

GEOLOGICAL HAZARD MITIGATION STRATEGY IN INDONESIA

Surono
Head of Geological Agency

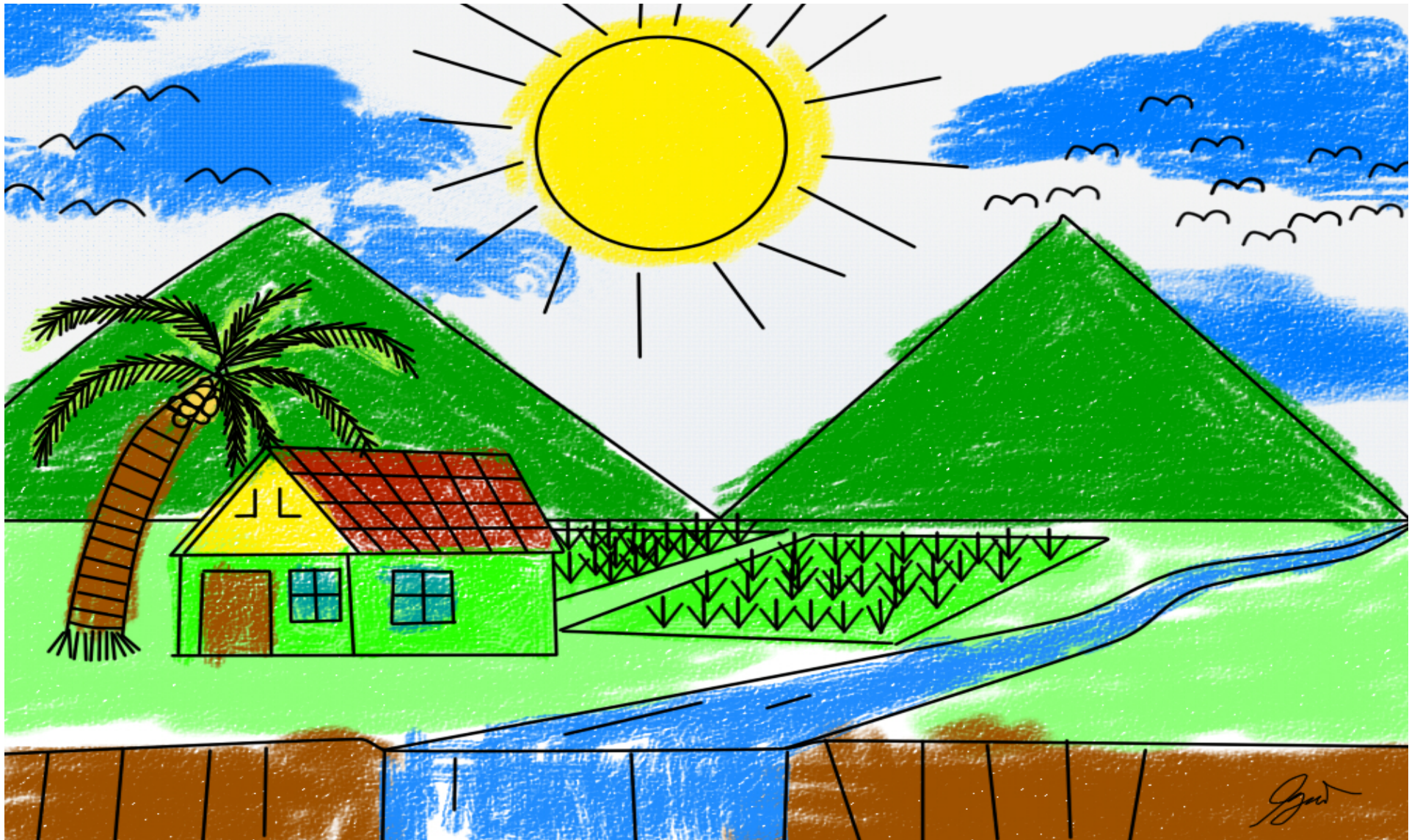
presented in:

The 2nd Global Summit of Research Institutes for Disaster Risk Reduction
Kihada Hall, Uji Campus, Kyoto University
Kyoto, Japan, March 19-20, 2015

Ministry of Energy and Mineral Resources
Geological Agency

Jln. Diponegoro no. 57 Bandung 40122, Jawa Barat, Republic of Indonesia
Phone: +62-22-7215297, +62-21-5228371 | Fax: +62-22-7216444, +62-21-5228372
Website : <http://bgl.esdm.go.id> | E-mail: geologi@bgl.esdm.go.id

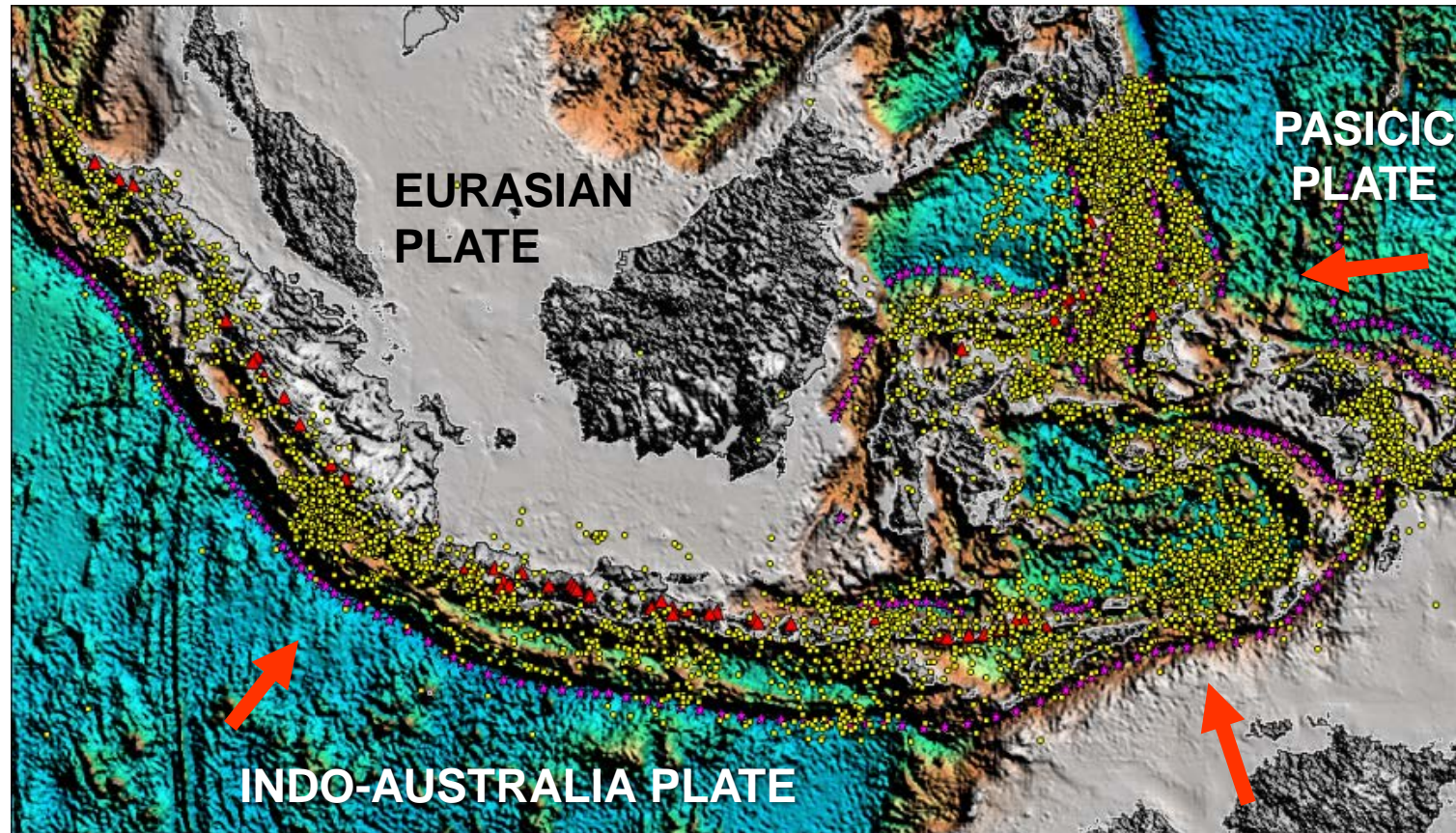




Indonesian children's painting

Background

Indonesia is located between the collision of 3 major tectonic plates including Eurasia, Indo-Australia and Pacific plates.



Indonesia's tectonic settings resulted in abundant natural resources including geological hazard, such as:

1. Earthquakes & tsunamis
 2. Landslides
 3. Volcanic eruptions
 4. etc
- 127 volcanoes (13 % of the World's volcanoes)
 - 67 volcanoes have erupted at least once since 1600 (Type-A) and are continuously monitored by 74 volcano observatories



Volcano Eruption



Earthquake



Tsunami



Landslide

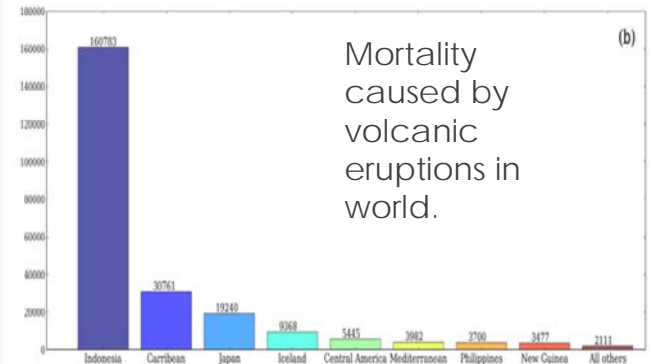
Statistics of geological disasters' victims in Indonesia

Date	Location	M	Victims
2011/3/11	Tohoku, Japan	9.0	>20,000
2010/1/12	Haiti	7.0	222,570
2009/9/30	Padang, Indonesia	7.5	1,117
2008/5/12	Sichuan, China	7.9	87,587
2006/5/26	Yogyakarta, Indonesia	6.3	5,749
2005/10/8	Kashmir, Pakistan	7.6	86,000
2005/3/28	Nias, Indonesia	8.6	1,313
2004/12/26	Sumatra (Aceh), Indonesia	9.1	227,898
2003/12/26	Bam, Iran	6.6	31,000
2003/5/21	Algeria	6.8	2,266
2002/3/25	Afghanistan	6.1	1,000
2001/1/26	Bhuj, India	7.6	20,023

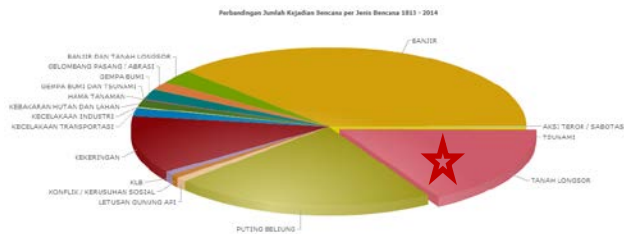
List of **earthquakes** that have caused more than 1000 victims since year 2000

Year	Location	Victims
1883	Sunda Strait (following Krakatau eruption)	36,000
1933	West Sumatera, Bengkulu, Lampung	Unknown
1938	Kai Island - Banda	Unknown
1967	Tinambung	58
1968	Tambu, Southeast of Sulawesi	200
1977	Sumbawa	161
1992	Flores	2,080
1994	Banyuwangi	377
1996	Toli-toli	9
1996	Biak	166
2000	Banggai	50
2004	Nanggroe Aceh Darussalam	265,000
2006	South of Java	550

List of **tsunami** occurrence and victims in Indonesian history.



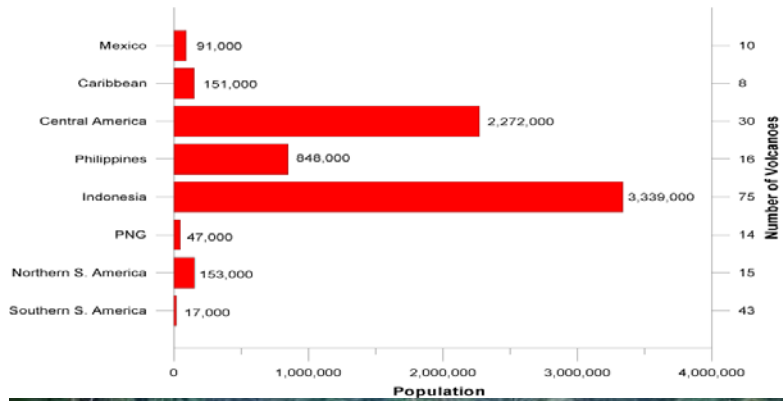
Indonesia has been recognized as the world's most victims caused by **volcanic eruptions**.



Distribution of victims caused by natural hazards. **Landslide** manifests the third deadliest natural hazard in Indonesia (after flood and tornado).

Challenges : Geological hazard areas are becoming more populated

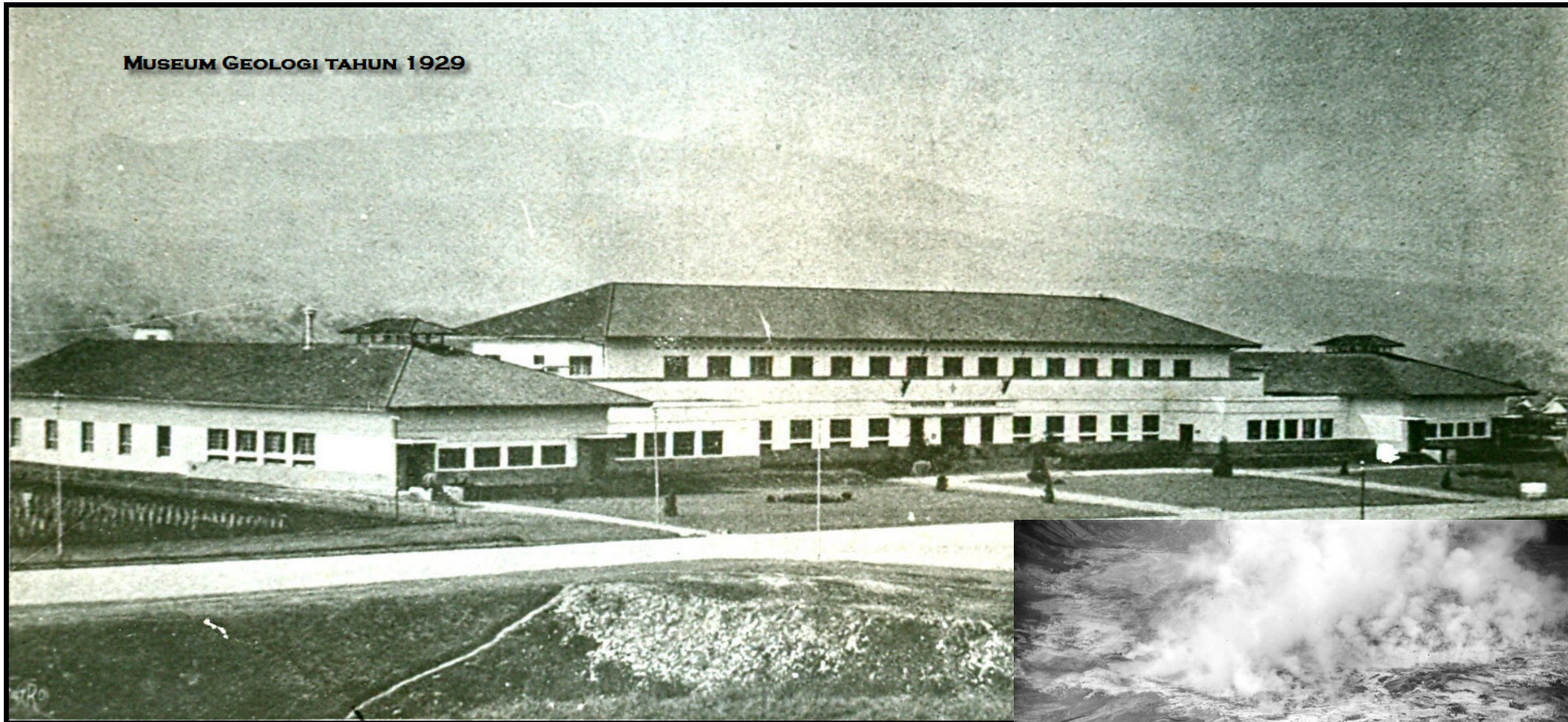
Ambient Population within 10 km of an Historically Active Volcano



Hazardous areas in Indonesia are typically fertile land, have an abundant amount of water, and beautiful scenery. Consequently, people are attracted to live and conduct activities in hazardous areas.

The Geological Agency (since 1850)

MUSEUM GEOLOGI TAHUN 1929

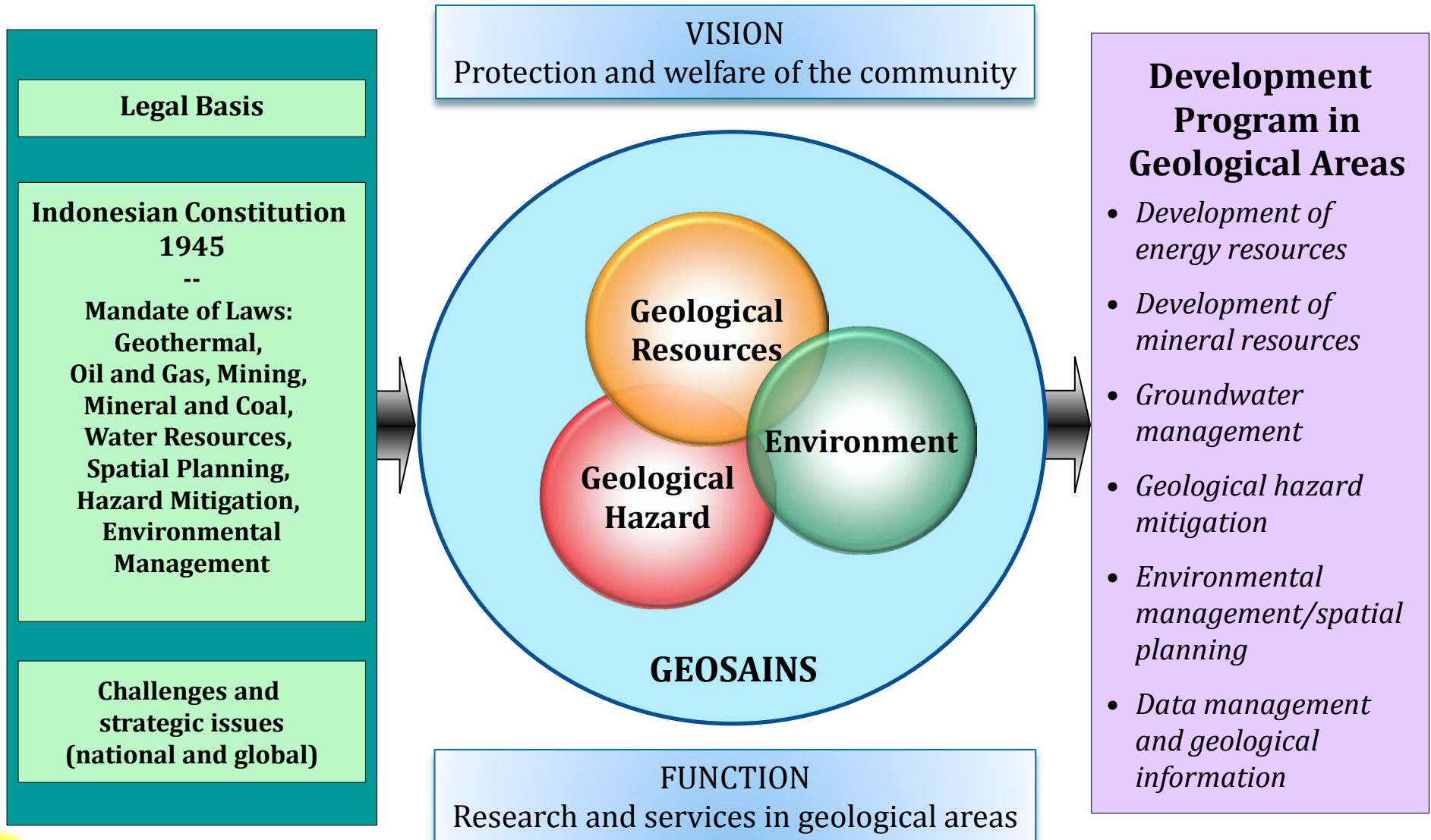


The Volcanological Survey was initiated in 1920 in response to the 1919 eruptions of Kelud volcano in East Java.

Kelud Volcano 1919



Task and Function of the Geological Agency



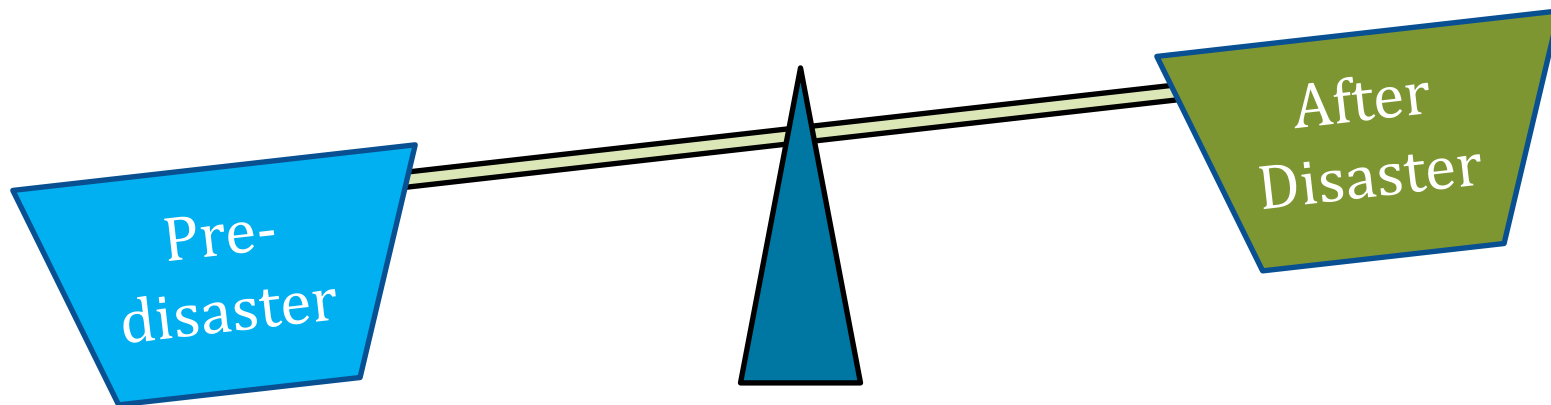
Regulations Concerning Geological Hazard Mitigation in Indonesia

- ❑ UU RI n. 24 Year 2007 : "Disaster Management"
- ❑ UU RI n. 26 Year 2007 : "Spatial Planning"
- ❑ PP n. 21 Year 2008 : "Implementation of Disaster Management"
- ❑ PERMEN ESDM n. 18 Year 2010 : "Organization and Administration of the Ministry of Energy and Mineral Resources"
- ❑ PERMEN ESDM n. 15 Year 2011 : "Guidelines for Geological Hazard Mitigation including Volcanic Eruptions, Landslides, Earthquakes and Tsunamis"

Regulations Concerning Geological Hazard Mitigation in Indonesia

- UU RI (law of the Republic of Indonesia) no. 24 Year 2007 concerning "Disaster management"
- UU RI (law of the Republic of Indonesia) no. 26 Year 2007 concerning "Spatial Planning"

The existence of these two laws have changed the paradigm of disaster management which is more focused on pre-disaster efforts.



Task and Function of Geological Agency concerning Hazard Mitigation based on the Regulation of the Minister of Energy and Mineral Resources N° 18/2010

Task

Responsible for conducting research, investigation, engineering and services in the field of volcanology and geological hazard mitigation.

Function

- Conduct monitoring, research, thematic mapping, geological disaster risk analysis
- Early warning of volcanic activities, landslide potential and technical recommendation in geological hazard mitigation.

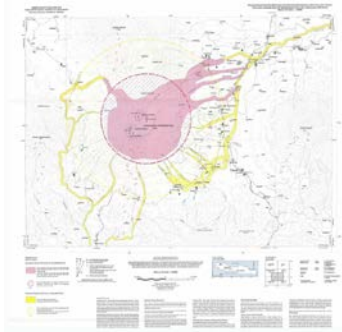


Strategy Of Geological Hazard Mitigation in Indonesia

Research & Monitoring



Hazard Mapping



Socialization, Contingency Plan & Education



Quick Response



International and National Cooperation (past 10 years)



AUSTRALIA-INDONESIA
FACILITY FOR
DISASTER REDUCTION

EARTH
OBSERVATORY
OF SINGAPORE



MIA VITA



etc





Contents lists available at SciVerse ScienceDirect

Journal of Volcanology and Geothermal Research

journal homepage: www.elsevier.com/locate/jvolgeores



The 2010 explosive eruption of Java's Merapi volcano—A '100-year' event

Surono ^{a,1}, Philippe Jousset ^{b,*}, John Pallister ^{c,2}, Marie Boichu ^{d,3}, M. Fabrizia Buongiorno ^{e,4}, Agus Budisantoso ^{f,g,5}, Fidel Costa ^h, Supriyati Andreastuti ^a, Fred Prata ^{i,6}, David Schneider ^{j,7}, Lieven Clarisse ^{k,8}, Hanik Humaida ^{f,5}, Sri Sumarti ^{f,5}, Christian Bignami ^{e,4}, Julie Griswold ^{c,2}, Simon Carn ^{l,9}, Clive Oppenheimer ^{d,m,n}, Franck Lavigne ^o

^a Center of Volcanology and Geological Hazard Mitigation, Jalan Diponegoro 57, 40122 Bandung, Indonesia

^b BRGM, 3 Avenue Claude Guillemin, BP36009, 45060 Orléans Cedex 2, France

^c U.S. Geological Survey, Cascades Volcano Observatory, 1300 SE Cardinal Court, Vancouver, WA 98604, USA

^d The University of Cambridge, Department of Geography, Downing Place, Cambridge CB23EN, United Kingdom

^e Istituto Nazionale di Geofisica e Vulcanologia, Via di Vigna Murata 605, 00143 Rome, Italy

^f BPPTK (Balai Penyelidikan dan Pengembangan Teknologi Kegunungapian), Jalan Cendana 15, Yogyakarta 55166, Indonesia

^g ISTERre, CNRS, Université de Savoie, 73376 Le Bourget du Lac cedex, France

^h Earth Observatory of Singapore, Nanyang Technological University N2-01a-10, Singapore 639798, Singapore

ⁱ Climate and Atmosphere Department, Norwegian Institute for Air Research, PO Box 100, Kjeller, 2027, Norway

^j U.S. Geological Survey, Alaska Volcano Observatory, 4230 University Drive, Anchorage, AK 99508, USA

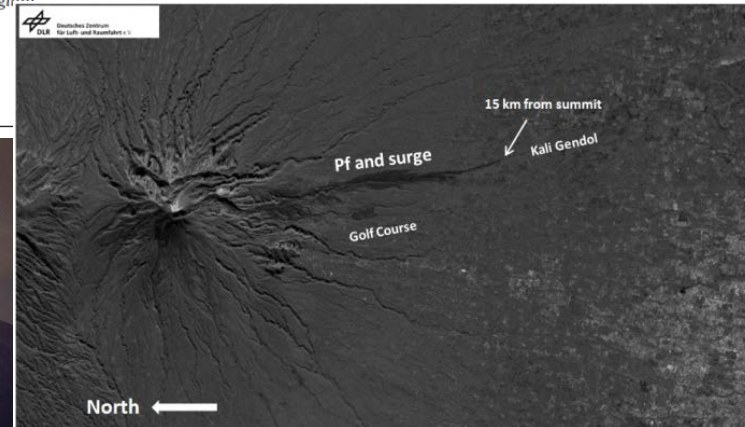
^k Université Libre de Bruxelles, Unité de Chimie Quantique et Photophysique, Campus du Solbosch, CP160/09, Avenue F.D. Roosevelt 50, 1050 Bruxelles, Belgium

^l MTU: Department of Geological/Mining Engineering & Sciences, 1400 Townsend Drive, Houghton MI 49931, USA

^m Le Studium, Institute for Advanced Studies, Orléans and Tours, France

ⁿ L'Institut des Sciences de la Terre d'Orléans, l'Université d'Orléans, 1a rue de la Fêrolierie, 45071 Orléans, Cedex 2, France

^o Laboratoire de Géographie Physique, 1 Place A. Briand, 92195 Meudon Cedex, France



CHALLENGES

Dense population and high rate of population growth, the risk due to geological hazard in Indonesia is very high. Our main challenges are :

- Evaluate the effectiveness and develop the existing mitigation system.
- Increase the capacity of people living around the hazardous areas to create a resilience society to destructive geological hazard.
- Empower the participation of all elements of the society in disaster mitigation system.

Arigatou gozaimasu..
Thank You..

<http://bgl.esdm.go.id>

**Ministry of Energy and Mineral Resources
Geological Agency**

Jln. Diponegoro no. 57 Bandung 40122, Jawa Barat, Republic of Indonesia
Phone: +62-22-7215297, +62-21-5228371 | Fax: +62-22-7216444, +62-21-5228372
Website : <http://bgl.esdm.go.id> | E-mail: geologi@bgl.esdm.go.id

