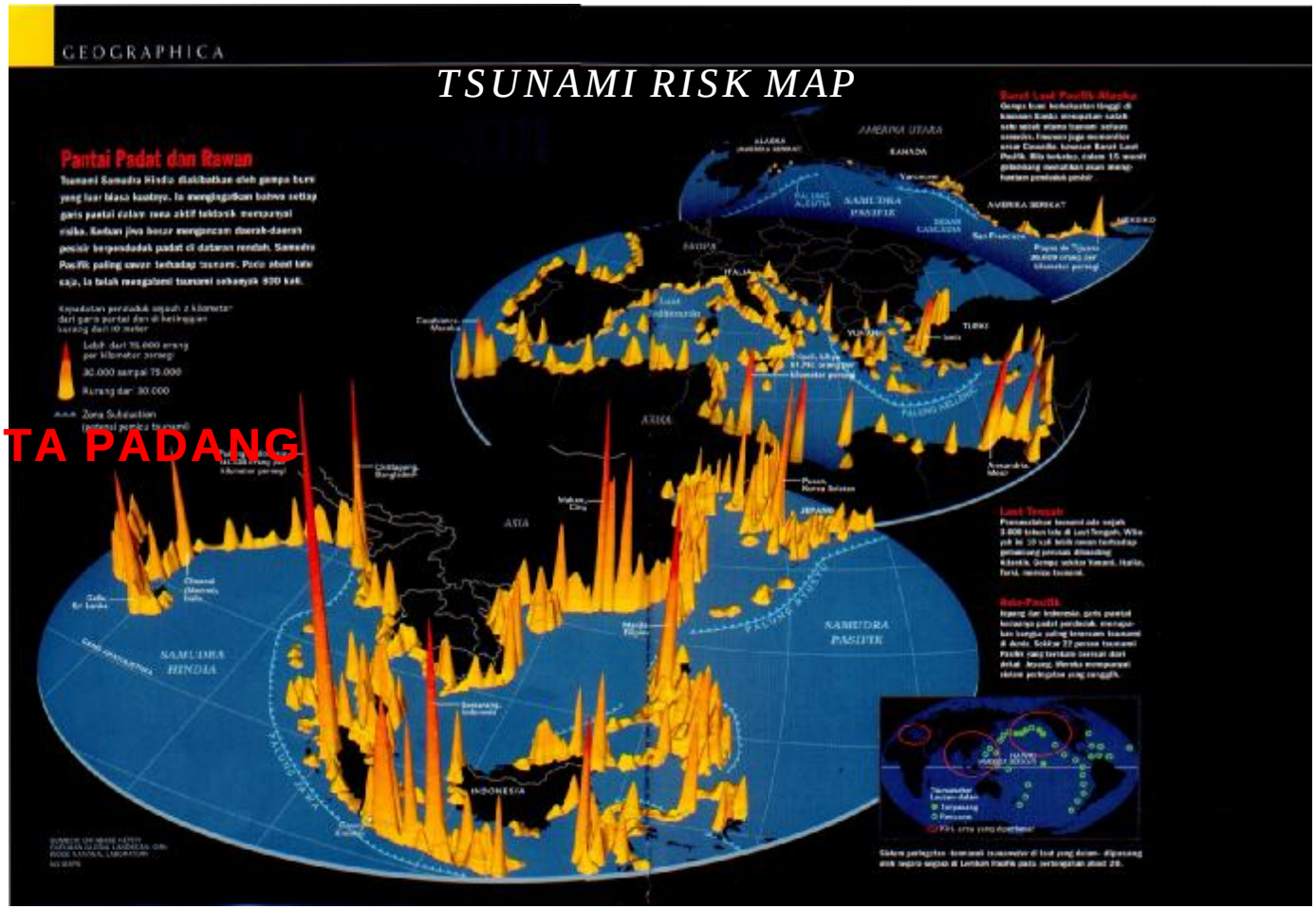
Tsunami Early Warning System, Lesson Learned from Padang City

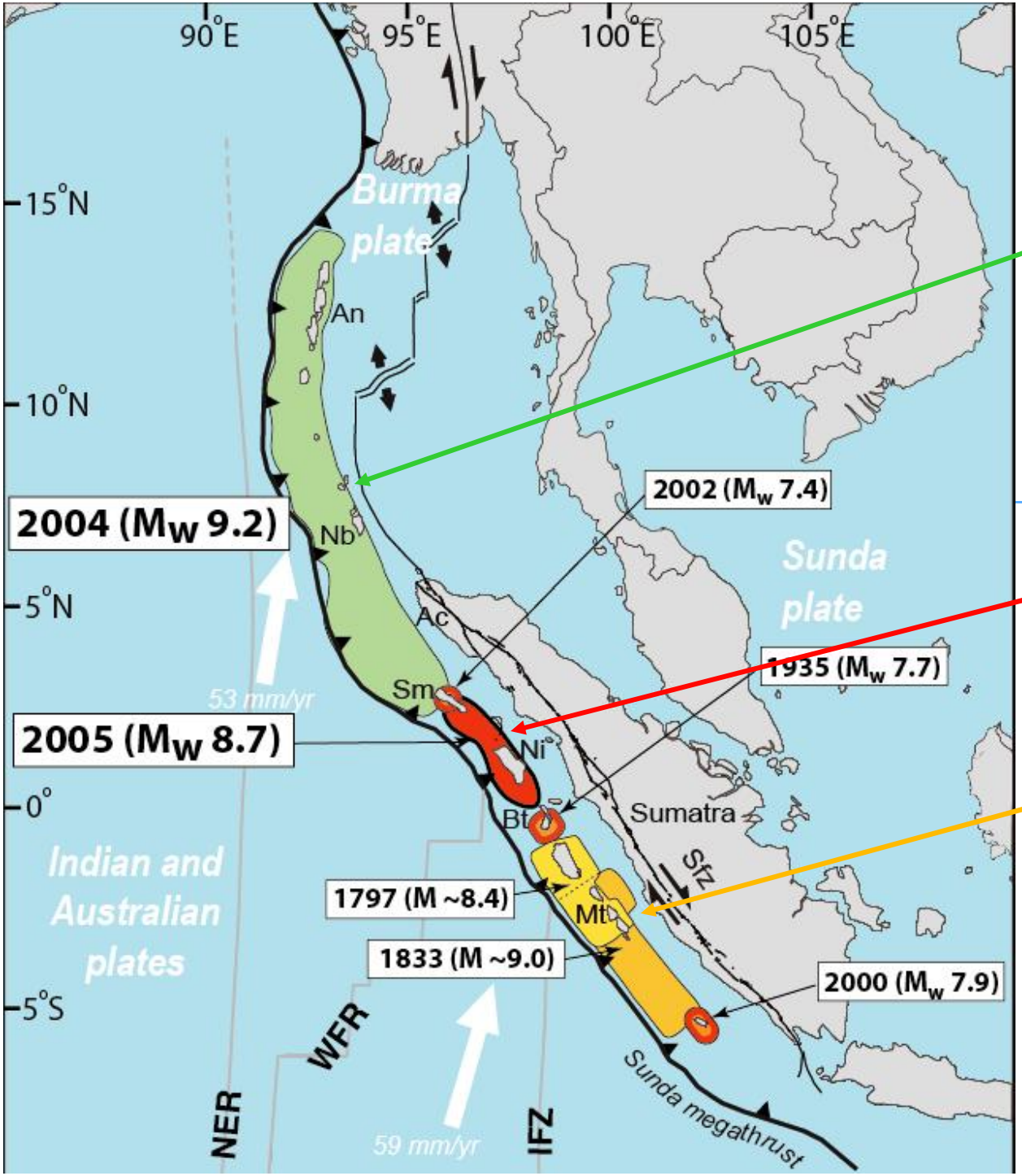
March 05, 2008

Patra Rina Dewi
Executive Director, KOMUNITAS SIAGA TSUNAMI (KOGAMI)
Padang, West Sumatra, Indonesia

Patra Rina Dewi, Komunitas Siaga Tsunami
Lokakarya Sistem Peringatan Dini Berbasis Masyarakat
IIDP-LIRNEasia, Jakarta, 5 Maret 2008



Source : National Geographic April 2005



Aceh-Andaman section

Nias-Simeulue section

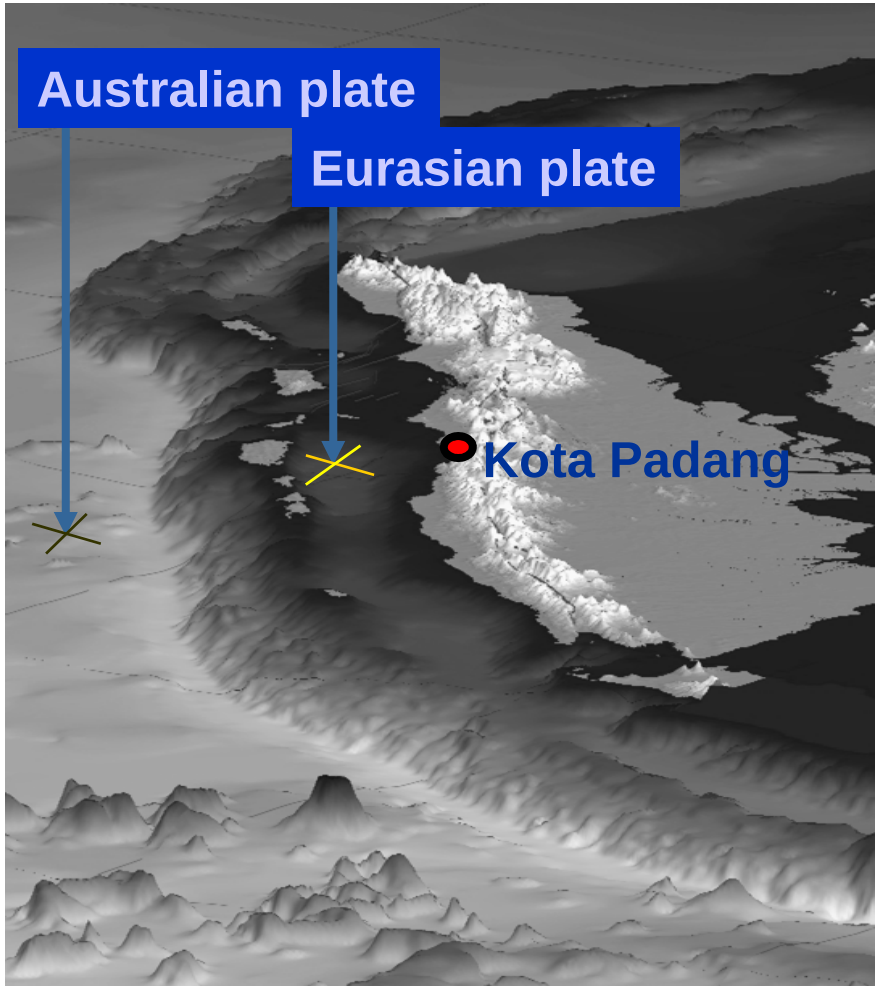
Mentawai section

The Mentawai section seems to be the most likely to rupture in the near future

Natawidjaja et al (2006) J Geophys Res

Tsunami potential in Padang City

- **Padang is located near subduction zone (Australian plate and Eurasian plate)**
- **In 1797 and 1833 Padang was hit by earthquake (± 8-9 magnitude) that generated Tsunami**
- **Prediction from Scientist (Prof. Kerry Sieh and Dr. Danny Hilman), Tsunami may hit coast of West Sumatra at anytime, the run up could be 5 m above sea level and the inundation could be maximum ±2 km inland, the first wave probably comes 20 – 30 minutes after the strong earthquake**



Risk in Padang

400,000 people live in red zone (0-5 m above sea level)

Lack of appropriate evacuation road and other infrastructures

Lack of multistory building for vertical evacuation

Evacuation time is only 30 minutes

DENSITY IN COASTAL AREA

400,000 people = 30 minutes ?

WE NEED EFFECTIVE EARLY WARNING SYSTEM !

IDEAL TEWS (in concept/hope)

1. **Lead by one institution (Tsunami Warning Centre)**
2. **The warning dissemination shoulde based on compilation data from TEWS equipments compare with the historical data and forecasting**
3. **Has level of message : information or warning (in PTWC : information, watch, advisory, warning/cancellation**
4. **Only predicted "target area" get a message (in Japan)**
5. **There is SOP for disseminating warning to the community**
6. **The TEWS should be socialized by the responsible agencies, so the community understand how to respond**

Key Principle : To reduce loss of life !

Patra Rina Dewi, KOGAMI
Lokakarya Sistem Peringatan Dini Berbasis Masyarakat
IIDP-LIRNEasia, Hotel Borobudur, 5 Maret 2008

THE FACT OF TEWS RECENTLY

At the National Level : (mechanism and equipment) are not ready to use yet, so the local government and community are still waiting

1. **The information from BMG through sms does not show the exact location of earthquake**
2. **The siren is already in place but there is no mechanism how to anticipate if the electricity off yet**
3. **The siren was failed to be activated on time when tested on December 17, 2007. The scenario explained that sirene would be activated at 11 am but the fact the sirene was on at 11.30 am (siren from BMG, responsibility of satkorlak Sumbar)**
4. **RA-NET is very useful to learn exactly the epicentre of earthquake but RA-NET doesnt have delay sistem, so when the electricity off, the data doesnt exist**

Patra Rina Dewi, KOGAMI
Lokakarya Sistem Peringatan Dini Berbasis Masyarakat
IIDP-LIRNEasia, Hotel Borobudur, 5 Maret 2008

EXISTING CONDITION IN PADANG CITY

1. **Padang already has own SOP (in progress to be legalized) including EWS which is integrated with SOP of command centre (Pusdalops)**

2. **Pusdalops of Padang has installed 8 sirens (the maximum radius for each siren : 1 km) and was tested successfully on Dec 17,2007 at 2 pm, responded by 10 disaster-prepared schools nearby**

3. **Community has been educated to use strong earthquake as the BEST WARNING ! which will be integrated with command from mayor (after BMG give official warning)**

4. **Community already know how to respond STRONG EARTHQUAKE (potential tsunami), WHAT TO PREPARE, and WHERE TO GO (case study : 12 and 13 September 2007 earthquake**

SOP EWS KOTA PADANG

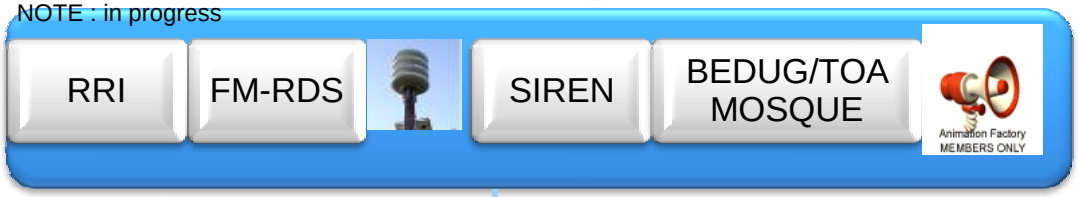
MAYOR/HEAD OF COMMAND CENTRE

COMMAND FOR EVACUATION/NOT

NO EARTHQUAKE/ ISSUE

CLARIFY TO COMMAND CENTRE

NOTE : in progress



EARTHQUAKE POTENTIAL TSUNAMI

EVACUATE TO HIGHER GROUND

COMMUNITY

KEEP EVACUATING/ NOT

Patra Rina Dewi, KOGAMI
Lokakarya Sistem Peringatan Dini Berbasis Masyarakat
IIDP-LIRNEasia, Hotel Borobudur, 5 Maret 2008

THREE CRITERIAS OF EARTHQUAKE POTENTIAL TSUNAMI
Particulary for People live in Coastal Area of West Sumatra

1. **Very strong! People can not stand up properly**
2. **Last more than one minute**
3. **The structure of building collapsed**

Example : 12 & 13 September 2007 Earthquake

People will EVACUATE IMMEDIATELY, bring EMERGENCY-KIT BAG and SEARCH INFORMATION THROUGH BATTERY RADIO or from MOSQUE

PEOPLE also agree to use simple tool to warn each other, example : bedug, electricity pole, school bell, etc

If the siren alarmed, they have to continue their evacuation until got official information about cancellation

HOW THE COMMUNITY RESPOND THE EWS?

EDUCATION IS THE KEY OF SUCCESS !!

1. **Supply them knowledge about disaster (mechanism, the risk, the impact)**
2. **Motivate them that the risk can be anticipated or reduced**
3. **Facilitate in making planning (including when have to evacuate / deal with EWS, determine evacuation route, decide family meeting-point and relocation zone)**
4. **Evacuation drill which is integrated with SOP of emergency-response of City**

SCHOOL EDUCATION

MERCYCORPS INDONESIA

KOGAMI

The School Education Roadshow in Padang was developed to increase knowledge of disasters for teachers, students and school staffs.

The School Education Roadshow was implemented successfully to 30 Elementary Schools, 21 Junior High Schools, and 10 Senior High Schools. Each school developed its own evacuation plan and hazard map in a participatory manner and KOGAMI had them professionally formatted and blown up as a lasting tool. About 17,700 students and 900 school staffs – 18,675 people all told! – were trained in disaster preparedness and proper evacuation.

Student enjoy the training

KOGAMI USIOTWS USAID

Patra Rina Dewi, KOGAMI
Lokakarya Sistem Peringatan Dini Berbasis Masyarakat
IIDP-LIRNEasia, Hotel Borobudur, 5 Maret 2008

DISASTER PREPARED SCHOOL

5 Criteria for disaster prepared school

1. **Have disaster knowledge**
2. **Have evacuation plan**
3. **Have procedure and early warning system**
4. **Have ability to mobilize resources**
5. **Have policy of mitigation**

UNESCO support KOGAMI to build 12 pilot of disaster prepared schools in Padang city : 2 elementary schools, 6 yunior schools, and 4 senior high schools

KOGAMI UNESCO

COMMUNITY MEETING

KOGAMIs experts give socialization of disaster preparedness to community

Community determine the evacuation route to the high ground

Community develop risk and evacuation map

Participant presents the developed evacuation route

POST REHEARSAL AND EVACUATION DRILL

Coordination among related agencies

Rehearsal and special drills for officials

Vehicles that used on post rehearsal/drill

Final Preparation

EVACUATION DRILL

Run to Higher ground (KOGAMI-ARTE TV)

Almost reach high ground (KOGAMI-LIPI)

At the relocation zone

Victim evacuation and medication are also part of the drill (KOGAMI – LIPI)

Significant result of education for the community

Earthquake 12 (7.9, Wednesday, 6.10 pm) & 13 September 2007 (7.7 Thursday, 6.49 am)

- Traffic jam < 2 hours
- People panicking < 30 minute
- mostly people chose not to evacuate on 12 September (only 25%, from assessment of GTZ) because it was first day of ramadhan, they prefer to pray at mosque, and based on the UNESCO-IOC assessment, people in Indonesia evacuated before warning disseminated
- One died because of building collapsed (12 September)
- About 70% people evacuated immediately after earthquake (13 September),
- Agencies controlled the situation immediately after the shaking stopped (based on SOP)
- Information from mayor through radio station was very useful for people
- Live-information from mayor through radio that was relayed using loudspeaker in the mosque helped people to get information

Earthquake 10 April 2005, 6.7 magnitude, Sunday, 5.18 pm

- Traffic jam > 2 hours (5 hours)
- People panicking > 3 hours
- People did not know what to do
- Schools and offices got holiday for >3 days
- One died because of accident

- **Community did not how to get information**
- **There was no control for 3 hours, no SOP**
- **cellular phone could not be used**
- **only police on the street**

Situation on 10 April 2005 earthquake compare to 13 September 2007 earthquake

10 April 2005 earthquake

13 September 2007 earthquake

NEXT PRIORITIES

1. EARLY WARNING SYSTEM

- The message from BMG is still confusing, for example on 13 september earthquake (earthquake info : 7.7 magnitude, 13-sept-07, 06:49:04 WIB, 140 km south west of Sungai Penuh, depth 24 km). The mayor almost gave wrong information to the community because community thought Sungai Penuh is inland. Still on 13-Sept-07 8:26:37 WIB, there was another warning after people was command by mayor to go back home
- People feel doubt about message from BMG because they think the message is not accurate yet, many messages about tsunami potential but there was oftenly no Tsunami

NOTE : Indonesia still needs better system in Tsunami Early Warning

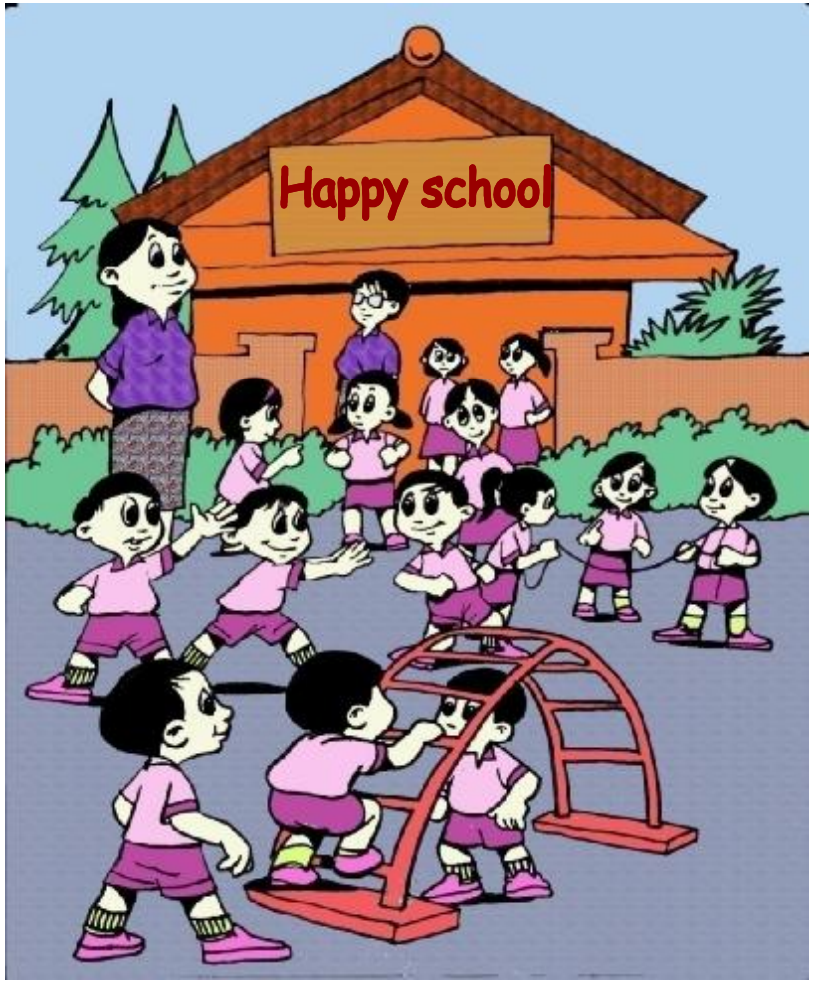
2. EDUCATION FOR THE COMMUNITY

- Early warning system is not useful if community dont know how to respond, so **the education is still the most important thing** for the community

KOGAMI'S DREAM

WE WANT TO SEE THE YOUNG GENERATION ENJOY THEIR TIME TO STUDY, TO PLAY, AND TO GET HAPPINESS because THEY ALREADY PREPARE TO ANTICIPATE, TO REACT, TO RECOVER DUE DISASTER

EVERYWHERE IN THE WORLD



THANK YOU FOR ALL KIND OF SUPPORTS

- Address : Jl. Bt. Pasaman No. 2 Rimbo Kaluang Padang 25114
- http://kogami.or.id
- http://kogami.multiply.com
- kogami_indonesia@yahoo.com
- Phone: +62 751 7860280

KOGAMI world ambassador in developing disaster preparedness culture