



BMKG

***FORECAST AND WARNING STRATEGY
DALAM SISTEM PERINGATAN DINI CUACA DAN
IKLIM EKSTREM***

**EDISON KURNIAWAN
KEPALA PUSAT METEOROLOGI PENERBANGAN**

*Disampaikan pada
RAKORBANGNAS Tahun 2021
Jakarta, 29-30 Juli 2021*

Biodata



Edison Kurniawan, S.Si, M.Si.

Jakarta, 5 Maret 1971

PENDIDIKAN UMUM:

AMG (1994); S1 Fisika UI (2000); S2 Sains Atmosfer ITB (2008) ; Stuned Scholarship Wegeningen University – Belanda (2011)

BEBERAPA PRESTASI :

Lulusan Terbaik Akademi Meteorologi dan Geofisika (1994)

Lulusan Terbaik Diklat PIM IV (2011)

Satya Lencana Karya Satya X (2005)

Satya Lencana Karya Satya XX (2017)

Piagam Penghargaan Terbaik Kedua Penatausahaan BMN (2018) -
Kemeterian Keuangan RI

Piagam Penghargaan Stand Terbaik Kedua Pameran PRB (2018) - BNPB

Piagam Penghargaan Satker dengan Kinerja Pelaksanaan Anggaran Terbaik Semester II (2016)
dan Semester I (2017) - Kementerian Keuangan RI

Piagam Penghargaan Satker dengan Kinerja Pelaksanaan Anggaran Terbaik Semester I (2015) -
Kementerian Keuangan RI

PENUGASAN :

Staf pada Sub Bidang Analisa Meteorologi BMG (1995-2004)

Fungsional Peneliti Bidang Klimatologi BMKG(2004-2010)

Kepala Sub Bidang Pencemaran Udara BMKG (2010-2013)

Kepala Stasiun Pemantau Atmosfer Global
BMKG (2013-2016)

Kepala Balai Besar MKG Wilayah I (2017-2020)

Kepala Pusat Meteorologi Penerbangan (2021 - sekarang)

Email : edison.kurniawan@bmkg.go.id

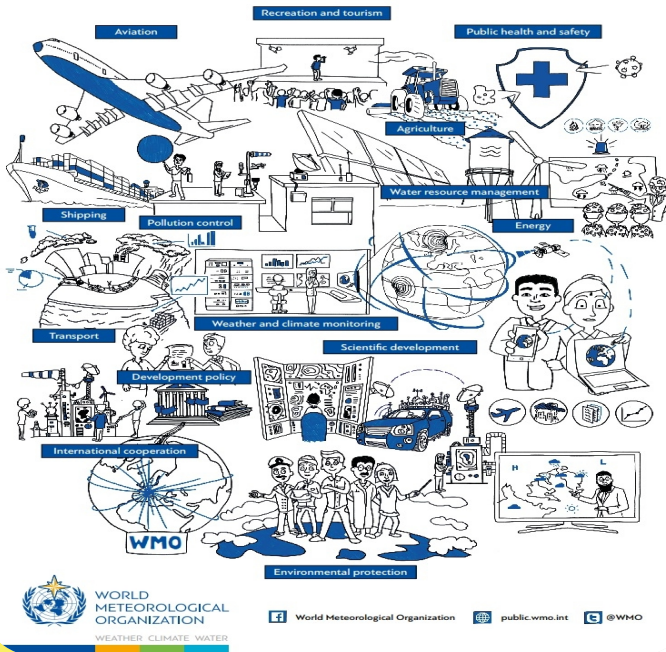
edison.kurniawan0503@gmail.com

HP : 08121873935

Multi-Hazard Early Warning System

UU 31 TAHUN 2009 PENYELENGGARAAN METEOROLOGI KLIMATOLOGI DAN GEOFISIKA

WHY THE WORLD NEEDS METEOROLOGISTS AND HYDROLOGISTS



Penyelenggaraan meteorologi, klimatologi, dan geofisika dalam rangka menghasilkan data dan informasi memiliki peran strategis yang dapat dimanfaatkan untuk meningkatkan nilai tambah dari berbagai kegiatan di sektor terkait.

1. Pertanian dan kehutanan;
2. Transportasi;
3. Pariwisata;
4. Pertahanan dan keamanan;
5. Konstruksi;
6. Tata ruang;
7. Kesehatan;
8. Sumber daya air;
9. Energi dan pertambangan;
10. Industri;
11. Kelautan dan perikanan; dan
12. Penanggulangan bencana;
13. Dan lain sebagainya;

Multi-hazard Early Warning System

Multi-hazard early warning systems *address several hazards and/or impacts of similar or different type in*

contexts where hazardous events may occur alone, simultaneously, cascadingly or cumulatively over time, and taking into account the potential interrelated effects.

A multi-hazard early warning system with the *ability to warn of one or more hazards increases the efficiency and*

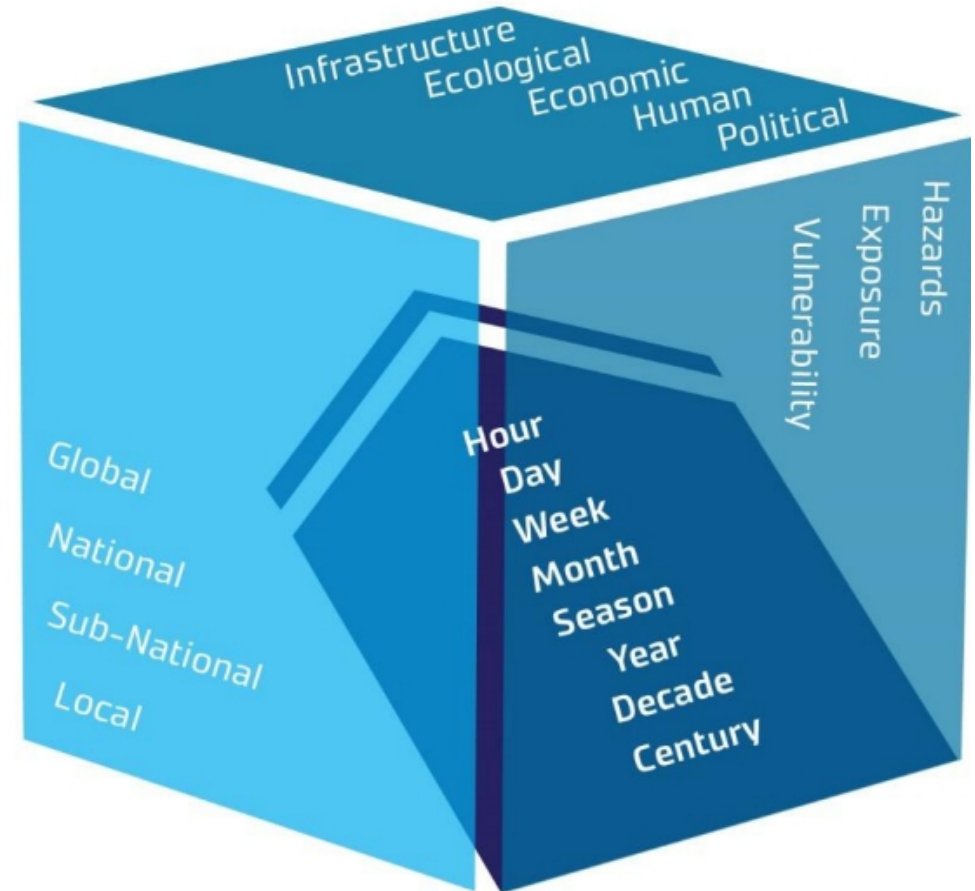
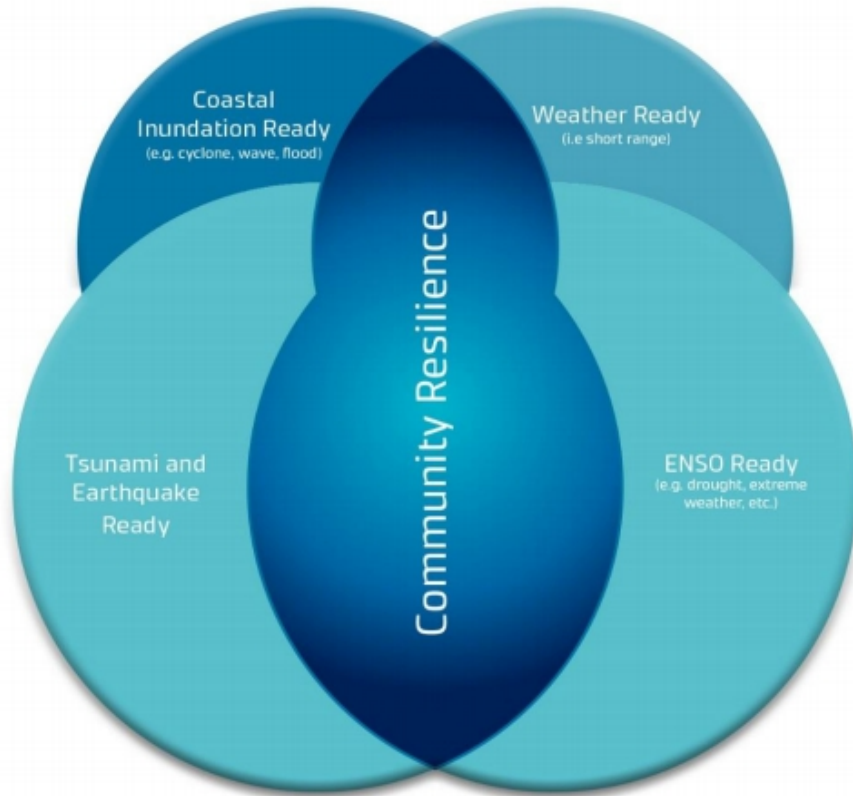
consistency of warnings through coordinated and compatible mechanisms and capacities, involving multiple disciplines for updated and accurate hazards identification and monitoring for multiple hazards.

Multi-hazard Early Warning System

1. Institutional arrangements
2. Earth observation data
3. Data information and collection
4. Hazard detection includes the data analysis software
5. Hazard decision support is comprised of the availability of hazard models and understanding whether a threat is imminent or not
6. Warnings and other infrastructure products
7. Impact based forecasting/warnings
8. Dissemination and notification
9. Risk communication is the ability for the system to be able to appropriately warn
10. Finally, community connection and response



Multi-Hazards Community Capacity





BMKG

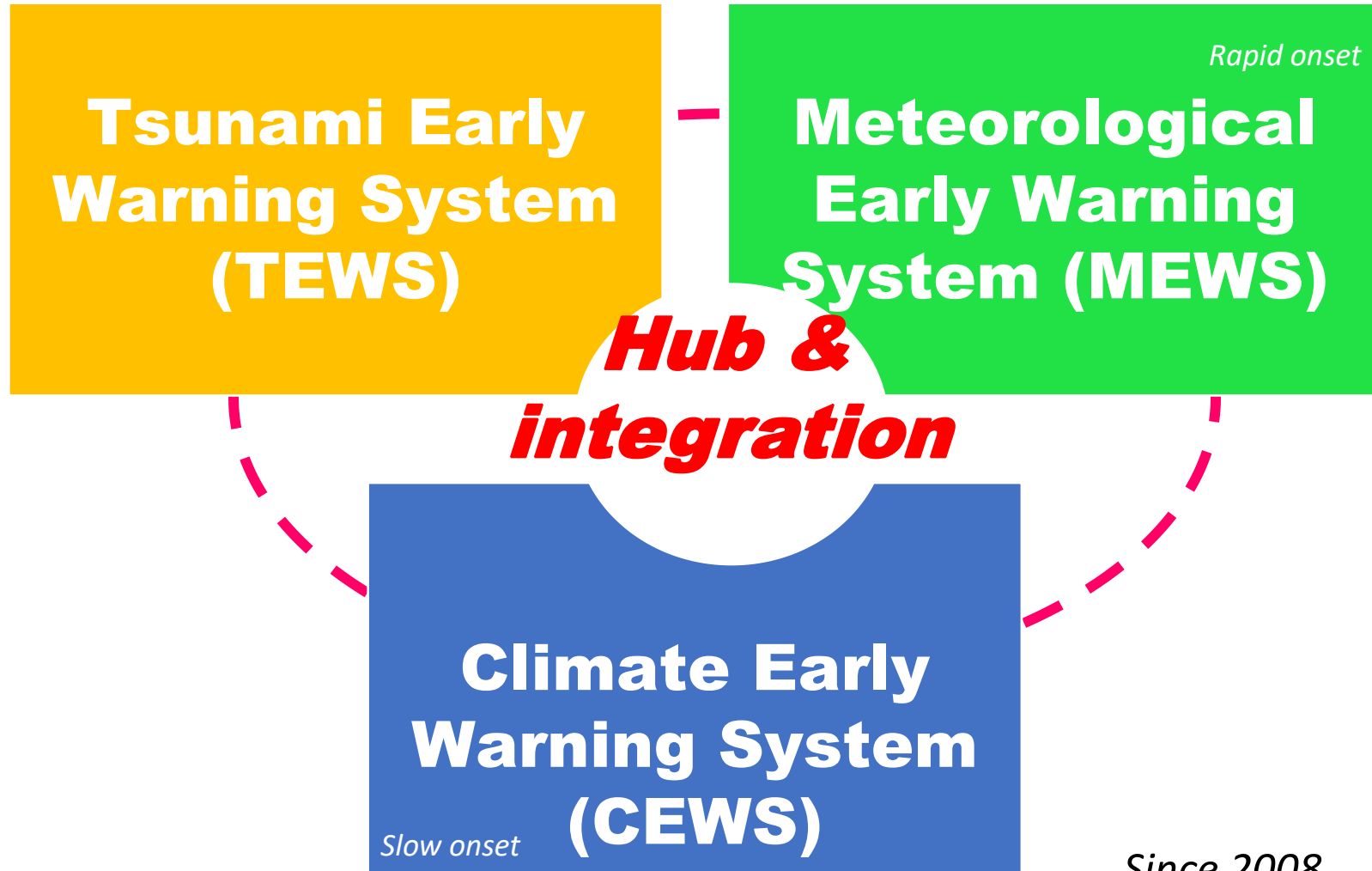
Problem and Challenges

*For a (multi-hazard) early warning system to operate effectively, national, regional and local governments and vulnerable groups should create an **integrated and comprehensive framework** which clarifies the **roles, responsibilities and relationships of all stakeholders** within the system (local, national, regional and international)*





Making MULTI-HAZARD early warning: Innovation & THE BREAK THROUGH



Since 2008

BMKG made The Hub / integration of the existing EWS (InaTews + MEWS + CEWS)

Making MULTI HAZARD early warning

Extreme Weather



Volcanic Ash



Tsunami



Coastal Inundation



Flood



Drought



Forest Fire



BMKG

National and Regional MHEWS as the Hub / integration of the existing EWS



Common Alerting Protocol

Volcanic Eruption

Safety

**Health
Chemical**

Nuclear

Dengue

Security

Environment

Transport



BNPB



KLHK



TNI



POLRI



BMKG

MULTI-HAZARD EARLY WARNING SYSTEM

Clear roles, responsibilities and coordination mechanisms (e.g. SOPs, MOUs)

Disaster risk knowledge and detection, monitoring, analysis and forecasting of the hazards and possible consequences

HAZARD[S] INFORMATION

- Observation
- Monitoring
- Analysis
- Forecasting
- Mapping

MULTI-RISK ANALYSIS

Assessment and quantification of:

- Exposure and vulnerability of people and assets to hazards
- Multi-hazard interactions

WARNINGS

Including:

- Probability of affecting people and assets
- Possible impacts
- Message targeted at different sectors

Institutional partnerships are essential among technical agencies and other MHEWS stakeholders for the development of hazard, exposure and vulnerability information and risk analysis.



Dissemination and communication



Prepare and respond

**GOVERNMENT
LOCAL TO NATIONAL**
(all relevant hazards)

TRANSPORTATION
(road ice, street flooding, travel delays, etc.)

AGRICULTURE PRODUCTIVITY AND FOOD SECURITY
(frost, hail, flooding, etc.)

ENERGY SUPPLY & DEMAND, PROTECTION
(heat and cold waves, severe storms, etc.)

HEALTH EPIDEMICS
(excessive rainfall, cold spells, heatwaves, etc.)

WATER RESOURCE MANAGEMENT
(excessive rainfall, drought, etc.)

(Example sectors)

General public

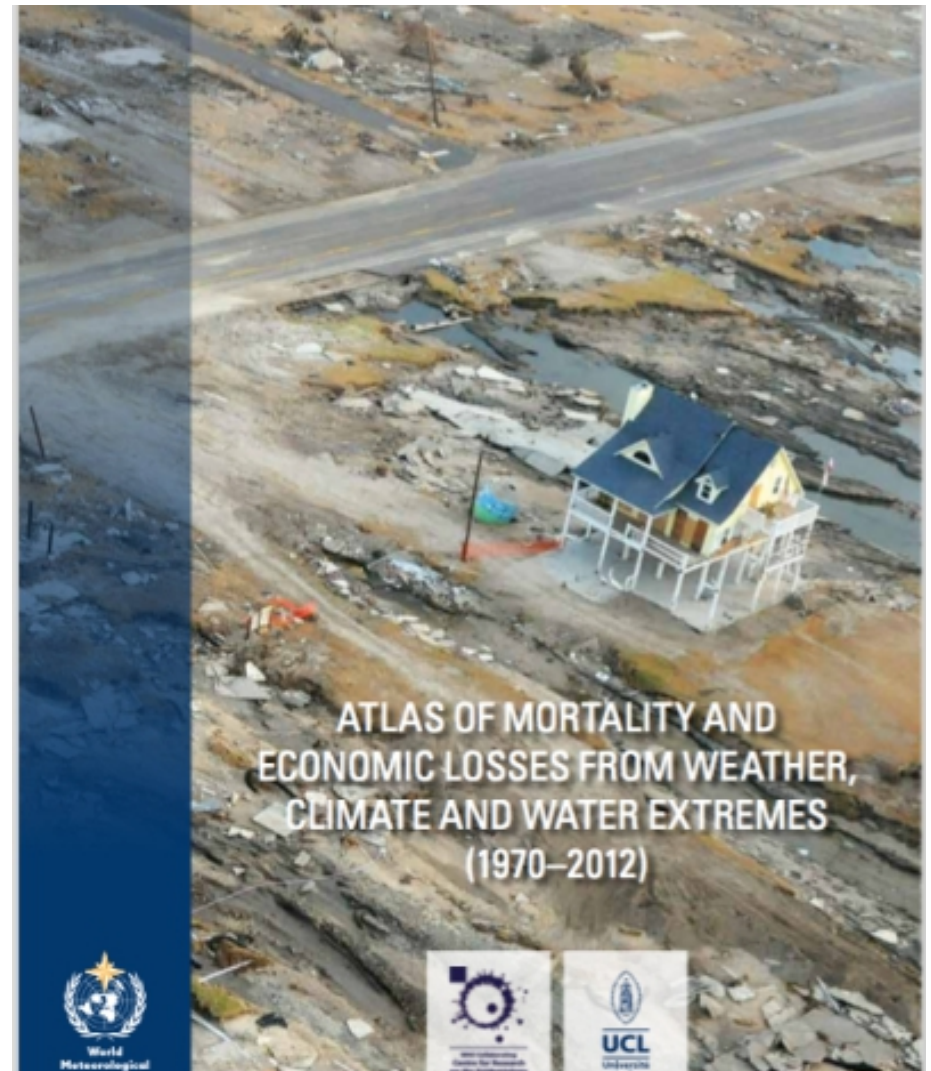
Feedback for system improvement

Disaster Risk Reduction

WMO Strategic Priority 1- DRR

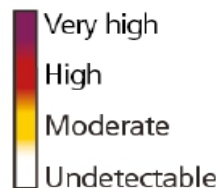
- The warmer planet, leading to more frequent **extreme Weather & Climate events**
- Global population above 9 billion in 2040, with **growing settlements in costal regions & megacities** (50% ↗ 72%)
- 780 *million* have **no access to clean water**
- 7 million premature death **due to air pollution**
- Increase of **vulnerability & greater loses !!!**

Sumber : WMO: Dr Zhang



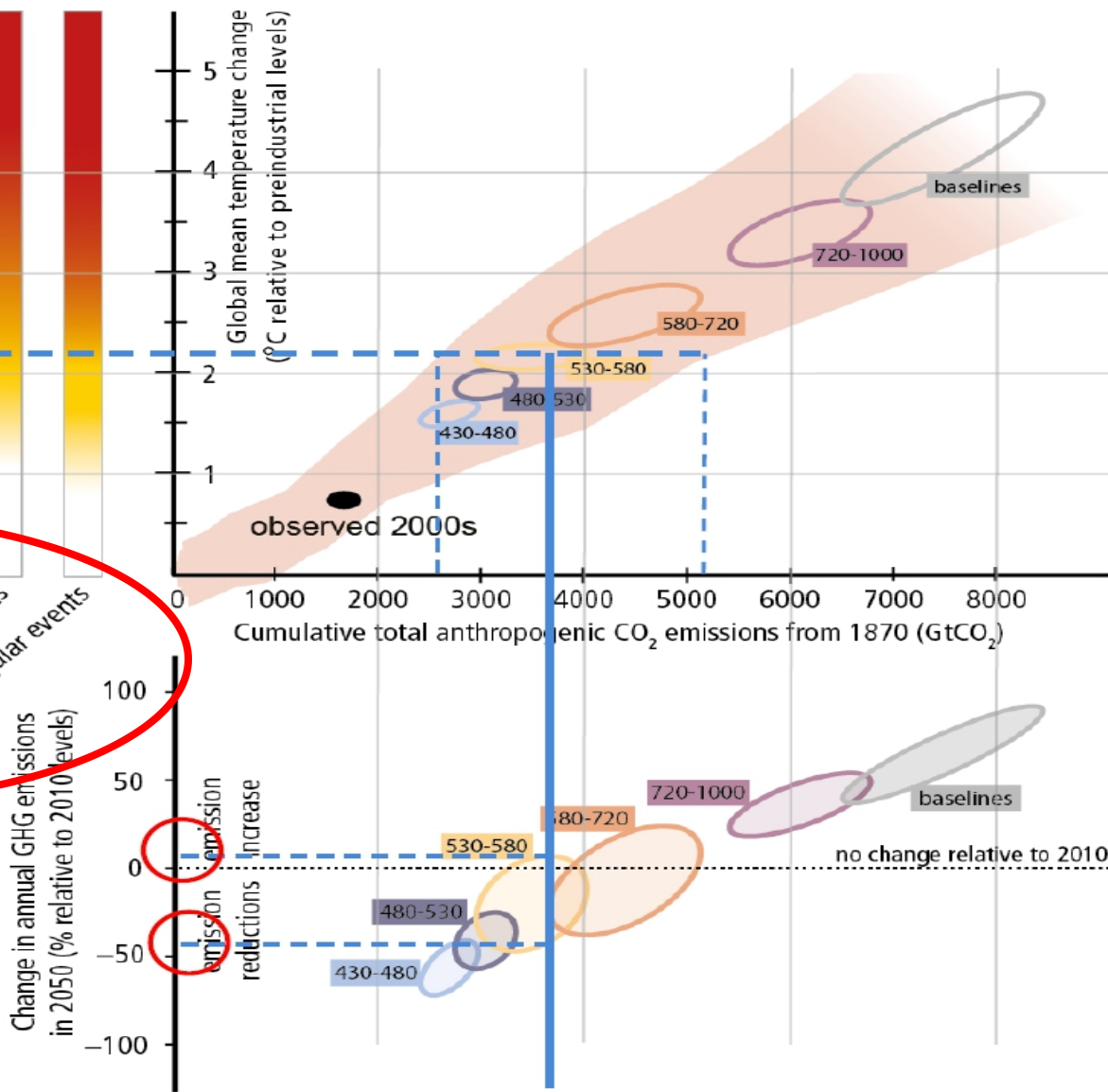
The planet will be warmer, leading to more frequent extreme events in 2040

Level of additional risk due to climate change (see box 2.4)

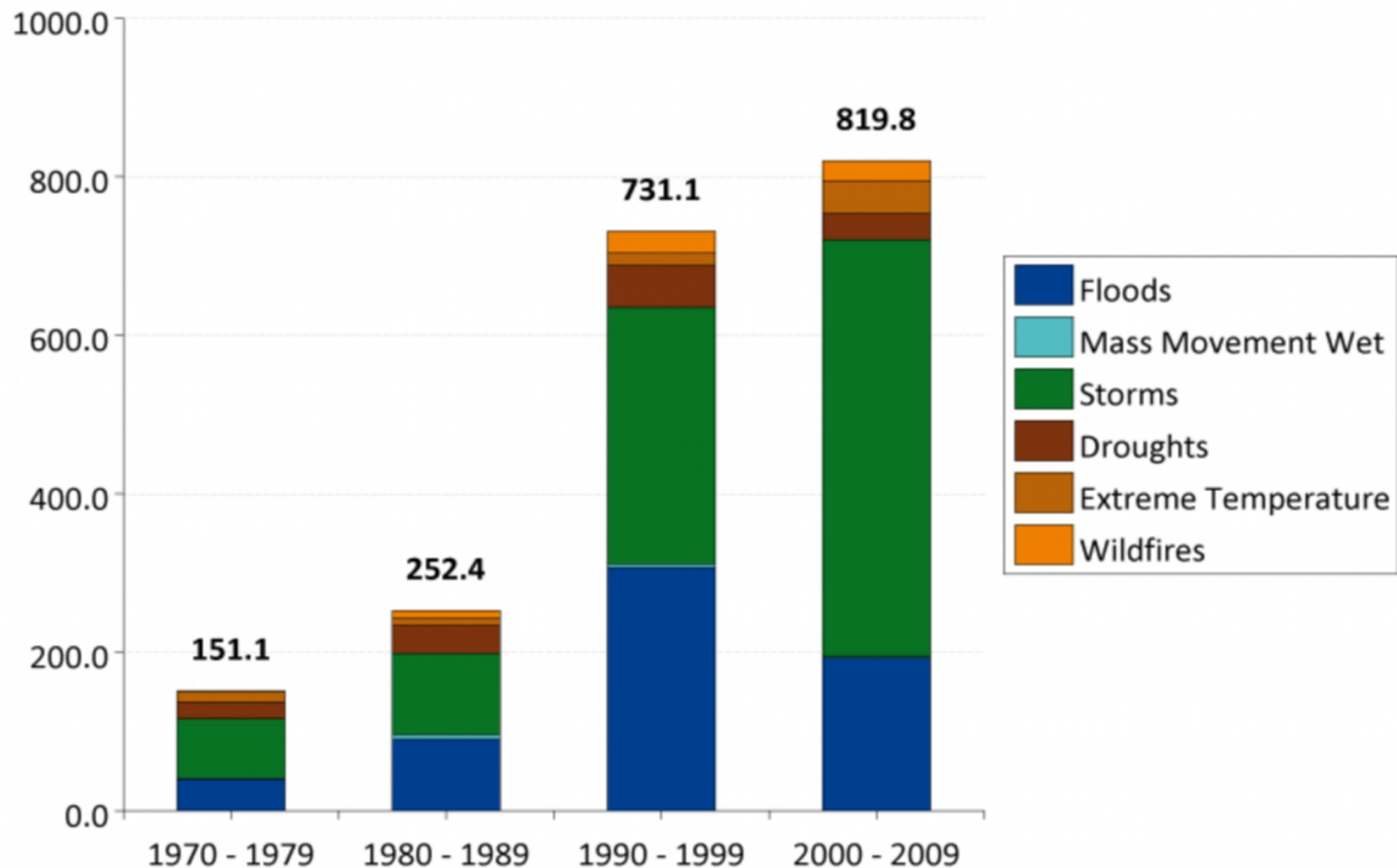


Unique & threatened systems
Extreme weather events
Distribution of impacts
Global aggregate impacts
Large-scale singular events

Levels of risks can now be connected to GHG emission changes by 2050. Added uncertainty arises from action on non-CO₂ gases, timing of pre-2050 action, and ambition of post-2050



The global total economic losses by decade and by hazard type in USD billions adjusted to 2011



January-February 2016 Global Temperature increase reference : 1881-1910

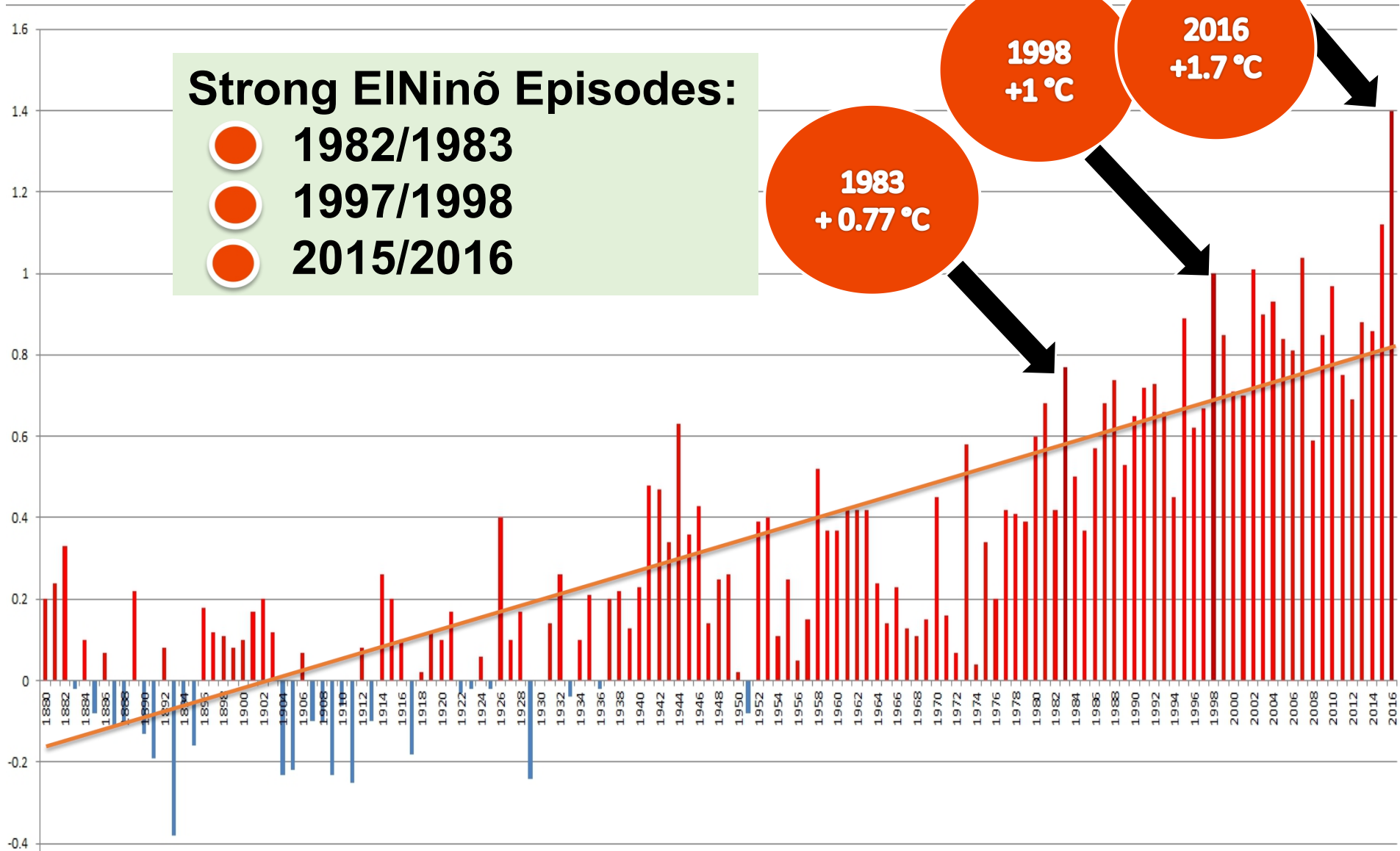
Strong ElNiño Episodes:

- 1982/1983
- 1997/1998
- 2015/2016

1983
+0.77 °C

1998
+1 °C

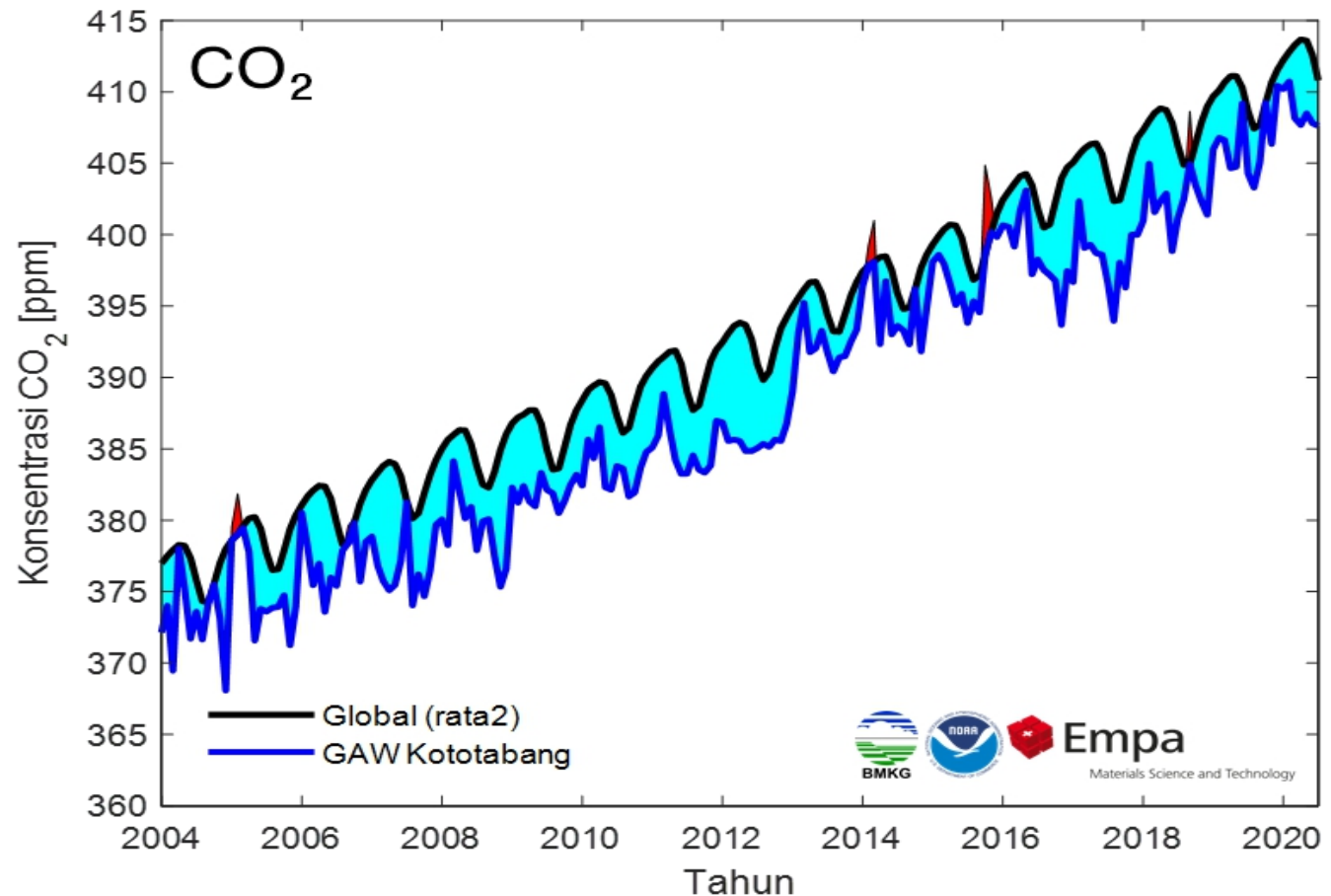
2016
+1.7 °C



TREN GAS RUMAH KACA INDONESIA

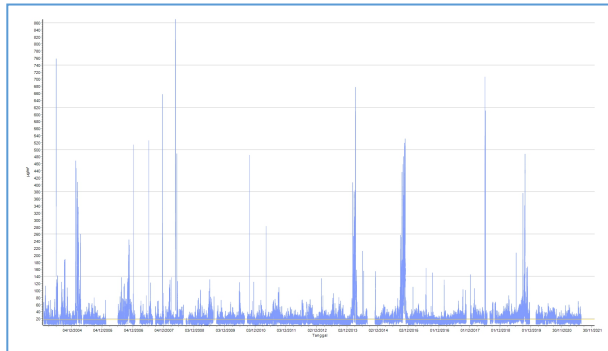
(1981 - 2020)

- Konsentrasi CO_2 di Indonesia (kurva biru) masih dibawah rerata global (kurva hitam).
- Beberapa kejadian yang lebih tinggi dari global (warna merah), terkait dengan kejadian karhutla yang dipicu oleh iklim ekstrim.

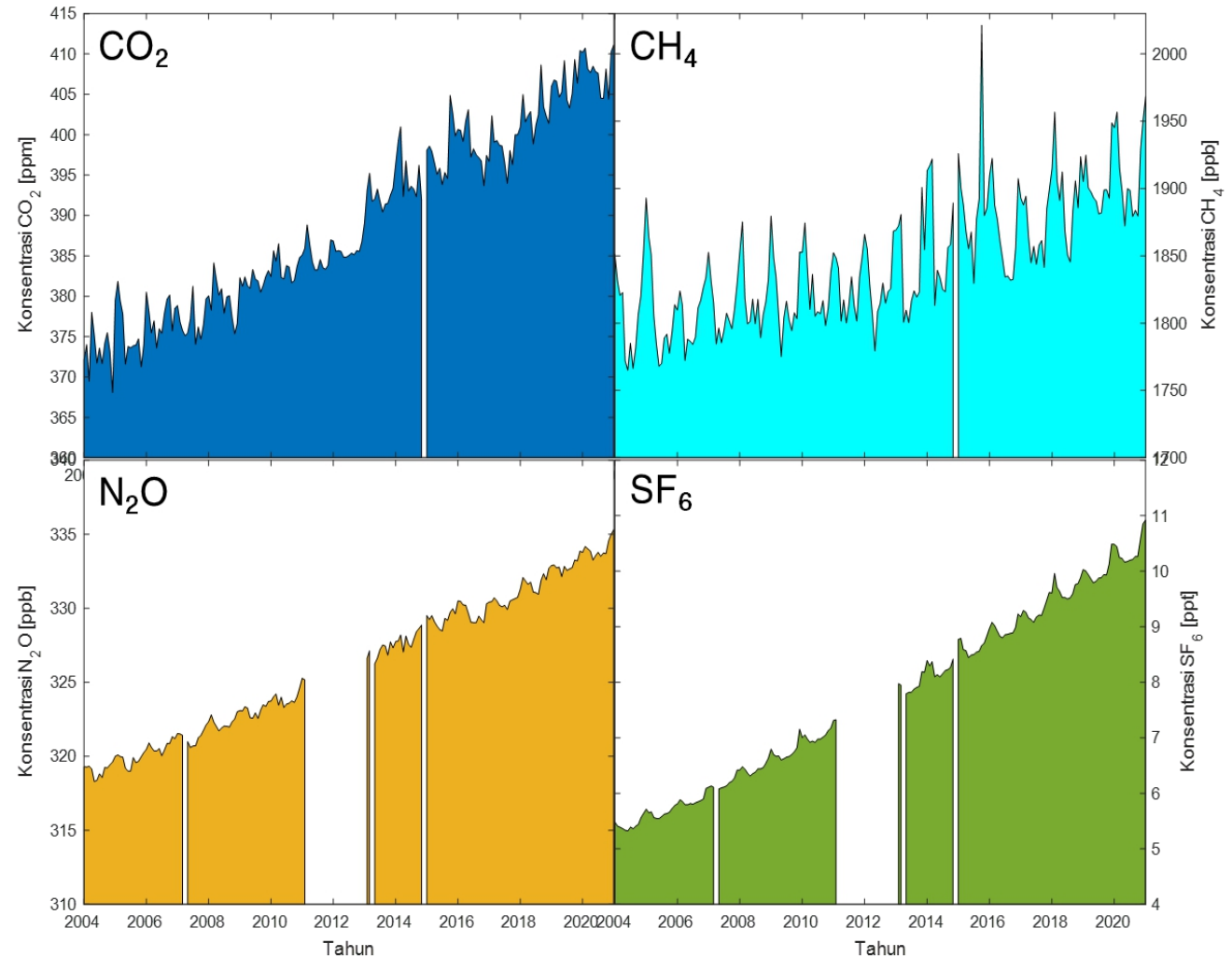


TREN GAS RUMAH KACA INDONESIA

(1981 - 2020)



Trend Konsentrasi
Aerosol





Solar Energy Potential Book 2020:

- **Method updating**
- **Data addition(2011 - 2019)**
- **Utilization of the sunshine duration data**

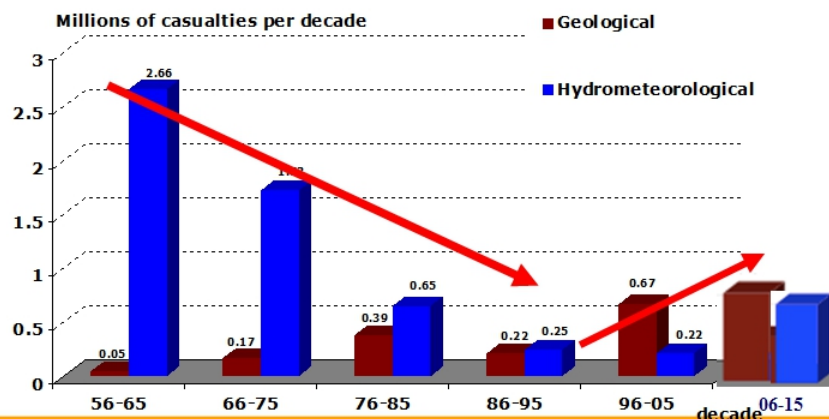
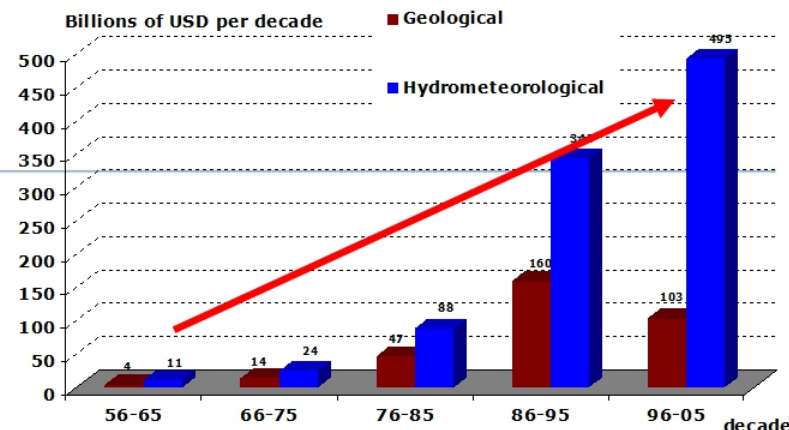
Global UN-level needs, goals & success indicators

1. UNISDR & Sendai agreement and its implementation: **Need new data and technologies for WMO:**
2. **Frustration of UNISDR:**
Economic losses are on the way UP, and life loss also see trend of increase
3. Critical role of WMO but **difficult to measure impact; observations, dissemination, forecast and service delivery may be perfect, but impact may still be large;**
4. hurricane Katrina provided a text-book illustration of how to **kill nearly 2,000 people by making poorly thought-through decisions** based on a forecast that was very good by the standards of its time.



More Data are Needed!

While economic losses are on the way up!

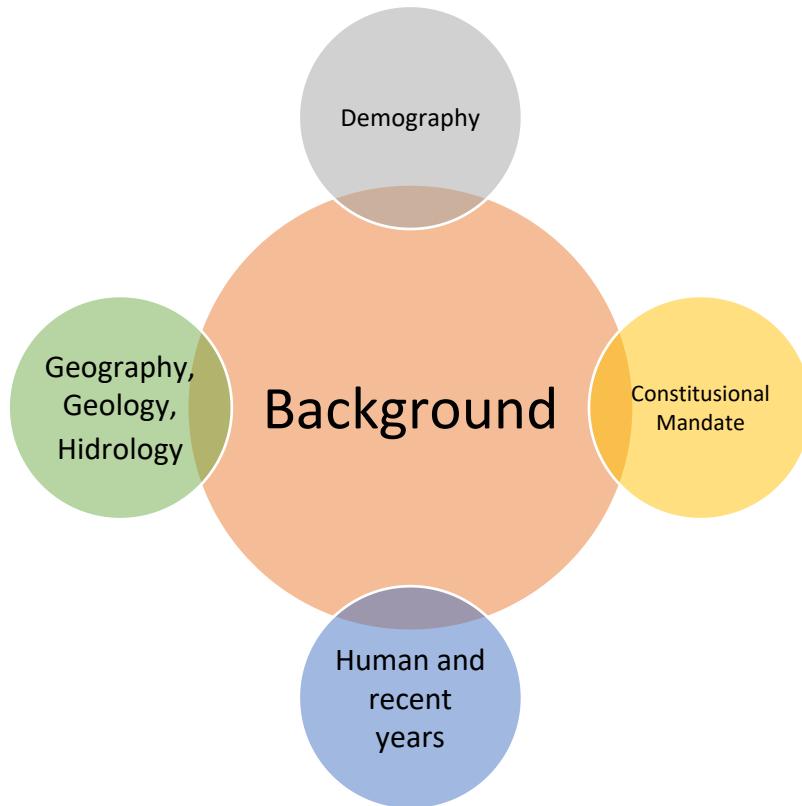


Loss of life from hydro-meteor disasters are decreasing!

Source: EM-DAT: The OFDA/CRED International Disaster Database

© World Meteorological Organization

Undang-Undang No. 24 Tahun 2007 Tentang : Penanggulangan Bencana (Constitutions on Disaster Management)



Natural disaster,
Non Natural Disaster,
Social Disaster

Disaster
Management (Pre-
post)

Risk

emergency disaster
assistance

victims and refugees



Undang-Undang No. 24 Tahun 2007 Tentang : Penanggulangan Bencana (Constitutions on Disaster Management)

Central Government Responsibility

- Disaster risk reduction and integration of disaster risk reduction with development programs.
- Community protection from the impact of disasters.
- Recovery of conditions from the impact of a disaster.

Central Government Authority

- Determination of disaster management policies is in line with national development policies.
- Establishment of national and regional disaster status and levels.
- Determination of cooperation policies in disaster management with other countries, agencies, or international parties

Local Government Responsibility

- Guarantee the fulfillment of the rights of communities and refugees affected by the disaster in accordance with minimum service standards.
- Community protection from the impact of disasters.
- Disaster risk reduction and integration of disaster risk reduction with development programs.

Local Government Authority

- Determination of disaster management policies in the region is aligned with regional development policies.
- Implementation of cooperation policies in disaster management in provinces and / or other districts / cities



Disaster Manager Agency



- Provide guidance and direction to disaster management efforts.
- Establish standardization and needs implementation of disaster management.
- Reporting the organization disaster management to the President every once a month under normal conditions at any time in an emergency disaster.



- Establish guidelines and directives in accordance with the policies of the local government and the National Disaster Management Agency for disaster management efforts.
- Arrange and establish permanent procedures for handling disasters.
- Carry out the implementation of disaster management in its territory.
- Report the implementation of disaster management to regional heads once a month in normal conditions and at all times in disaster emergency conditions.

COORDINATION STRATEGY FOR DRR IN NATIONAL LEVEL



Coordination framework:

Ministry programs and activities related to the Kerangka Pengeluaran Jangka Menengah (Medium-Term Expenditure) Framework 2015-2019;

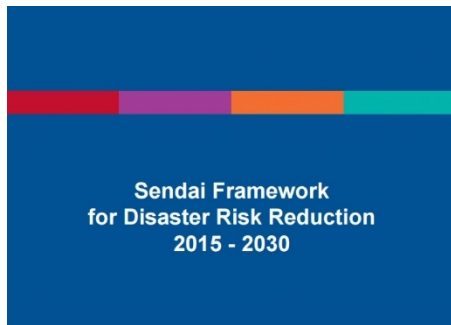
Number of budget allocations (Renja);

Support for reducing disaster risk index

GLOBAL TARGETS

7 Global Targets of SFDRR are

7 GLOBAL TARGETS



Sendai Framework for DRR
2015-2030



“Disaster Loss to Disaster Risk”



The Sendai Framework for Disaster Risk Reduction 2015–2030 has four priorities for action that encompass activities at local, national, regional and global levels.

PRIORITY 1

Understanding disaster risk reduction

Policies and practices for disaster risk reduction should be based on an understanding of disaster risk in all its dimensions of vulnerability, capacity, exposure of persons and assets, hazard characteristics and the environment.

PRIORITY 2

Strengthening disaster risk governance to manage disaster risk

Disaster risk governance at the national, regional and global levels is of great importance for an effective and efficient management of disaster risk.

PRIORITY 3

Investing in disaster risk reduction for resilience

Public and private investment in disaster risk reduction are essential to enhance the economic, social, health and cultural resilience of persons, communities, countries, their assets, as well as the environment.

PRIORITY 4

Enhancing disaster preparedness for effective response and to “Build Back Better” in recovery, rehabilitation and reconstruction

Strengthened disaster preparedness for response, recovery, rehabilitation and reconstruction is critical to “Build Back Better”.

NATIONAL AND LOCAL DIMENSIONS

REGIONAL AND GLOBAL DIMENSIONS

Indonesia on DRR

25 YEARS
ON DRR COMMITMENT

2000
WE CAN
END POVERTY
2015
MILLENNIUM
DEVELOPMENT
GOALS

SDG's



1989

International
Decade for
Natural
Disaster
Reduction
(IDNDR)

1994

Yokohama
Strategy and
Plan of Action

1999

ISDR
International
Strategy for
Disaster
Reduction

2005

Dec 2004,
Indian
Ocean
Tsunami

HFA
Hyogo
Framework for
Action
2005-2015

2015



Sendai Framework
for Disaster Risk Reduction
2015 - 2030

Sendai Framework for DRR
2015-2030:

1. 7 global target
2. 4 priority action

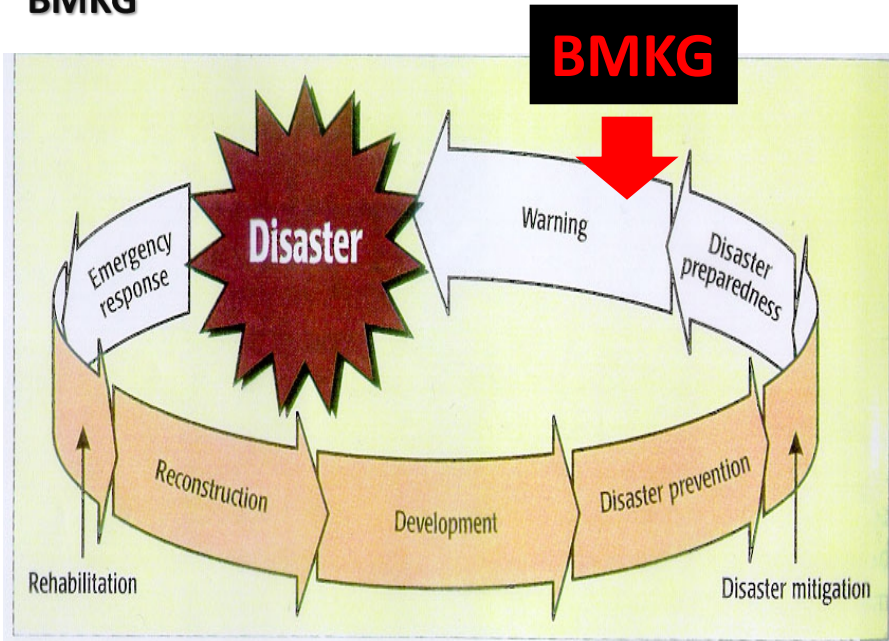
1992



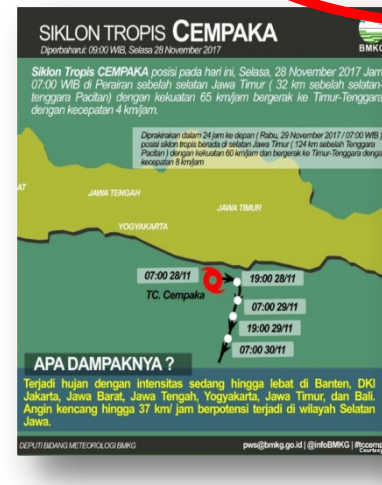
United Nations
Framework Convention on
Climate Change

PARIS2015
UN CLIMATE CHANGE CONFERENCE
COP21·CMP11

BMKG on Disaster



On TC Cempaka in 2017 BMKG delivered a good forecast but not enough to reduce the impact. Impact based information form decision support center for Hidrometeorological hazard need to be strengthen.





BMKG Alert

signature.bmkg.go.id/users/impact

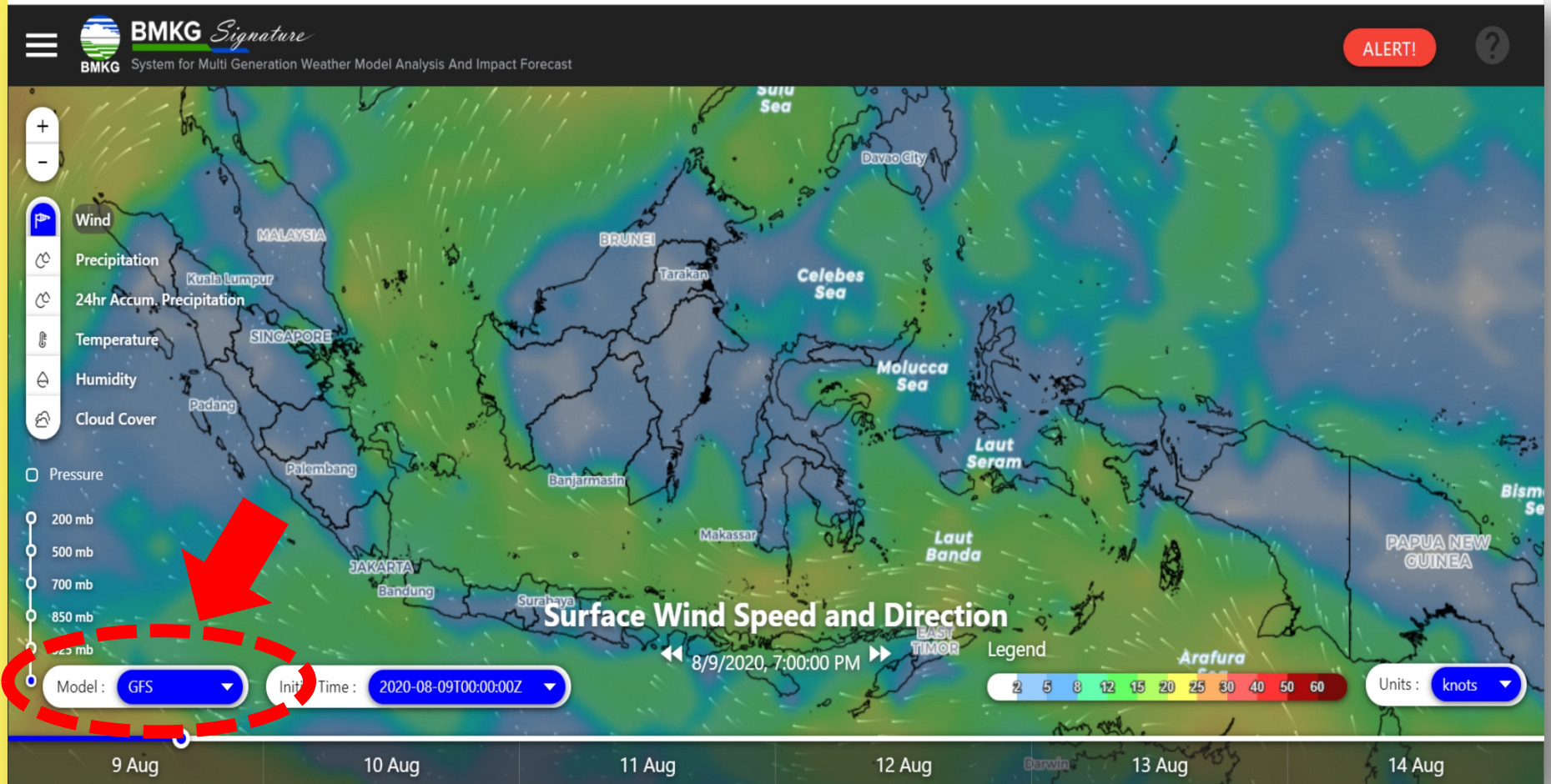
Apps DramaLove.TV Smallpdf.com - A Fr... QGIS User Guide Advanced Search -... Spotify TC Microwave View... tcwc Jatna Supriatna - G... Readings | System... Buka Kunci PDF - P... kuliah

BMKG Signature
System for Multi Generation Weather Model Analysis And Impact Forecast

ALERT!

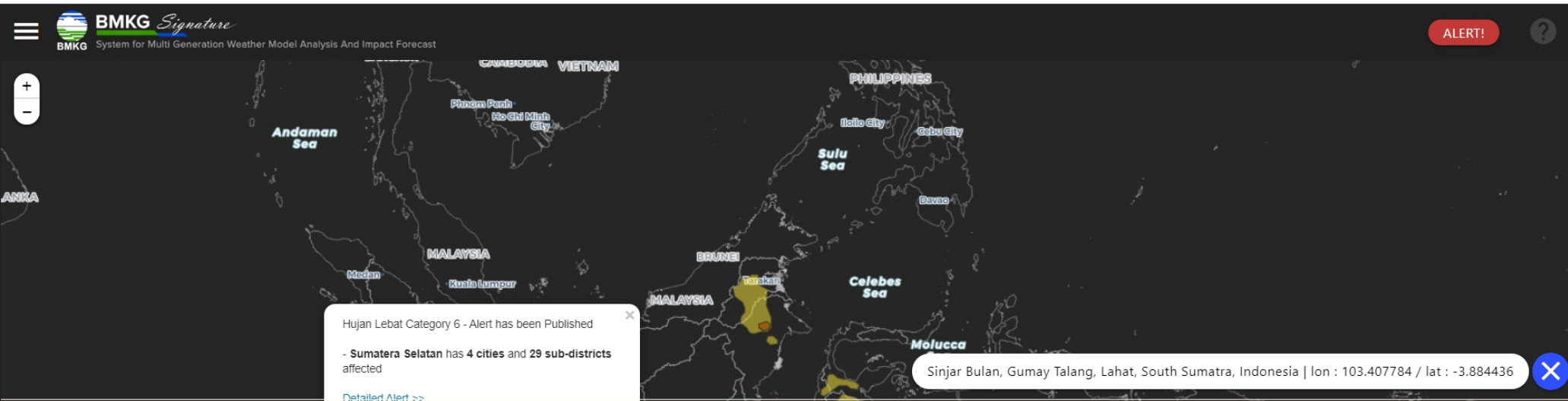


PERALATAN ANALISIS DAN PRAKIRAAN CUACA (WEB WWW.SIGNATURE.BMKG.GO.ID/#)





BMKG Alert



Hujan Lebat - Status Siaga untuk Wilayah Sumatera Selatan

This alert published on Tue Feb 04 2020 12:24:54 GMT+0700 (Indochina Time)

Tanggal Berlaku

2/5/2020 sampai dengan 2/6/2020

Dampak

- Sulit mengendarai kendaraan di jalanan.
- Sebagian kelompok masyarakat terisolir.
- Mulai terjadi kerusakan pada rumah dan bangunan lainnya.
- Sebagian masyarakat kehilangan mata pencaharian dan hewan ternak.
- Jembatan yang rendah tidak dapat dilintasi.
- Gangguan lalu lintas karena jalan utama banjir atau ditutup.
- Mulai terjadi kerusakan pada jalan dan jembatan.

Wilayah Terdampak

◦ Sumatera Selatan

Empat Lawang: Muara Pinang, Pendopo, Talang Padang, Tebing Tinggi
Lahat: Gumay Talang, Gumay Ulu, Jarai, Kikim Barat, Kikim Selatan, Kikim Tengah, Kikim Timur,
Kota Agung, Lahat, Merapi Selatan, Muara Pampang, Mulak Ulu, Pagar Gunung, Pajar Bulan, Peabes

Yang Harus Dilakukan

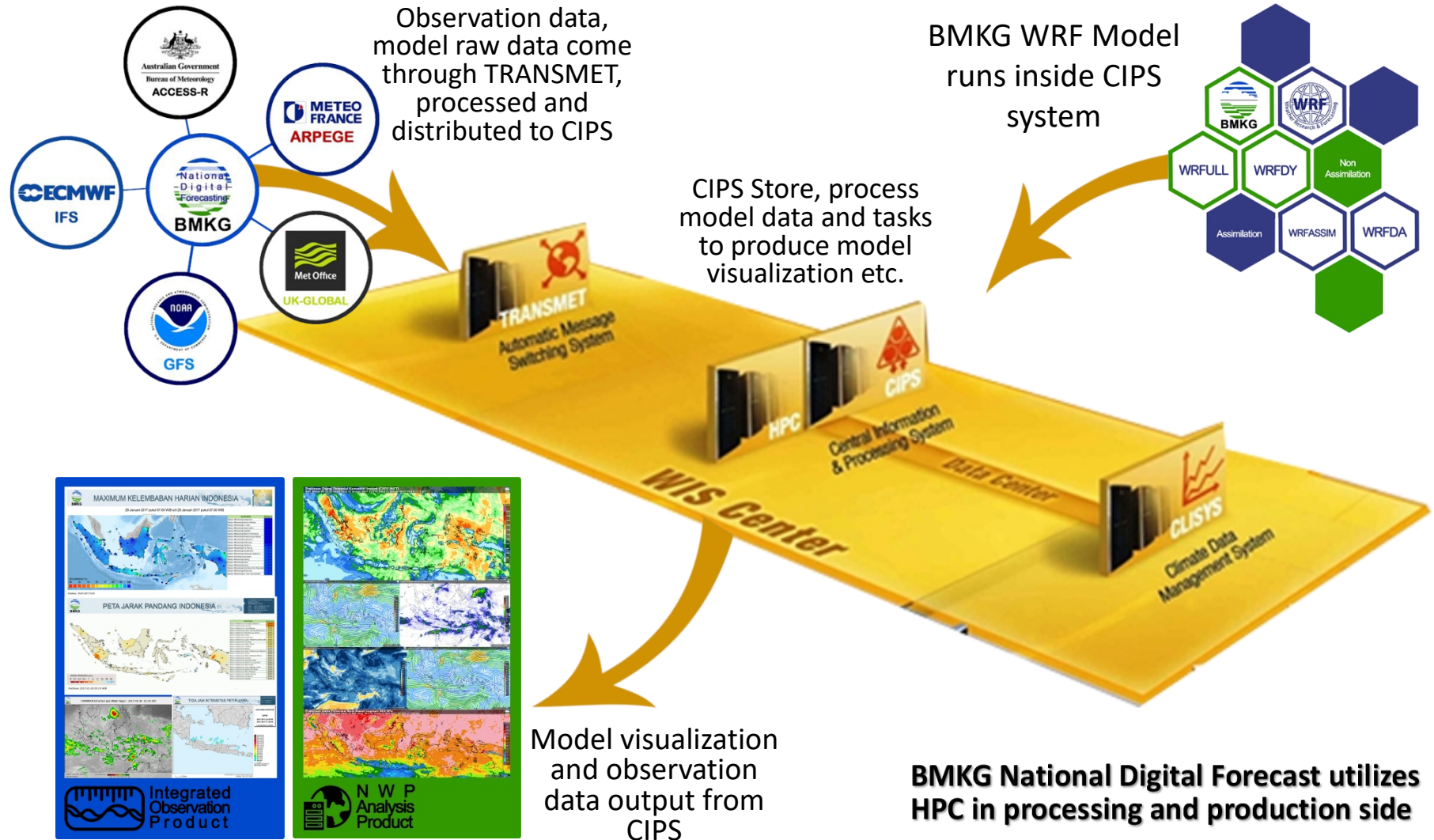
- Berhati-hati jika beraktivitas di luar rumah.
- Memperbarui informasi melalui media massa maupun media sosial.
- Mencari informasi melalui pihak-pihak terkait kebencanaan.
- Tidak beraktivitas di luar rumah jika tidak mendesak.

Matrix Dampak

Likelihood	Very Low	Low	Medium	High
	Minimal	Minor	Significant	Severe
	1	2	3	4
	5	6	7	8
Impact				

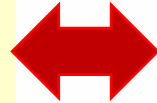
Teknologi operasional EWS Cuaca dan Iklim Ekstrem

Existing Condition

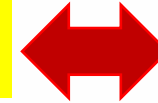


INDONESIA INTEGRATED WEATHER INFORMATION SYSTEM

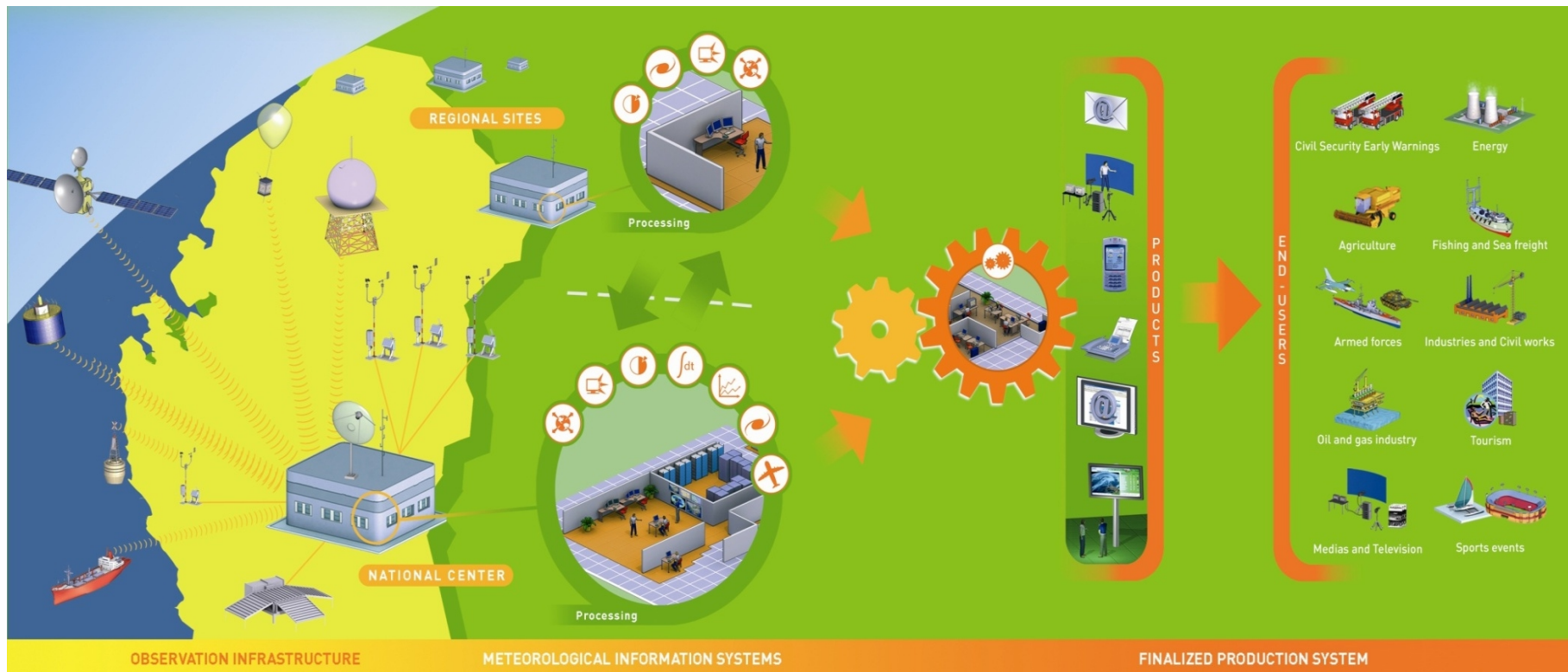
Observation
Systems



Information
System



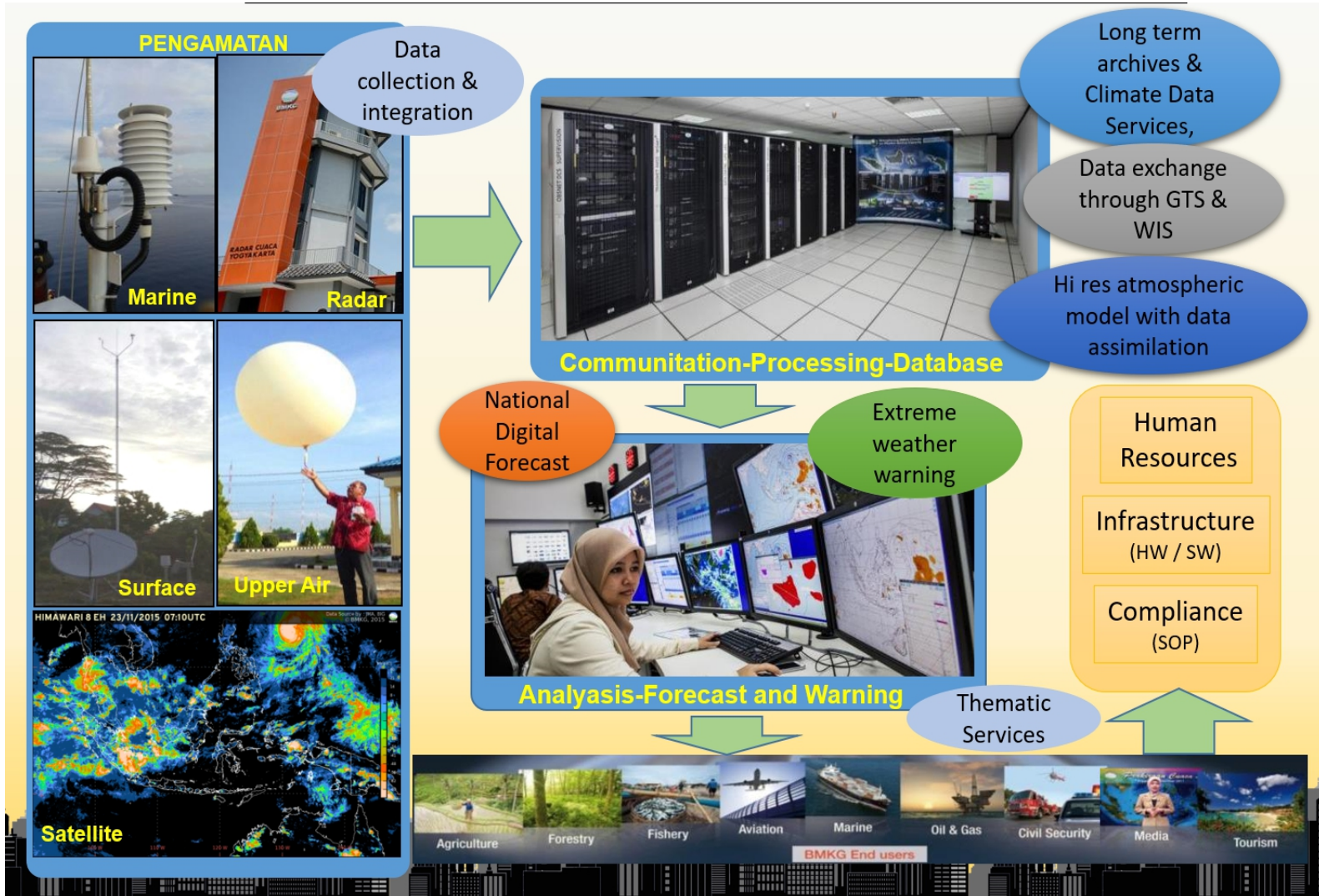
Public Weather
Services / Early
Warning System



Support Services



INTEGRATION OPERATIONAL FLOW







National Weather Forecast Product Transformation

BMKG

Traditional process

Prakiraan Cuaca

Kota	Banda Aceh
Medan	
Pekanbaru	
Batam	
Padang	
Jambi	
Palembang	
Pangkal Pinang	
Bengkulu	



DKI JAKARTA 3 HARIAN

Digital process

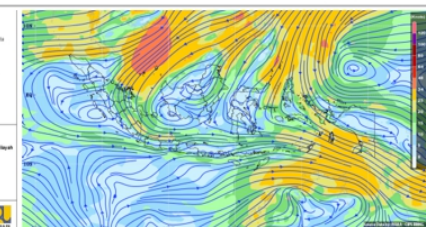
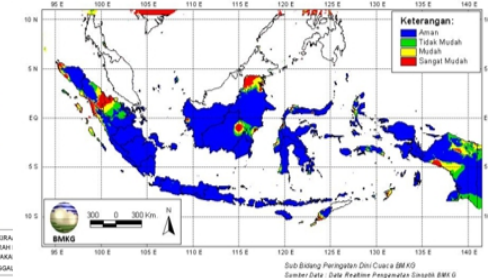
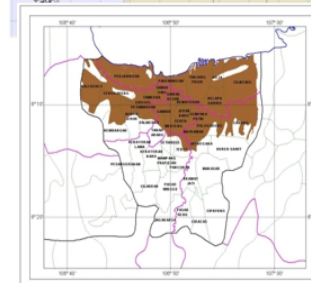
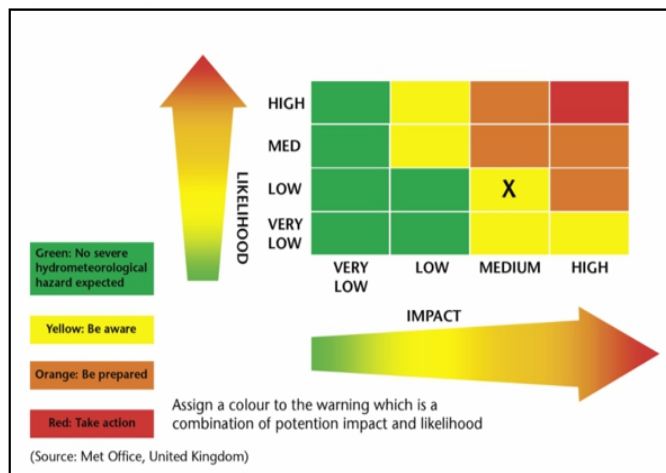
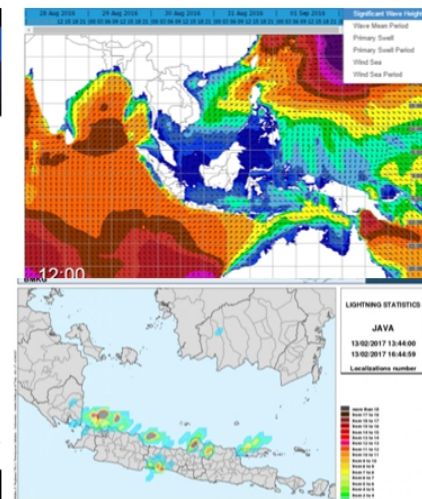
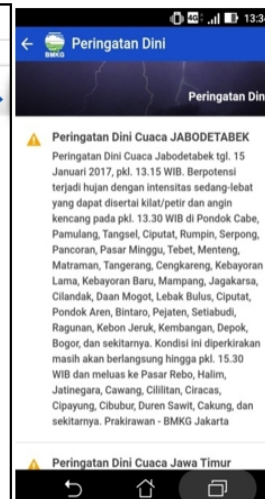
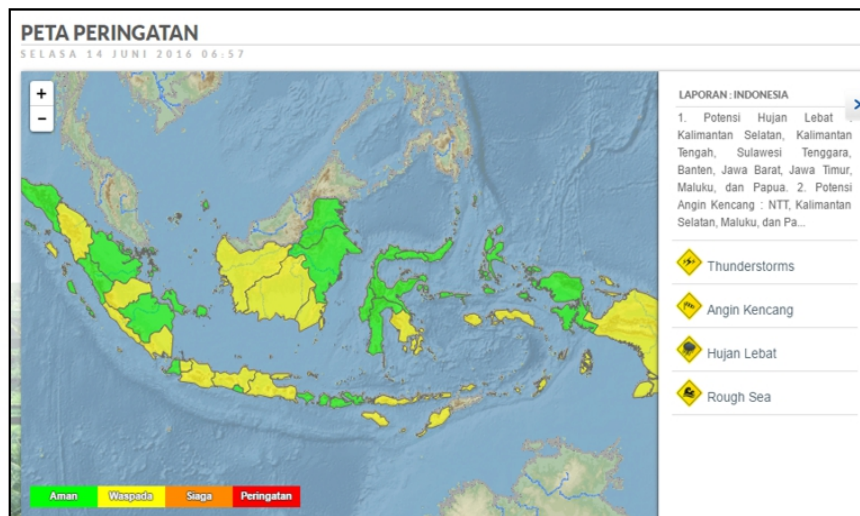
PRAKIRAAN CUACA DKI JAKARTA
Dipublikasikan: 7:20:04-13 April 2018

	JUMAT 13 APRIL 2018				SABTU 14 APRIL 2018				MINGGU 15 APRIL 2018			
	PAGI	SIANG	MALAM	DINI HARI	PAGI	SIANG	MALAM	DINI HARI	PAGI	SIANG	MALAM	DINI HARI
JAKARTA UTARA	Cerah berawan	Cerah berawan	Berawan	Cerah berawan	Cerah berawan	Cerah berawan	Berawan	Berawan	Cerah berawan	Hujan Lokal	Berawan	Berawan
JAKARTA PUSAT	Cerah berawan	Cerah berawan	Berawan	Cerah berawan	Cerah berawan	Cerah berawan	Berawan	Berawan	Cerah berawan	Hujan Lokal	Berawan	Berawan
JAKARTA BARAT	Cerah berawan	Hujan Lokal	Berawan	Berawan	Cerah berawan	Hujan Lokal	Cerah berawan	Berawan	Cerah berawan	Hujan Lokal	Berawan	Cerah berawan
JAKARTA TIMUR	Cerah berawan	Hujan Lokal	Berawan	Berawan	Cerah berawan	Hujan Ringan	Cerah berawan	Berawan	Cerah berawan	Hujan Ringan	Cerah berawan	Berawan
JAKARTA SELATAN	Cerah berawan	Hujan Lokal	Berawan	Berawan	Cerah berawan	Hujan Ringan	Cerah berawan	Berawan	Cerah berawan	Hujan Ringan	Cerah berawan	Berawan
KEPULAUAN SERIBU	Cerah berawan	Cerah berawan	Cerah berawan	Cerah berawan	Cerah berawan	Cerah berawan	Berawan	Berawan	Cerah berawan	Berawan	Berawan	Hujan Lokal

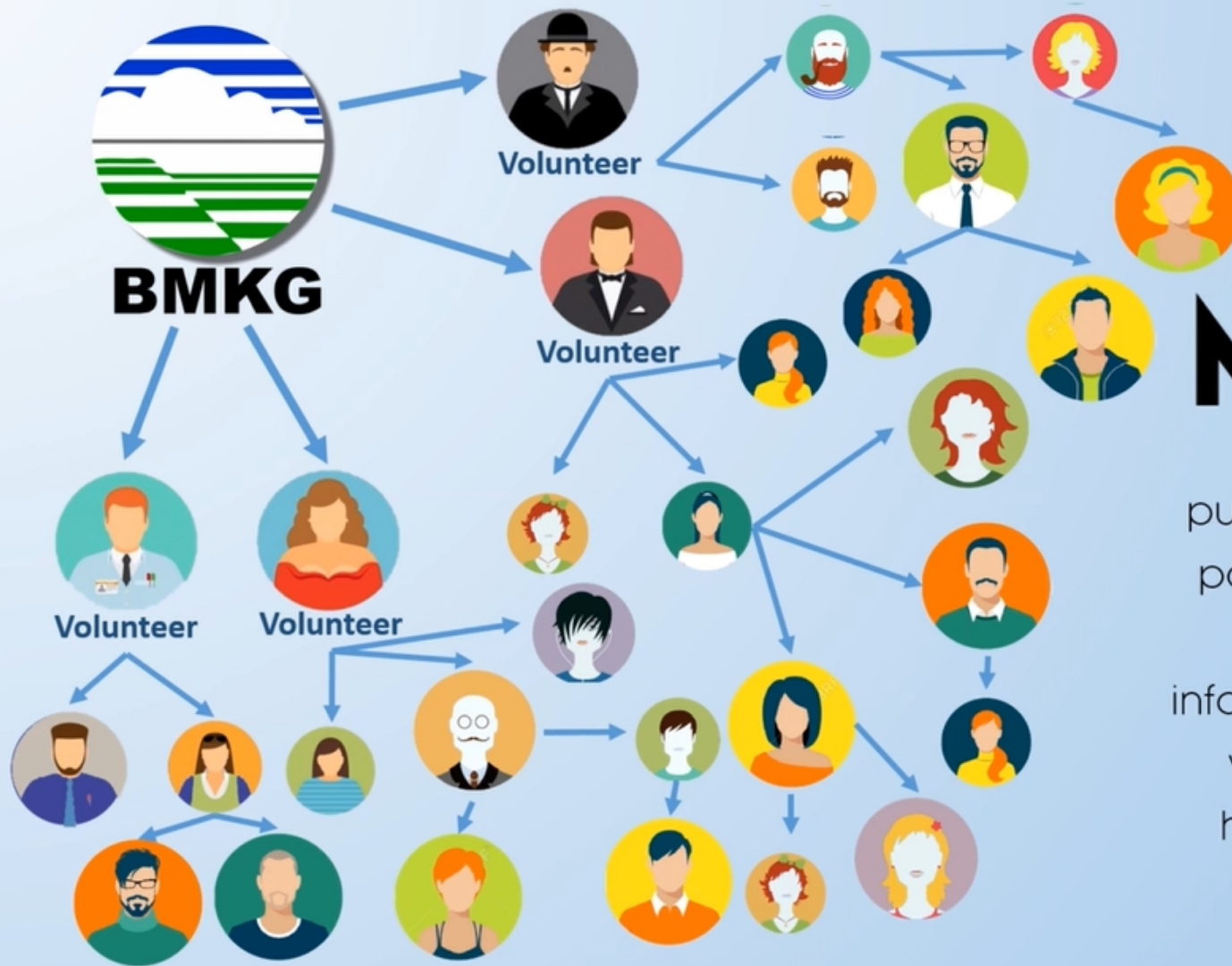
KEDEPUTIAN BIDANG METEOROLOGI BMKG



BMKG EARLY WARNING PRODUCTS



PROGRAM PENINGKATAN KAPASITAS USER



MOSAIC

A program that has main purpose to reduce disaster potential by learning about how to get weather information, how to interpret weather information, and how to response weather information.

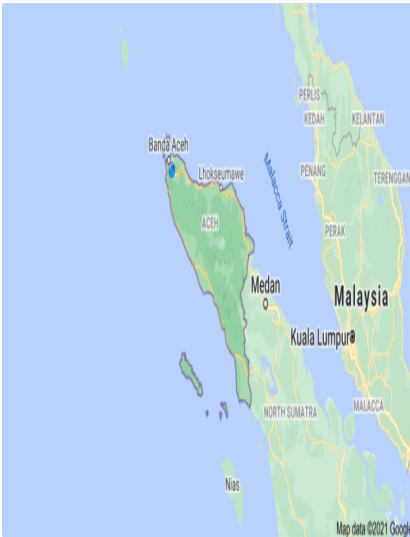


MASYARAKAT INDONESIA SADAR IKLIM DAN CUACA (MOSAIC)

A PROGRAMS TO MAKE INDONESIAN COMMUNITIES UNDERSTAND ABOUT CLIMATE AND WEATHER



Lesson Learnt



Penandatanganan Perjanjian Kerjasama (PKS) antara BMKG dan BI perwakilan Aceh dilakukan pada tanggal 11 September 2019 bertempat di Lambung Kuliner, Ulee Lhee, Propinsi Aceh

Lesson Learnt



- ❑ **Peresmian Program City Watch di Bandara Internasional Kualanamu - Deli Serdang 19 Oktober 2018**
- ❑ **Kerjasama antara BMKG dan Dentsu Jepang**
- ❑ **Melibatkan Pemprov Sumut, Pemkot Medan, Otoritas Bandara/ Kemhub, PT Angkasa Pura, Perum LPPNPI / Airnav, Basarnas, DPD Prov Sumut.**



MOSAIC Platform

BMKG	Phase 1	Phase 2	Phase 3
Participant	Disaster volunteers	Volunteers on Specifics Sectors	Traning for Trainers
Subjects	Introduction on Weather and Climate	Introduction on Weather and Climate	Skilled modeling of adult learning principles and delivery techniques, including how to help adults learn and remember, processing and facilitation techniques, classroom set-up and management, and handling difficult participant situations
	Understanding the impact of extreme weather	Understanding the impact of extreme weather on specific sectors	Researched, up-to-date and well-designed program and materials related weather and climate impact to their specific community
	Weather and Climate simulation (practice)	Weather and Climate simulation (practice)	The application of a client's own content throughout the program and for any final skill demonstration project.
	How to understand weather forecast and warning from BMKG	How to understand weather forecast and warning from BMKG	The opportunity to receive both facilitator and peer feedback and coaching.
	Know the action from response matrices of impact forecast and risk alert	Know the action from response matrices of impact forecast and risk alert to their sectors	Connecting with the regional hub of BMKG and Disaster Manegement offices
	How to use BMKG alert information to the community	How to use BMKG alert information to the specific community	
	Tabletop exercise	Tabletop exercise	
Partners	BNPB, BPBD, Tagana (Volunteers from Ministry Social), Public Volunteers group, Public Radion networks, University disaster group.	Agriculture, Health, Industry, Forestry, Humanitarian, School/Education, Military, Social, Businees/Finance.	
Duration	3 days	3 days	2 days

DISEMINASI PRODUK

AKSES INFORMASI



Website

www.bmkg.go.id
web.meteo.bmkg.go.id
maritim.bmkg.go.id
aviation.bmkg.go.id



Aplikasi Mobile

infoBMKG



Available on the
App Store



ANDROID APP ON
Google play



Media Sosial

@infoBMKG



Radio

RRI
ELSHINTA
SONORA
RAPI
ORARI



Televisi

TELEVISI PEMERINTAH
TELEVISI SWASTA



Media

ONLINE
CETAK

Call Center BMKG Pusat 196

021 – 6546315
021 – 6546318

Followers



4,2 Juta



5,8 Juta

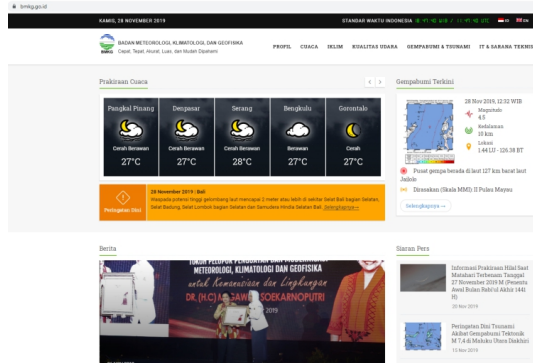


97,8K Subscribers

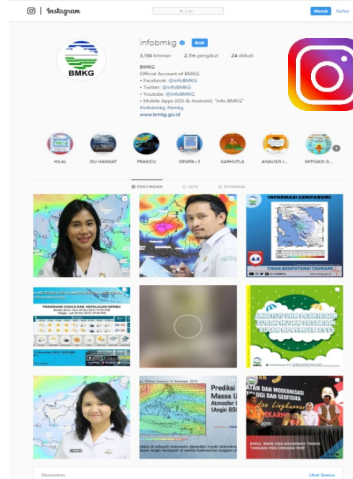
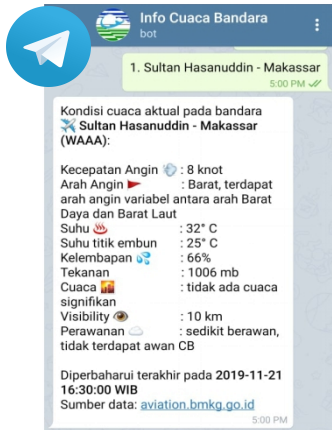
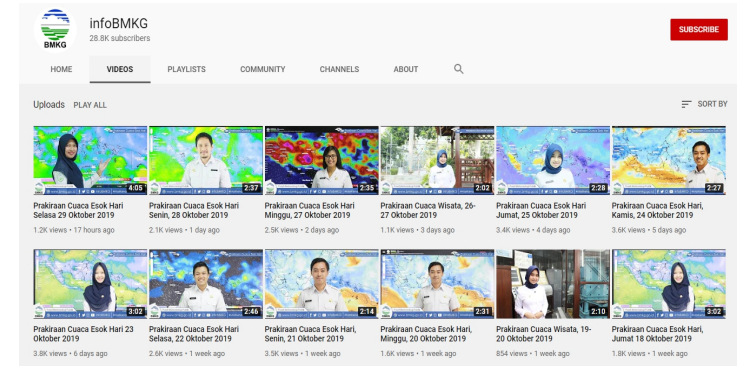


Diseminasi melalui website, aplikasi dan media sosial

Website



aplikasi





@infoBMKG



facebook



Jl. Angkasa 1 No.2 Kemayoran Jakarta Pusat, Indonesia
www.bmkg.go.id

Info Iklim : 021 4246321 ext. 1707

Info Cuaca : 021 6546315/18

Info Gempabumi : 021 6546316

Terima kasih

