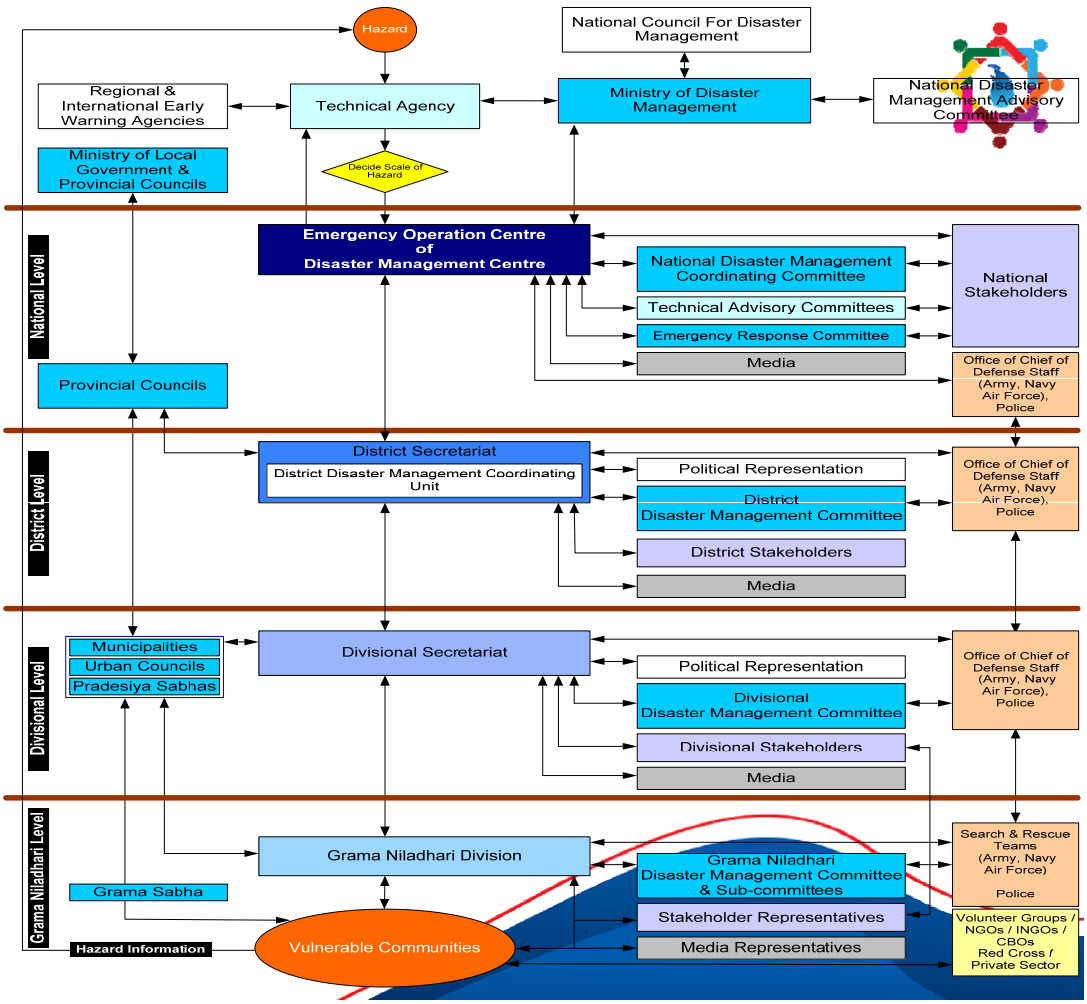
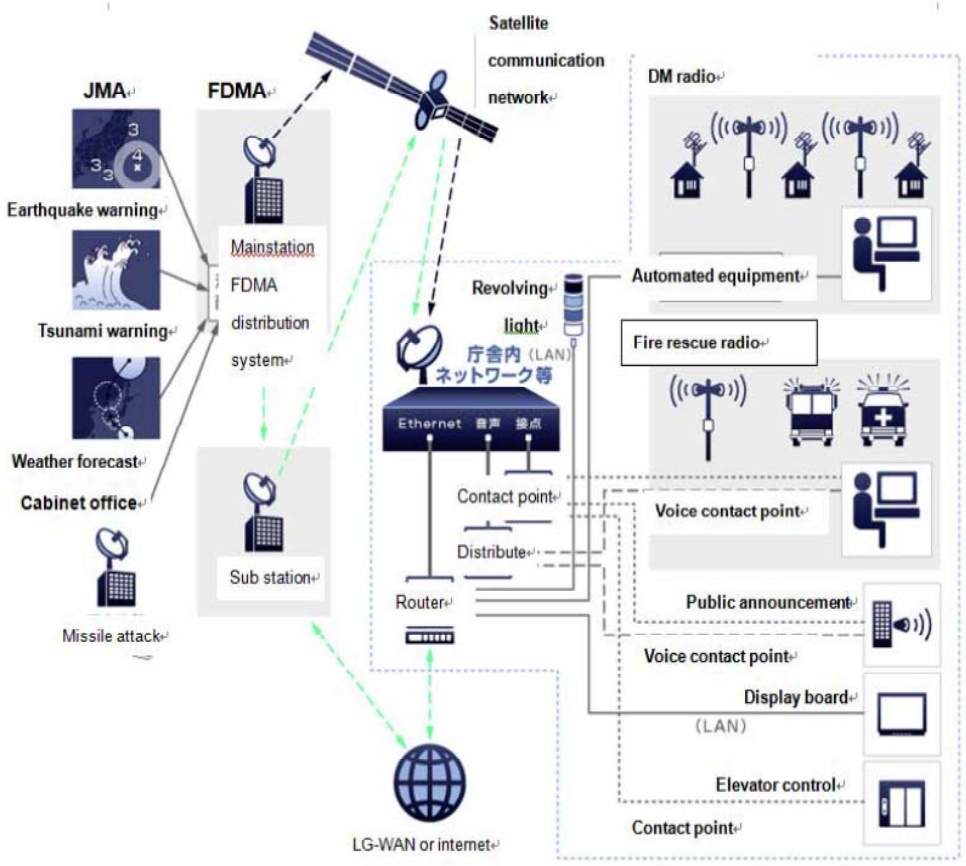
Analysis of the Effectiveness of Early Warning System to Face Future Tsunamis in Sri Lankaby comparing with Japanese Early warning system

Early Warning System In Sri Lanka



Early Warning System In Japan



Research Design

Specific Aims:

- To identify current issues in the early warning system in Sri Lanka
- To analyze the effectiveness of the established early warning system to face future Tsunamis in the in Sri Lanka, in comparison with Japanese early warning system

Expected Results:

- Validation of the effectiveness of the Tsunami early warning system in Sri Lanka
- Comparison of the EW systems in Sri Lanka and Japan
- Identification gaps in the current Early Warning System and remedial measures for further improvements.

Methodology

- Data and information collected from the both countries.
- A survey data was gathered by using a questionnaire method that is utilized to correct, analyze and interpret the views of a group of people.
- Data are analyzed by ranking method.
- Finally, the conclusion and recommendation could be forwarded through SWOT analysis techniques.

Data Collection

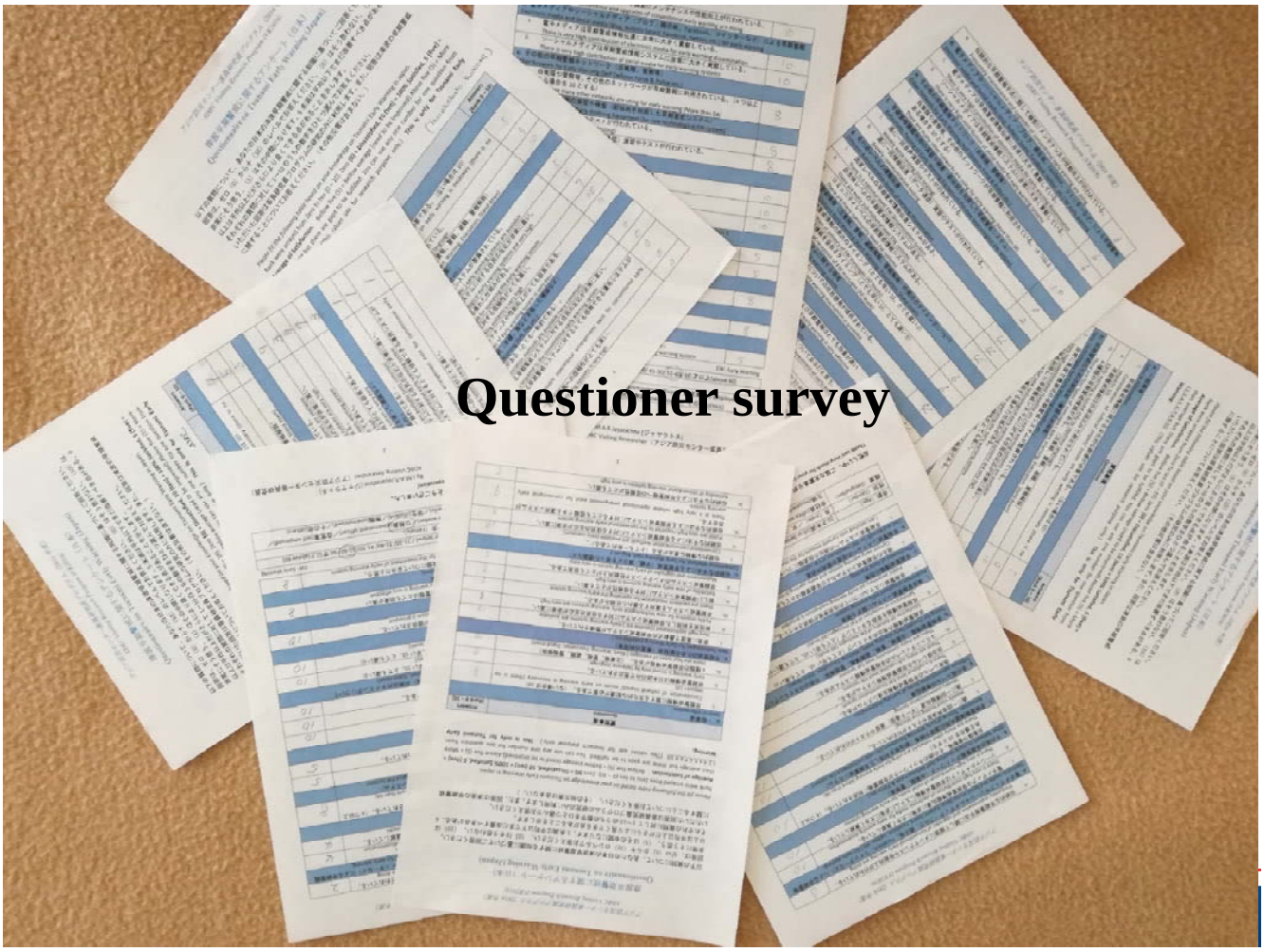
- Information and data of the current Tsunami early warning system in Sri Lanka.
- Collect the information and data of the Tsunami early warning system in Japan.
- Shearing of Practical experience.
- Presentations and discussions in the ADRC VR 2016B in Japan.
- Review of Literatures delivered by Universities in japan with lesson learn.
- Site visit in tsunami and earthquake areas in the Japan.
- Hyogo prefecture Disaster Management Centre and Hyogo police
- Exhibitions / Museums and other relevant sources.
- Web sites.
- Japan Meteorological Agency (National Government)
- Tsunami Storm Surge Prevention Station, Osaka (Local Government)
- Tsunami Education Centers
- DRI museum and other observation
- Meeting with relevant stakeholders and communities.
- 2011 Tsunami Site visit and ccurrent preparedness and mitigation activities in Japan
- Field visits
- Questioner survey

Category of Data collected for evaluation, both Japan and Sri Lanka

- *General Information*
- *New Technologies for Early Warning (satellite etc.)*
- *Conventional Methods for Early Warning (Drum, bells, flags, etc.)*
- *Social media and electronic media (blog, bulletin board, Facebook, twitter, etc.) for Early warning*
- *Other Network for Early Warning (Self-defense, Military & police etc.)*
- *Rehearsals, Testing of Early Warning Equipment*
- *Different Administrative levels of Warning Dissemination*
- *Timing for Tsunami Early Warning (Alert, Warning, Evacuation, Stand down)*
- *Awareness of tsunami early warning system*
- *Effectiveness of Early Warning*
- *Cost and Benefit investment for EW systems*

Data Evaluation Method

- Data were analyzed by ranking analyzing method.
- Rank were arrayed from Zero to ten (0 – 10). Zero (0) = Dissatisfied, 10 (ten) = 100% Satisfied, 5 (five) = Average of Satisfaction. Bellow five (5) = Bellow average (need to be improved). Above five (5) = More than average but there are gaps to be fulfilled. In the other hand, it does imply the value from Zero (0) to ten (10) is equal to the 0% to 100%.
- Data will be analyzed by the descriptive statistics method such as Mean, Median, Mode, Range, Standard deviation etc.
- All relevant data will be compared by qualitatively and quantitatively.
- Percentage is used to describe the data proposition of the sample.
- In order to present the data, Pie charts, bar charts tables will be used.
- Finally find the Gaps and consequences.



Limitation of the Research

1. *Time: Three months' period is not enough to gather the data with other works.*
2. *Field observation: Inadequate discussions has had with affected communities and relevant officers.*
3. *Literature review: Lack of available research on the early warning system.*
4. *Analysis: Simple analysis method has been used to discuss the result.*
5. Inadequate questioner survey in the Japan in each prefectures.

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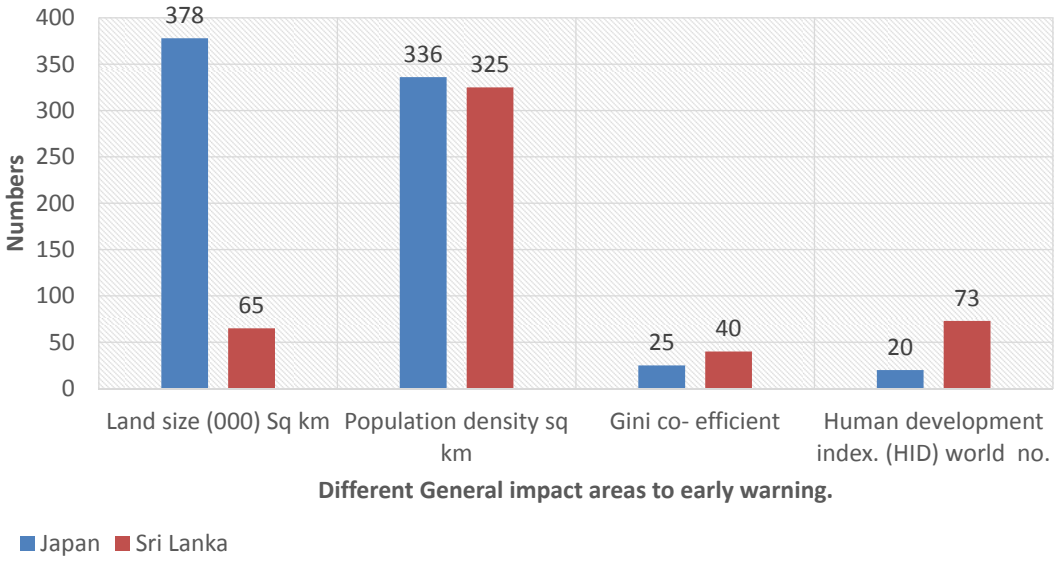
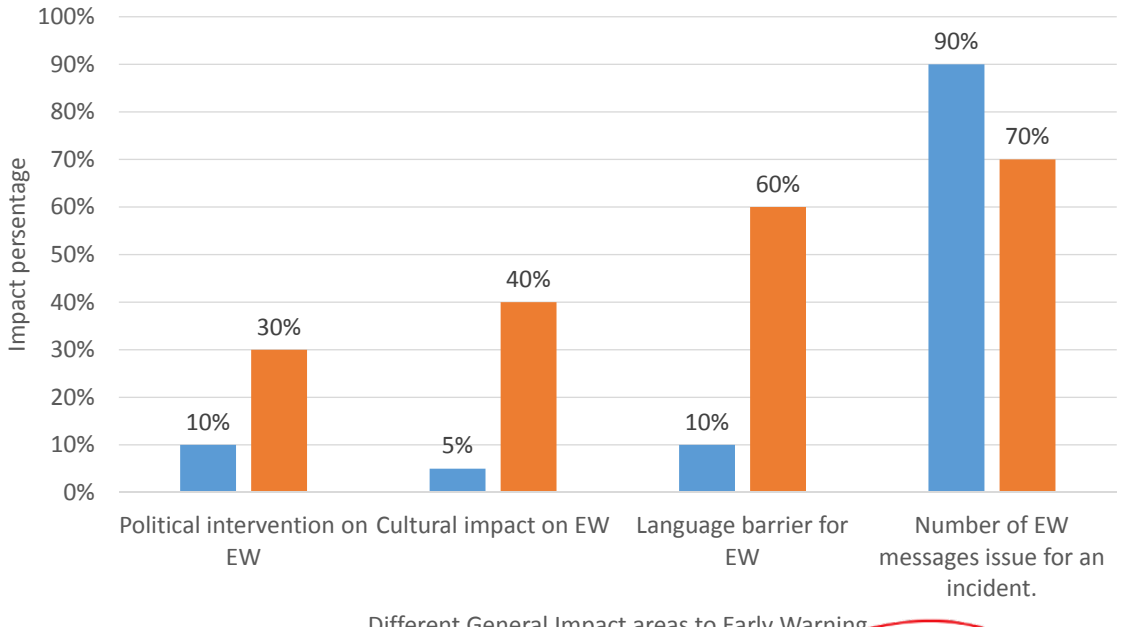
1. Evaluation of General Information to Early Warning

No	Activity	Japan	Sri Lanka	Description
1	Land size	378	65	(000) Japan is 06 time bigger than Sri Lanka. Cost line length of Japan 29751 Km and SL is 1340
2	Population density	336	325	(Sq km) Density is almost same. But Japan has high Population distribution in coastal area due to 70% land belong to mountainous and forest while SL is 30%
3	Gini co- efficient	25-30	40-45	Inequality of income or wealth is higher in the SL.
4	Human development index. (HID)	20 (0.89)	73 (0.75)	Life expectancy, Education and per capita income are high in japan it is rank no. 20.
5	Political intervention on EW	10 %	30 %	Sri Lanka has a more political intervention than japan.
6	Cultural impact on EW	05 %	40 %	Sri Lanaka has multi-culture
7	Language barrier for EW	10 %	60 %	SL is multinational country. Many language have been using in Sri Lanaka specially Sinhala ,Tamil and English.
8	Number of EW messages issue for an incident.	90 %	70 %	SL issue only four numbers of EW message for one incident but japan issue more number of different EW messages to the community for tsunami.

Comparisum of General Facters



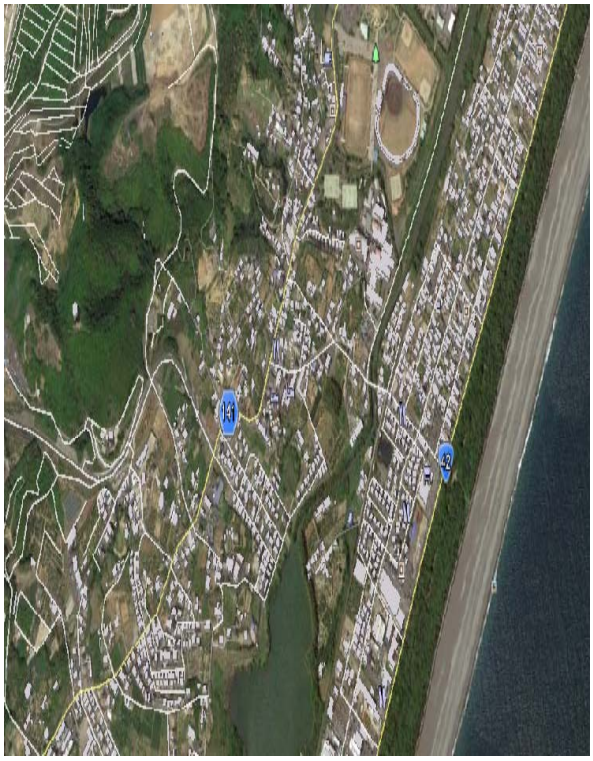
Impact of General Information to Early Warning



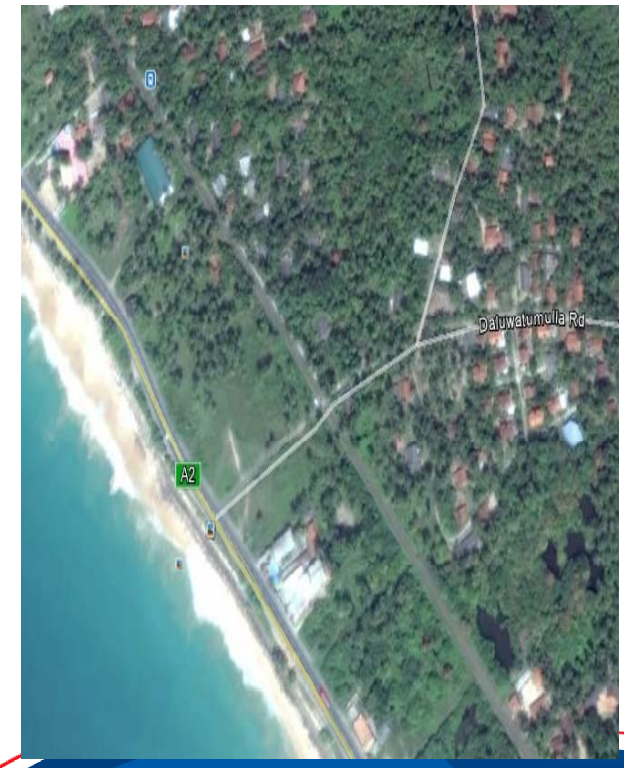
Both the high population density of coast line and long length of the costal line of the Japan will be created the disadvantage for tsunami disaster early warning. There is a high frequency of chance to missing the warning of entire vulnerable costal belt thus if the one warning tower fail to disseminate warning that will be affect more peoples in the vulnerable area due to high density of population in the costal belt. However, these facts can be ignoring with the available warning systems.

Inequality of income is high in Sri Lanka. Life expectancy, Education and per capita income are high in japan it is rank no.20. This wealth also effects to the receive the warning due to unavailability of radios, television, mobile phones and internet facilities to some vulnerable communities in Sri Lanka. Political intervention to the early warning dissemination in Sri Lanka is bit higher than the japan. It is also effect to consume the timing of warning dissemination. Sri Lanka is multinational country therefore it has multi-culture. Many languages have been using in Sri Lanka specially Sinhala, Tamil and English. Sri Lanka has to pass the messages based on the culture and language in order to control the panic situation. For instance, east and the north of the country are majority of Tamils and the moor. Because of that disseminate the messages by Tamil languages is more effective. Also Sri Lanka is tourist country. All the costal belt is enriched with foreigners. Therefore, it is very important to pass the messages by English language too.

Japan Coast



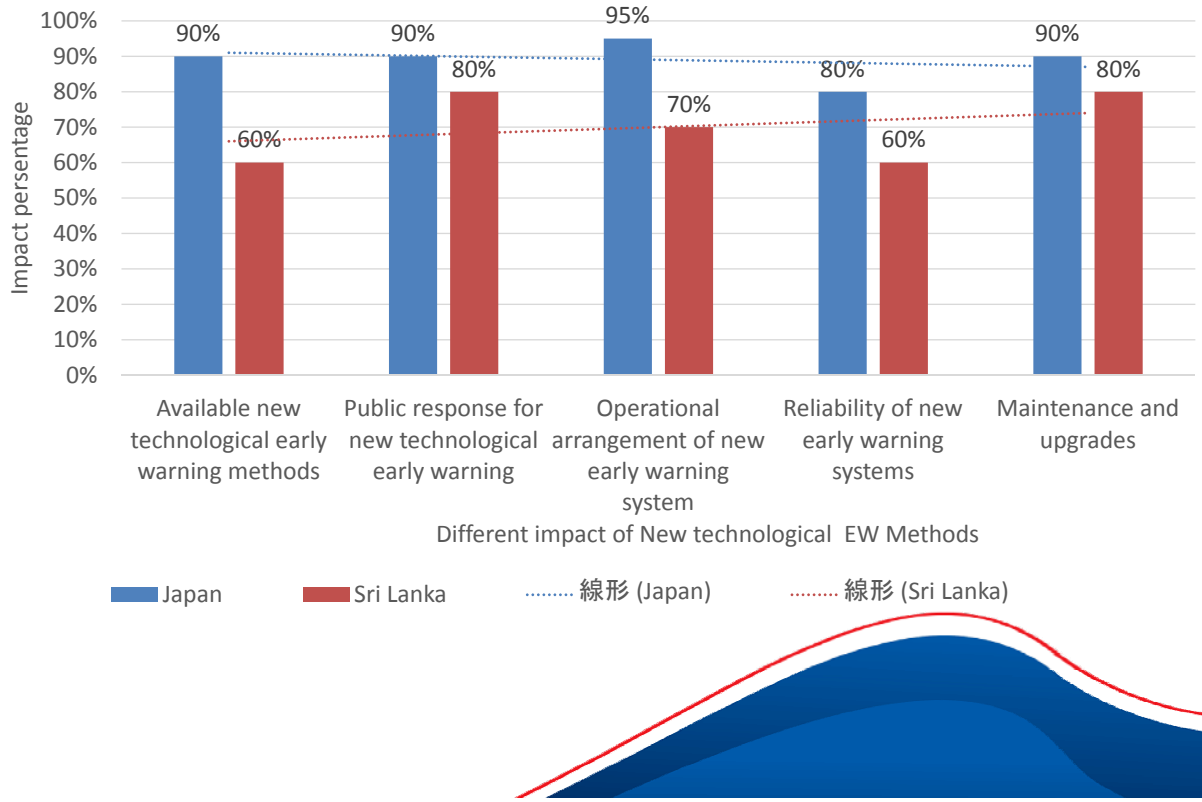
Sri Lanka Coast



2 .Use of New Technologies for Early Warning

No	Activity	Japan %	Sri Lanka %	Description
I.	Available new technological early warning methods	90	60	Japan has more systems with satellite. But SL has only few system early warning towers, no satellite.
II.	Public response for new technological early warning	90	80	Japan is highly depending on this new system thus available in everywhere. SL also highly depend but systems are not common.
III.	Operational arrangement of new early warning system	95	70	Japan has fully automatically warning system. But SL depend initial data and information getting from regional countries.
IV.	Reliability of new early warning systems	80	60	Though it is reliable in both countries, SL don't have system. Tsunami rare in SL than Japan.
V.	Maintenance and upgrades	90	80	Japan has technology, skill and, knowledge. SL has to hire the all. Big issue to SL.

Use of New Technologies for Early Warning

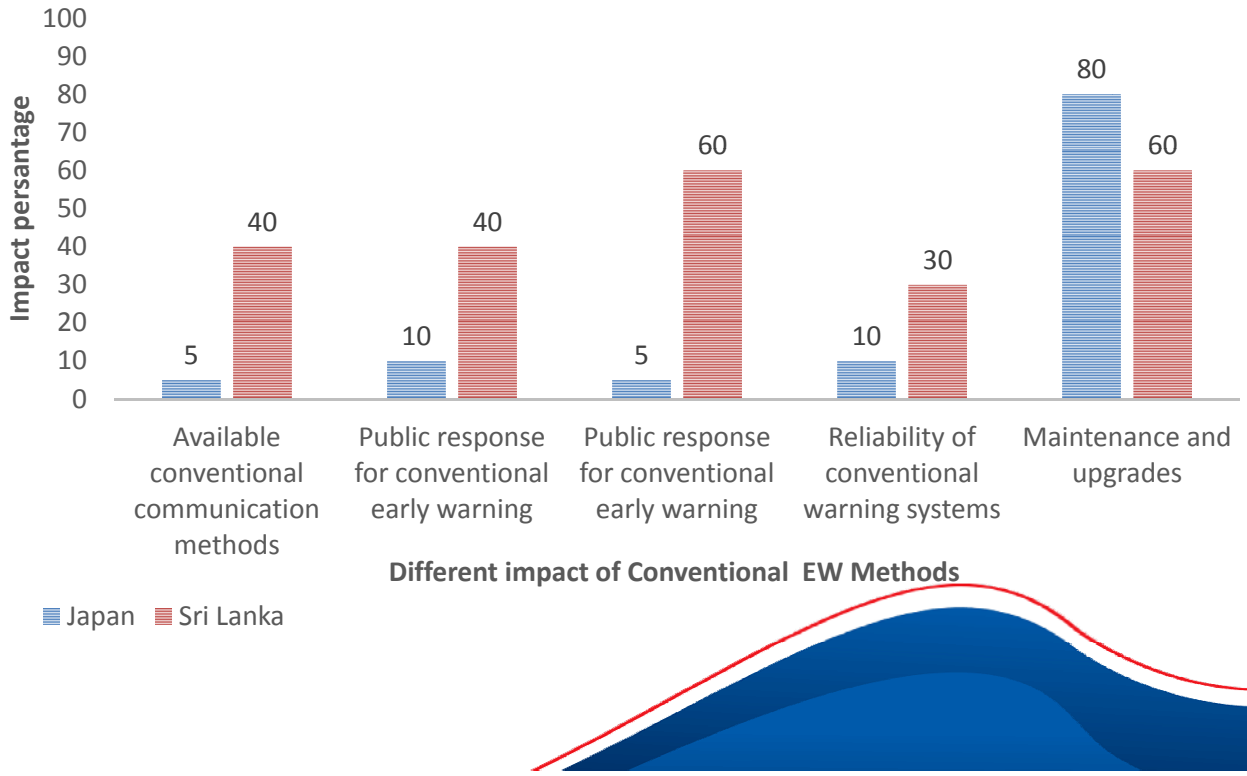


Japan has Early warning systems based on the satellite operation. They have own satellite which is J-Alert. But Sri Lanka does not have any satellite. A few systems have operated by satellite technology which are early warning towers and Thuraya satellite communication. Japan is highly depending on these new technological early warning systems. Those systems are allocated to where it is vulnerable locations in the country. Japan has fully automatic warning system. Peoples in the Japan are highly response to the new technological warning systems like early warning towers. Sri Lanka also highly depend on the new technological early warning system but systems are not commonly available in the country. Only 77 early warning towers are available in costal belt in the country. Also Sri Lanka is being depending on the initial data and information which are forwarding by regional countries specially India, Indonesia and Australia. Though these new technological systems are reliable in both countries, Sri Lanka don't have proper maintenance mechanism due to unavailability of such technological expertise in the country. This is big issue of Sri Lanka. Japan has their own technology, skill and, knowledge. However, the Tsunami is very rare in Si Lanka than Japan. In the past decade the only one tsunami has recorded in Sri Lanka while having more tsunami in Japan.

3. Use of Conventional Communication Methods for Early Warning (CCM)

No	Activity	Japan %	Sri Lanka %	Description
I.	Available conventional communication methods	05	40	SL has mostly depend on CCM due to lack of new systems while japan has very few.
II.	Public response for conventional early warning	10	40	SL has high respond but it is depending on person to person and other factors also. eg. environment and location etc.
III.	Public response for conventional early warning	05	60	This system has depend on the national system and information receiving system.
IV.	Reliability of conventional warning systems	10	30	Most popular in rural area in SL. But very low reliability in both countries.
V.	Maintenance and upgrades	80	60	Japan has proper maintenance mechanism if the systems are exist.

COMPARISUM OF CONVENTIONAL EARLY WARNING METHODS.



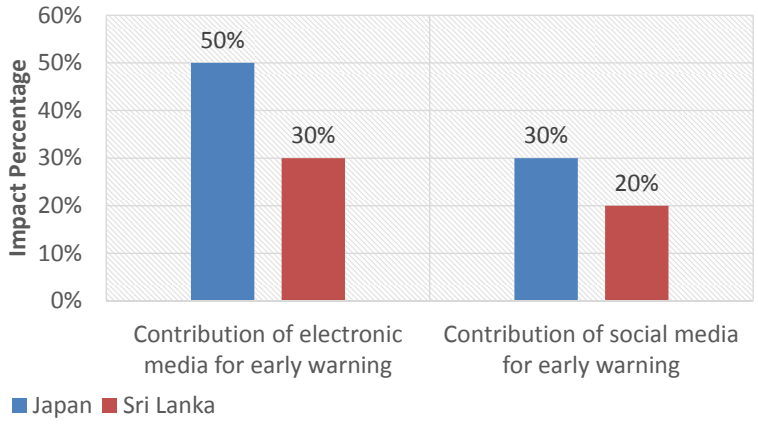
CONVENTIONAL EARLY WARNING METHODS.

Sri Lanka has mostly depended on Conventional Communication Methods due to lack of new technological systems. Sri Lanka has been highly responded to these conventional communication systems but it is depending on person to person and also the other factors which are environment, location, number of system available, kind and type of the communication system etc. This system also has depended on the national system because they cannot predict the tsunami. Therefore, they have to be alert on the national warning and information receiving system. If there is a gaps or failure in national system, entire conventional communicational system has failed. Due to low cost of operation and maintenance this CCM is very much popular in rural area in Sri Lanka. Japan has a very few systems are operations such as megaphone and public address systems. Japan has proper maintenance mechanism if the systems are existing. But it is very low reliability in both countries.

4. Utilization of social media and electronic media for Early warning

No	Activity	Japan %	Sri Lanka %	Description
I.	Contribution of electronic media for early warning	50	30	Japan has separate media channel for EW. SL has depend on Pvt and Govt channels.
II.	Contribution of social media for early warning	30	20	Both countries predominantly using but SL has not proper mechanism to use for EW.

5 . Social media and electronic media for Early warning



Japan has separate media channel for early warning and they can operate independently. Sri Lanka has depended on privet and government broadcasting and telecasting channels and those are not working at 24 hours' basis. Both countries predominantly using but Sri Lanka has not proper mechanism to use this media during night time. Face book, twitter, WhatsApp, Skype, messenger, viber and other social media are being used by the both countries. But in the night no one has responded to getting warning from social media.

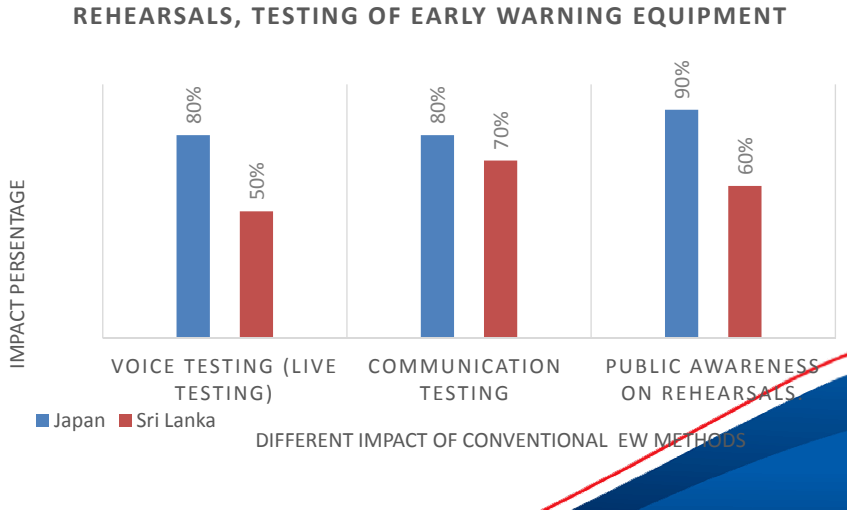
6. Use of Other Network for Early Warning (Military & police etc.)

No	Activity	Japan %	Sri Lanka %	Description
I.	Contribution of other network for early warning	10	40	Japan use own system while SL more utilized other com systems such as Military, Police etc.

Japan use their own communication system while Sri Lanka has been more utilized the other communication systems such as Military, Police, fire brigade, coast guard, railway etc. This is very reliable when the main system has fail the other alternative system has existed. Also peoples more confidence when it is coming more communication channels.

7. Rehearsals, Testing of Early Warning Equipment

No	Activity	Japan %	Sri Lanka %	Description
I.	Voice testing (Live testing)	80	50	Japan frequently testing. SL has not satisfactory level.
II.	Communication testing	80	70	Both countries are above average level.
III.	Public awareness on rehearsals.	90	60	SL peoples are always panic.

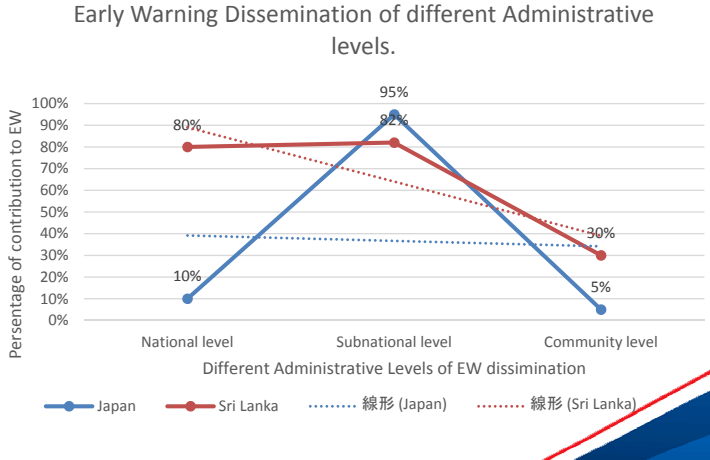


Rehearsals, Testing of Early Warning Equipment

Japan has frequently testing of their communication systems by full strength. But Sri Lanka has not operated the system frequently in the full strength. Sri Lanka is being used poll testing method to test the early warning towers in order to prevent the panic. But it does not imply the workability of the voice dissemination of the warning towers. Both countries are being displayed the above average level in the testing of communication systems.

8. Responsibility of Different Administrative levels for Warning Dissemination

No	Activity	Japan %	Sri Lanka %	Description
I.	National level	10	80	SL has higher responsibility to EW at any time.
II.	Subnational level	95	82	Prefecture level has very high responsibility while districts of SL also has almost same responsibility.
III.	Community level	05	30	SL communities have high responsibility due to inadequate EW equipment. But japan has national EW system to cater all the vulnerable areas.

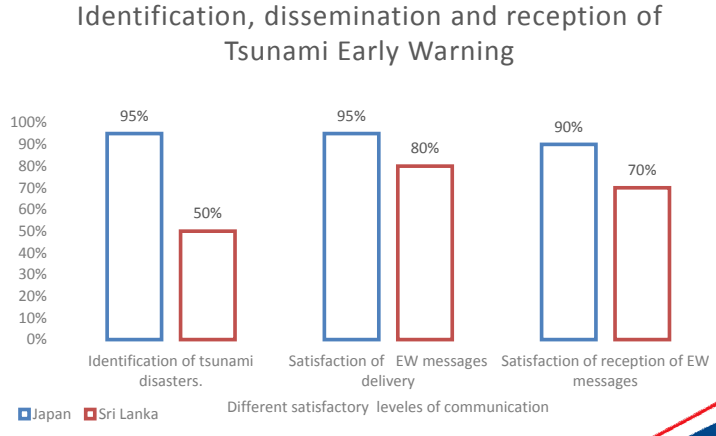


Different Administrative levels for Warning Dissemination

Sri Lanka national government has higher responsibility to early warning dissemination at any time. Districts of Sri Lanka also has same responsibility to pass the message to the district level and community level. Sri Lankan village level communities have high responsibility to disseminate the early warning among their communities due to inadequate technological early warning equipment. Japan has each prefectures level early warning system to cater all the vulnerable areas in the country. But japan don't have any responsibilities to warn the people nationally. If Prefecture could not able to disseminate the national government pass the messages immediately through the broadcasting, telecasting and by using other communication techniques.

9. Evaluation of communication in the Tsunami Early Warning

No	Activity	Japan %	Sri Lanka %	Description
I.	Satisfaction of EW messages delivery	95	80	SL also satisfied if the messages received on time.
II	Satisfaction of reception of EW messages	90	70	Japan direct delivery and received. But SL has different integrated system.
III.	Identification of tsunami disasters.	95	50	Japan has technical body. SL has mostly depend on International body. Japan Peoples can feel the earthquake. But SL isn't it.



Most of the time Japan Peoples can feel the earthquake. They have their own sign for tsunami disaster, the people can take the decision to move to safe location. Japan has direct delivery and receiving early warning mechanism without depend other nation. Japan has high technical body to analyze the situation. Sri Lanka also satisfied if the messages received on time but Sri Lanka has to be depend on the International body to get the tsunami warning. However, Sri Lanka has integrated early warning system pass the message as soon as possible to the vulnerable communities.

10. Awareness of tsunami early warning system

No	Activity	Japan %	Sri Lanka %	Description
I.	Public awareness on warning mechanism	90	50	Japan has good awareness among the public. Awareness has to be improved in SL.

Japan has an excellent awareness system among the public sector. Japan had several tsunamis in the past decade. This experiences also convenience to peoples in alert to the tsunami awareness. Therefore, most of the peoples know the tsunami. However, if the peoples receive tsunami warning, they could not know about where to go, what time to go, what to bring etc. Especially they don't know about transportation arrangement. Therefore, all the peoples are come with their vehicles. That would be major issue in the japan. The japan warning system has not yet concern about this issues. Sri Lanka has to improve the public awareness on early warning mechanism with the all the communities. Only the coastal communities know the tsunami warning system. But the other communities should have also known the warning system in order to prevent the impact from tsunami disasters.

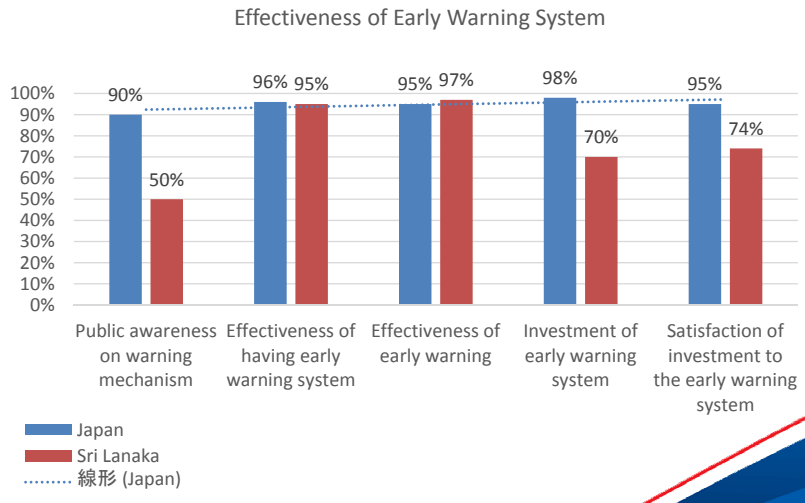
11. Effectiveness of Early Warning System

No	Activity	Japan %	Sri Lanka %	Description
I.	Effectiveness of having early warning system.	96	95	Both countries high priorities.
II	Effectiveness of early warning	95	87	Effectiveness of the EW depend on the Quality of messages and the warning received by public.

Both countries have given higher priorities on early warning systems to save the lives and properties. Effectiveness of the early warning system depend on the Quality of messages and the warning received by public. More tsunamis have to be happened in order to analyze the effectiveness of the warning system. If there is no tsunami effectiveness also zero. Therefore, Japan has high effectiveness why it is operated in 2011 tsunami successfully. But in Sri Lanka do not have any tsunami after the establishment of tsunami towers simply after 2004.

12. Analysis of Cost and Benefit investment for EW Systems

No	Activity	Japan %	Sri Lanka %	Description
I	Investment of early warning system	98	70	Comparatively SL also spend more money on EW.
II	Satisfaction of investment to the early warning system	95	74	Japan has high vulnerability to tsunami. But SL has only one experience. Based on the frequency of tsunami occurrence, Investment should be focused on Multi hazards warning system.



Cost and Benefit investment for EW Systems

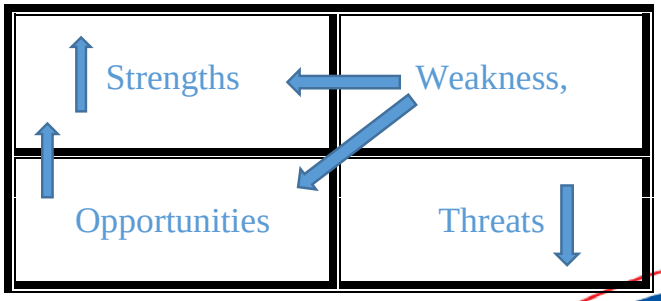
Comparatively Sri Lanka also invested more than the return of investment (ROI) to the tsunami early warning system. But Sri Lanka has only one experience in 2004 tsunami. Bu Japan has high vulnerability to tsunami. Based on the frequency of tsunami occurrence, Investment has focused on Multi hazards angle. Therefore, it can be used to any impending disasters.

Available and usability of the Early Warning Methods

No	Communication System	Japan	Sri Lanka
	Land line telephones / CDMA	Common use	Common use
	Early Warning Towers	Commonly using for every disasters	77 towers only. Use for tsunami and cyclone.
	Satellites	Common use	Tower operation and very rare use for communication.
	SMS	Always using for public at any network.	Use for selected costumes. Cannot operate all the networks.
	Cell Broadcast	No use	Fairly use but do not have confidence.
	VHF/HF Radio	Common use	Moderate use.
	Mobile Network	Common use	Common use. But in the disaster, network system jammed.
	Television channels	24 hours channels	No 24 hours channel. During night time have to inform to start the telecast.
	Radio channels	24 hours channels and separate channels are available.	No 24 hours' channel. During night time have to inform to start the telecast
	Press media	Not enough time	Not enough time
	Fax	Ordinary use	Only 15 minutes can use after that system jammed.
	Email	Always using.	Selected personal only
	Internet	Common use	Messages Upload but not common use.
	By Vehicles –Announcements	Fire brigade, police vehicles and helicopters are used.	No helicopters used, police, military vehicles.
	NGOs and CBOs	Not much involved	High involved.
	PA Systems	Commonly fixed systems are being used.	Always used. Mobile Pa systems also use.
	Mega phones.	Very common	Very common.
	Hand Sirens	Not use	Ordinary use.
	Electric Sirens	Common use	A very few use.
	Temple and church bells	Not use	Common use.
	Mosque PA system	Not use.	Common use
	Riders/ Push Bicycle & Motor	Not use	Ordinary use.
	Early Warning Committees (Door to Door)	Not prominent. No mechanism.	Committees are available. In the disasters cannot find the committee.
	Flags and different colour cords.	Rare use	Ordinary use
	Other institutional communication systems	Japan has dedicated line to communication. Therefore, not depend on other communication.	SL always depend on other communication system such as military, police, fire brigade etc.
	Mouth to mouth.	Very rare	Higher relationship among the communities. Most common practices.

SWOT Analysis

Strengths	Weakness
Opportunities	Threats



No	Information effect to EW	Japan	Sri Lanka
1	Land size and coastal belt of the country	Weakness	Weakness
2	Costal Population density	Threats	Opportunity
3	Gini co- efficient	Opportunity	Weakness
4	Human development index. (HID)	Strength	Weakness
5	Political intervention for EW	Opportunity	Weakness
6	Cultural impact for EW	Strength	Weakness
7	Language impact for EW	Opportunity	Threats
8	Use of different Type of messages to EW	Weakness	Strength
9	Availability of very high sophisticated (Satellite etc) early warning methods	Strength	Strength
10	Public response for new technological early warning	Opportunity	Opportunity
11	Operational arrangement of new early warning system	Strength	Strength
12	Reliability of new early warning systems	Strength	Weakness
13	Maintenance and upgrades	Opportunity	Weakness
14	Available conventional communication methods	Weakness	Strength
15	Public response for conventional early warning	Weakness	Opportunity
16	Operational arrangement of conventional early warning system	Weakness	Weakness
17	Reliability of conventional warning systems	Weakness	Opportunity
18	Contribution of electronic media for early warning	Opportunity	Opportunity
19	Contribution of social media for early warning	Opportunity	Opportunity
20	Contribution of other network for early warning	Opportunity	Strength
21	Voice testing (Live testing)	Strength	Opportunity
22	Communication testing (poll test)	Opportunity	Opportunity
23	National level EW	Opportunity	Strength
24	Subnational level EW	Strength	Strength
25	Community level EW	Weakness	Opportunity
26	Satisfaction of delivery and reception of EW messages	Opportunity	Opportunities
27	Public awareness on warning mechanism	Opportunity	Opportunity
28	Effectiveness of having early warning system and early warning	Strength	Strength
29	Investment of early warning system	Strength	Strength

Presentation Outline

- Places visit during VR 2016B program
- Research Topic
- Early Warning System In Sri Lanka
- Early Warning System In Japan
- *Research Design*
- *Methodology*
- *Data Collection*
- Category of Data collected
- *Data Evaluation Method*
- *Limitation of the Research*
- *Evaluation of data*
- *Conclusion*
- *Recommendations*

Conclusion

A complete and effective early warning system comprises of four elements

I. Identification of Disaster Risk, Sign and Threats

A complete early warning system should have a system to identify the impending disaster risk, sing and threats independently.

II. Timely Disseminate and Reception of Messages.

Identified disaster risk, sign and threats has to process to the valuable message and that message should have to disseminate timely and it should be verified the reception of relevant communities in the appropriate mechanism.

III. Efficiency of the Warning Mechanism

Efficiency of the early warning messages has depended on the time of dissemination and reception, accuracy of the message, short and clarity, community perception and acceptance and community respond.

IV. Effectiveness of the system

The effectiveness of the system would be depended on number of disaster occurrence, availability of the system and reliability of the system.

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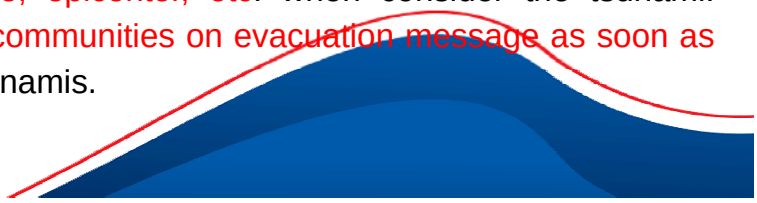
Recommendations

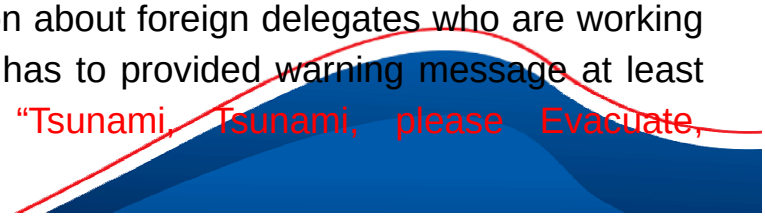
1. To make complete and effective early warning system should be inter-related with many elements, knowledge of hazards and vulnerabilities, education and training for people at risk, dissemination strategies and reception strategies as well as preparedness capacity to respond.
2. Responsibilities need to be clearly defined and people need to be well-informed and feel a degree of ownership of the implementation process. Much depends on establishing institutional capacities to ensure that early warning systems are well integrated into governmental policy and decision-making process. Focusing on early warning systems itself - show how communities can be involved in this process or how they can initiate the establishment of an early warning system at local level in connection with those at national, regional and international levels.
3. People-centered early warning systems is to be empowered individuals and communities exposed to hazards to act in sufficient time and in an appropriate manner to reduce the possibility of personal injury, loss of life and damage to property and the environment.
4. Stakeholders comprising both information suppliers and information receivers should be made educated on all key elements of the end-to-end system and the relevant SOPs and communications which have to be complied.
5. Early Warning is the uttermost important thing. It has to be validated periodically.

Recommendations for Japan

1. Japan has to be developed a traffic plan and it should be integrated with the early warning system to ensure the evacuation of the vulnerable communities due to high density of costal population and
2. When the earthquake magnitude is more than 07, the population of the 01 kilometer from the beach should be evacuated to the safer location with their vehicles within 05 – 10 minutes and if they unable to evacuate within given time, aware the people to evacuate without vehicles in order to avoid traffic jam.
3. The Japan has to enhanced the awareness of the early warning systems, channels, mechanisms and type and kind of early warning massagers which are going to be send the communities.
4. Japan is being disseminated several messages to general public and vulnerable communities. Therefore, each and every people could not be taken appropriate decision. In order to reduce this panic situation before the relevant time, Japan has to reduce the number of advisory, alert, warning messages. People do not need earthquake messages, magnitude, epicenter, etc. when consider the tsunami. Japan has to emphasized to the communities on evacuation message as soon as possible due to limited time for tsunamis.



5. Japan has to be improved the conventional communication system to response even during the night time. Early warning towers and other system could not be explained the evacuation locations and further additional details, in such situation conventional mechanism are important to guide the people until reach to safe locations. Therefore, Megaphone, public address systems etc, has to be ready in appropriate locations.
6. Japan has more than 60 % elderly peoples. They are taken more than 15 minutes to evacuate to the safe location by foot. Most of elderly and different abled people will die due to tsunami while they are moving to safe location and lack of awareness on early warning. In order to prevent such situation, Evacuation messages has to disseminated as soon as possible.
7. Japan ordinary used Japanese language to warn the communities but japan has to take keen attention about foreign delegates who are working in the japan. Therefore, japan has to provided warning message at least English language too like “Tsunami, Tsunami, please Evacuate, Evacuate”.



Recommendations for Sri Lanka

1. Improve the dedicated communication system with the regional warning centers between the national tsunami warning center to avoid the communication interruption. Sri Lankan peoples could not get the earthquake feeling where Sri Lanka is not locating in the earthquake fault or Ring of fire.
2. Sri Lanka has cultural and social impacts for early warning specially language and giving night time evacuation order. The women cannot be seen in the night around 7pm due to transport barriers, less security, culture itself refuse to see the women in the night, dependence are not allowed etc, therefor Sri Lanka has to do Drill in the night time by using early warning system to avoid the such situation. Only the early warning towers has provided messages by three languages. But each and every warning messages has to be disseminate by "Sinhala, Tamil, English" language in order to prevent the language barriers in Sri Lanka and thus each administrative levels have to be kept in ready the prerecorded warning messages to disseminate at the disasters.

3. Sri Lanka has been struggling with new technology involvement after established with the early warning system in 2009. Sri Lanka has to hired the technology from the original suppliers and it has to upgrade by time to time expending high cost. It is highly recommending to integrate with local technologies which can be sustained and effective by corporate with technical institutes.

4. The Sri Lanka has a well-established early warning system. Though it is well established, there is no any dedicated channel to conform the dissemination and reception of the message. Sri Lanka is being utilized many other channels which are military, police, etc. to overcome the current gap of early warning system. It is recommended to arrange a dedicated line with several locations to get the feedback of early warning messages.

5. After the great 2004 tsunami the word "TSUNAMI" is famous in the country. But science, aptitude of the hazard and many other response activates are not known by many other communities in the middle part of the country. Awareness on tsunami has to be provided and enhanced to the communities in order to save the life from future tsunamis.

Common recommendation to the world on early warning mechanism

1. *In the past decade most of the peoples in the world has died by tsunamis due to lack of tsunami early warning system without concerning region, country, race, religion or any other factors. Most of countries they don't have enough money to cover the entire area by warning systems. Some systems are very expensive. Some countries are doing business and earn large profit by selling early warning system. Most of the countries are struggled with the technologies. Therefore, it is recommended to* ***identified and established a common early warning system (one system) for all countries*** *such as digital HF communication system or satellite base communication system etc. to overcome the early warning issues in the world and save the lives form tsunamis.*

1. *There are many warning systems exist in the word at the present. Many sirens, many colour codes are been using for communicate the warning information to the public. Therefore, it is recommended to standardized the sound that can be utilized as a* ***Common sound for disasters*** *such as ambulance sound. That common sound will help to identified the disasters in anywhere in the world and it can be integrated to mobile phones, radios, early warning towers, emergency response vehicles even during night time and also SMS alert for elderly people, foreigners.*

1. *Create awareness among the communities to* ***"improve their ability to judge the disasters"*** *take appropriate action like "Kamaishi Higashi Junior High School" in japan 2011 tsunami respond.*

- ✓Thanks for all the ADRC staff.
- ✓Resource personals.
- ✓Other Institutes where I gain knowledge.
- ✓Other who are encourage me.
- ✓DK house manager.
- ✓My friends from Pakistan and Thailand.
- ✓Specially Shiomi san for coordinate.
- ✓Finally Japan.

Thank you.