GeoRiskPH
INNOVATIONS FOR RESILIENCE

Paving a New Landscape in Risk Valuation: The GeoRisk Philippines Initiative

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Geocon 2019: Geoscience for a Resilient and Sustainable Philippines
December 04, 2019

Outline

- What is GeoRisk Philippines (GeoRiskPH)
- GeoRiskPH System, Platforms & Results
- GeoRiskPH Impact
- Global Risk Assessment Framework (GRAF) and GeoRiskPH
- Call for Action

GeoRiskPH

INNOVATIONS FOR RESILIENCE

Multi-agency Project, led by DOST-PHIVOLCS, funded by DOST in 2018

Governance Platform **(intangible)** where different stakeholders (Government-to-Government, Government-to-Citizens, Government-to-Business) can collaborate for the sharing, standardization and optimum use of information necessary for risk valuations, *and consequently for good governance*

Physical Platforms **(tangible)** where tools are developed for data integration, management and analysis of information

GeoRiskPH
INNOVATIONS FOR RESILIENCE

GEOSPATIAL INFORMATION MANAGEMENT AND ANALYSIS PROJECT
FOR HAZARDS AND RISK ASSESSMENT IN THE PHILIPPINES

Innovations for Resilience

- **Empower** the National Government, other Government Agencies, Local Government Units, Institutions and Individuals to better prepare for the effects of natural hazards
- **Enable** the Government to be more prepared and resilient to hazards, providing platforms where risk transfer mechanisms may be developed & facilitated

- **Provide** platforms where different government agencies may *share, exchange & analyze data & formulate ideas,* expediting development of more relevant **Science-based, citizen-centric products, decisions & policies**

VISION

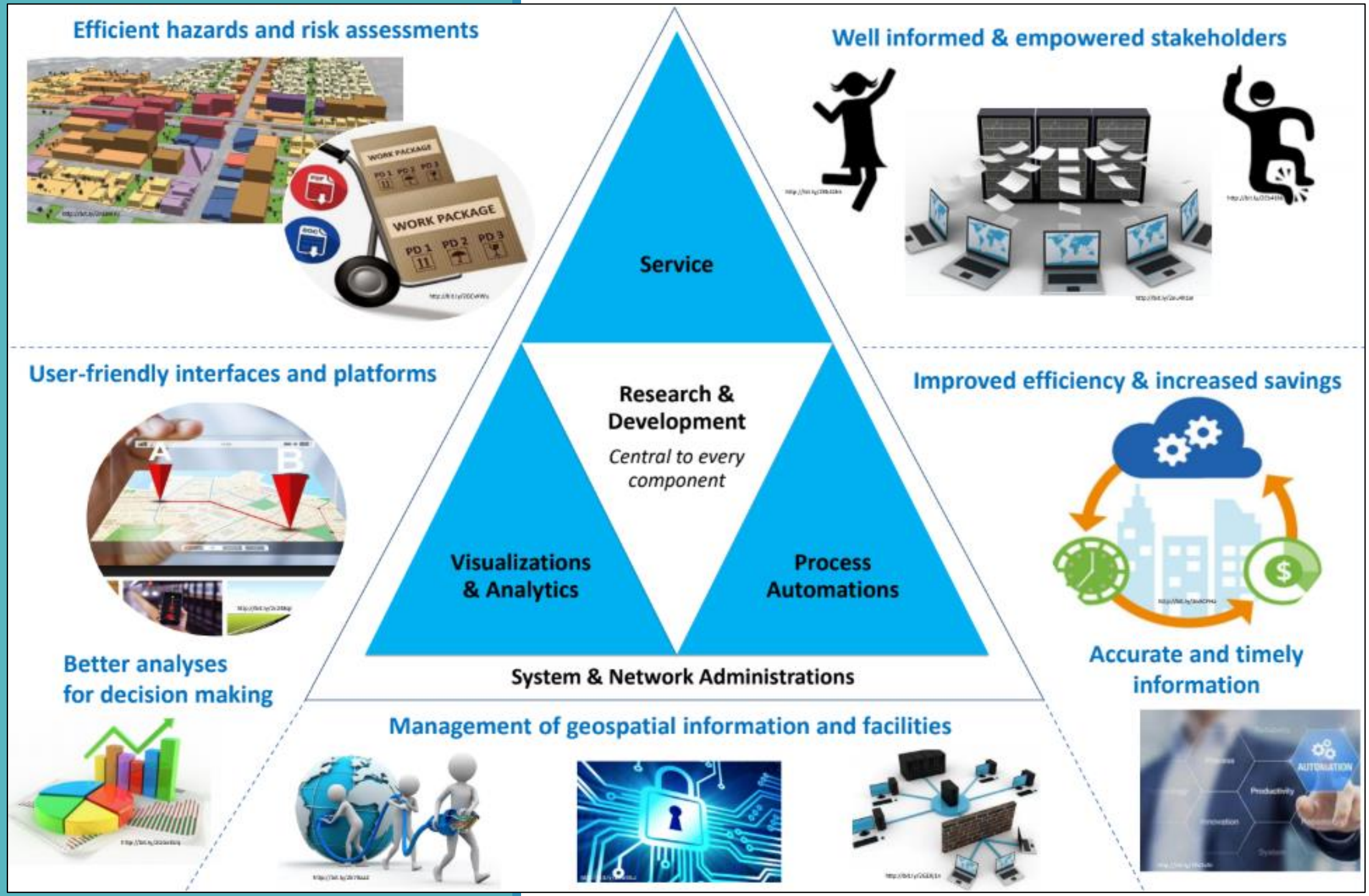
Philippines' central source of information for accurate and efficient hazards and risk assessment

to help government increase the nation's resilience to natural hazards

GeoRiskPH

INNOVATIONS FOR RESILIENCE

GeoRiskPH Framework & Roadmap



Cabinet Issued Directives for Use of GeoRiskPH & HazardHunterPH in Government

Duterte OKs DOST-developed tech that locates hazards in PH

By Azer Parrocha July 2, 2019, 7:52 pm Share

DOST-DEVELOPED TECH. President Rodrigo Roa Duterte presides over the 39th Cabinet Meeting at the Malacañan Palace on Monday (July 1, 2019). Duterte approved the Department of Science and Technology (DOST)-developed technologies that locate environmental hazards in the Philippines. *(Robinson Niñal Jr./Presidential photo)*

MANILA -- President Rodrigo Duterte has approved two technologies that will help the government collect data for environmental hazards and assess situations for immediate disaster response.

Presidential Spokesperson Salvador Panelo said Duterte approved the Department of Science and Technology (DOST)-developed technologies during the Cabinet meeting on Monday night.

"(These technologies were) approved by the President and the Cabinet," Panelo said in a statement.

He said one of the technologies, GeoRisk Philippines Initiative, is meant to further improve data gathering for environment hazards, Panelo said.

"It is an integrated system or database where one can map or locate hazards in a specific location and view it on an application called the Hazard Hunter Philippines," he added.

Panelo said another application is the Situation Data Mapper, which "receives real time assessment on a situation and can provide analysis for high level decisions for disaster response".

He, meanwhile, said the DOST has recommended that all agencies update and share with them their hazard information to further develop the system. ***(PNA)***

Related Stories

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https://www.pna.gov.ph/articles/1073911

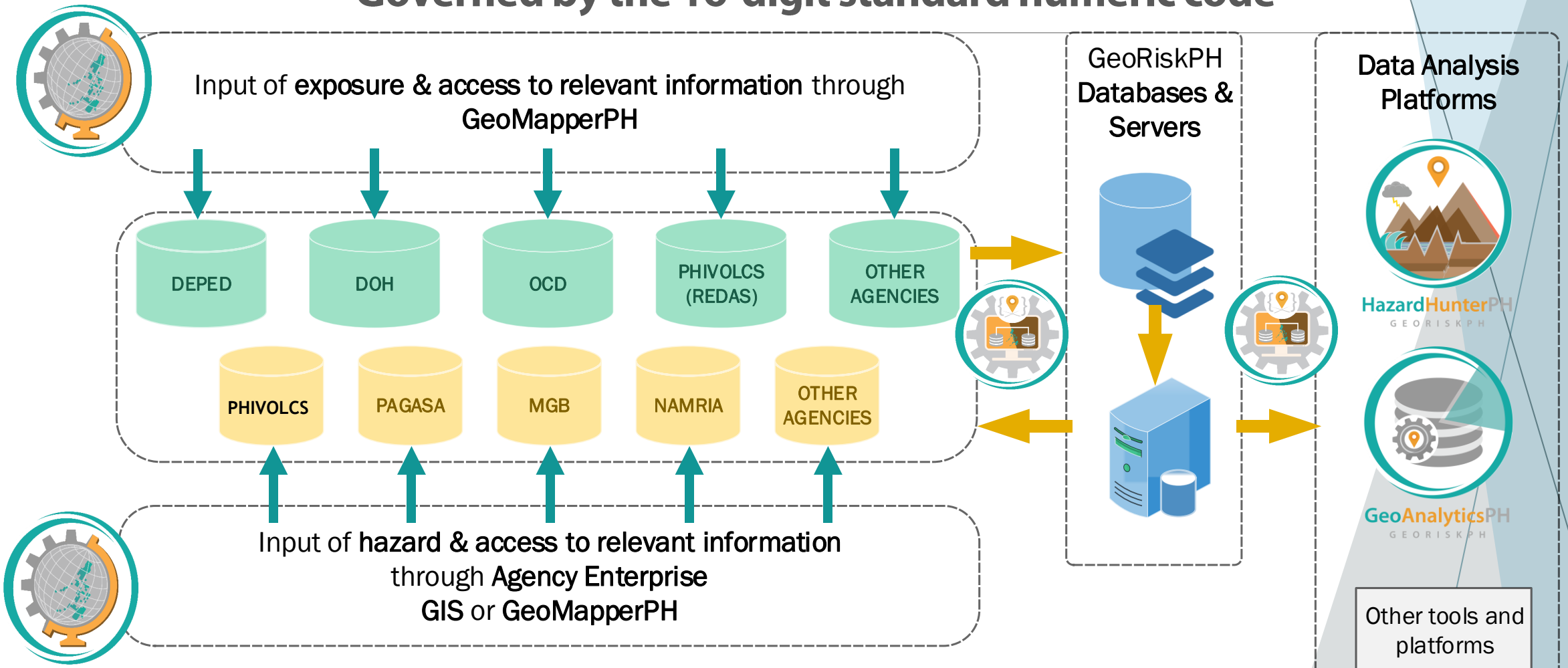
National Land Use Committee (NLUC)

The National Economic Development Authority (NEDA)-led National Land Use Committee (NLUC), composed of 17 member agencies, agreed for the **Department of Science and Technology (DOST) to lead** in the development of the **National Exposure Database.**

The **GeoRiskPH integrated system** was designated as the official platform for the said development.

GeoRiskPH INTEGRATED SYSTEM

Governed by the 16-digit standard numeric code



GeoRiskPH PROTOCOLS

Thematic Standard Codes

1 - Basemaps
2 - Hazards
3 - Exposure
4 - Impact
5 - Risk
6 - Capacity
7 - Vulnerability
8 - Boundaries

All data that are contributed:

- must have 16-digit numeric codes
- must have undergone topology corrections
- must have WGS 1984 as standard projection
- must be verified by agency database manager

2010200143010521

(16-digit code)

2 Hazard

01 Seismic Hazard

02 Active Fault/Ground Rupture

001 Fault Name

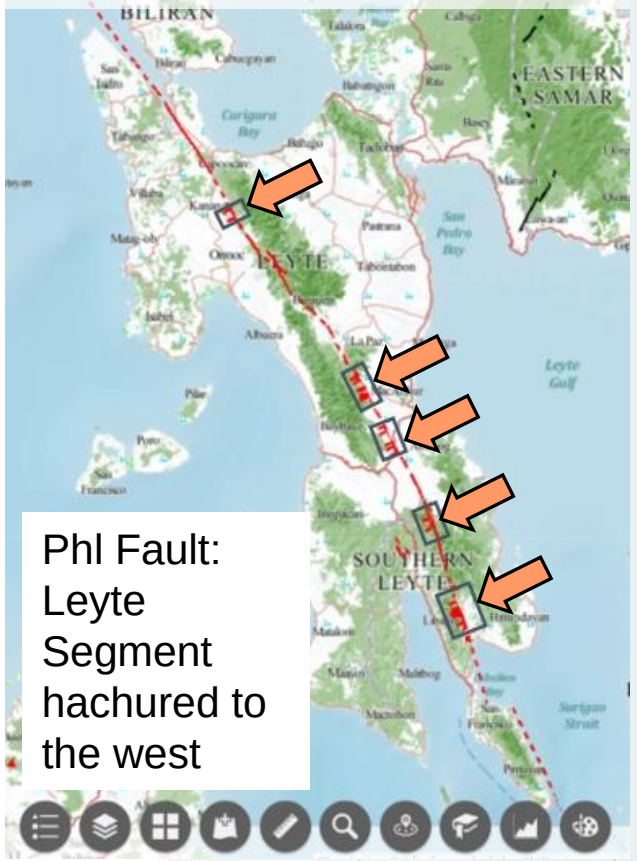
43 Segment Name

01 Fault Category

05 Trace Type (Trace Certain)

21 Line Type (Hachured to the west – red)

VISUAL REPRESENTATION



Phl Fault: Leyte Segment hachured to the west

GeoRiskPH PLATFORMS

DATA INPUT

GeoMapperPH
GEORISKPH

For the Development of the

NATIONAL EXPOSURE DATABASE

By the National Land Use Committee

DATA ACCESS

Map & Feature
SERVICES

For Efficient sharing of Information

SINGLE URL for GOVERNMENT INFORMATION

(APIs ready; platform under dev't)

HAZARD ASSESSMENT

HazardHunterPH
GEORISKPH

For ONE-STOP SHOP **HAZARD ASSESSMENT SERVICE**

For Individuals and Institutions

EXPOSURE ASSESSMENT

GeoAnalyticsPH
GEORISKPH

For **VISUALIZATION & ANALYTICS**

For National Government Agencies, Local Government Units

GeoRiskPH RESULTS

DATA INPUT

GeoMapperPH
GEORISKPH

For the Development of the

NATIONAL EXPOSURE DATABASE

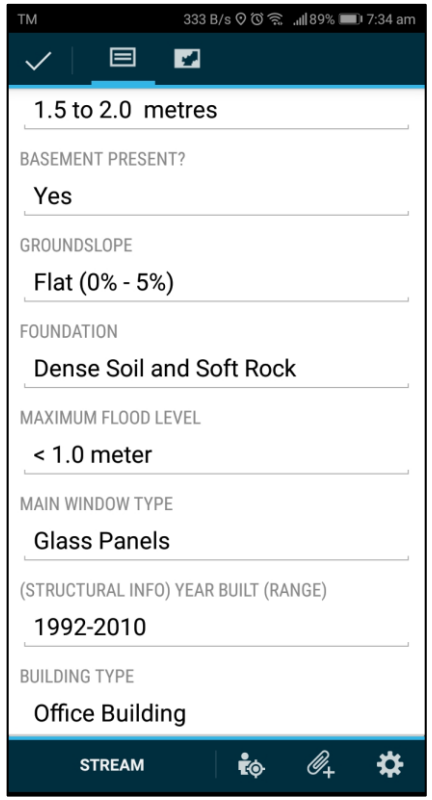
By the National Land Use Committee

Information in the Exposure Database include:

- Building footprint location
- Vulnerability (physical, social, economic)
- Coping Capacity
- *Other information deemed necessary*

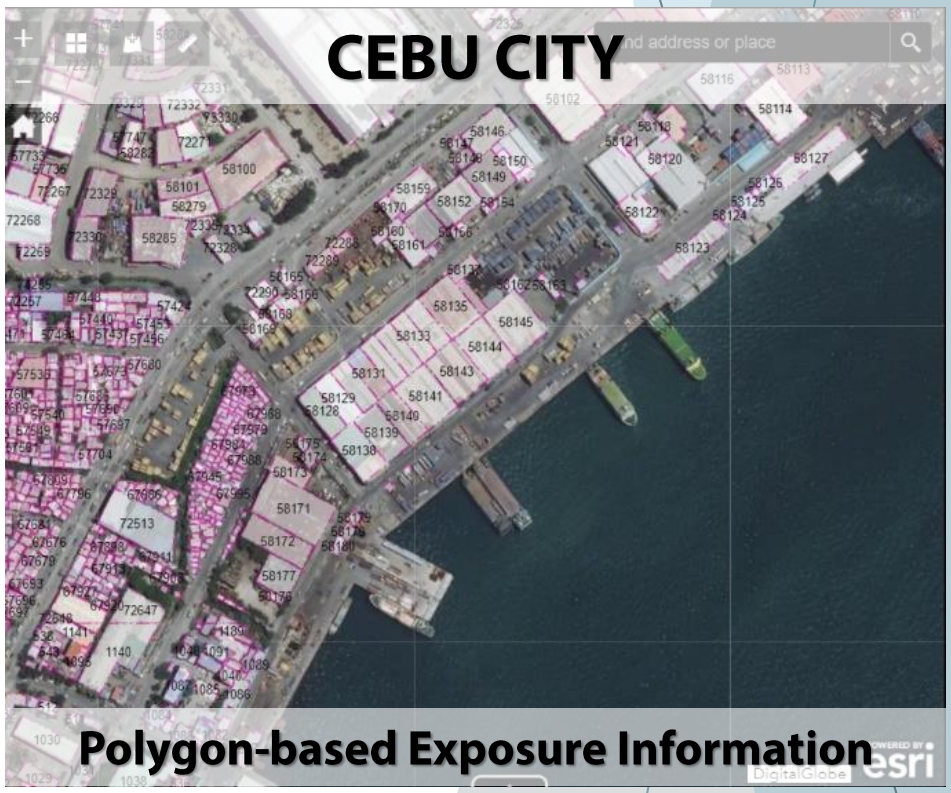
Mobile Application

For Field Data Collection



Web Application

For Pre- & Post-Fieldwork Input & Analysis



GeoRiskPH RESULTS

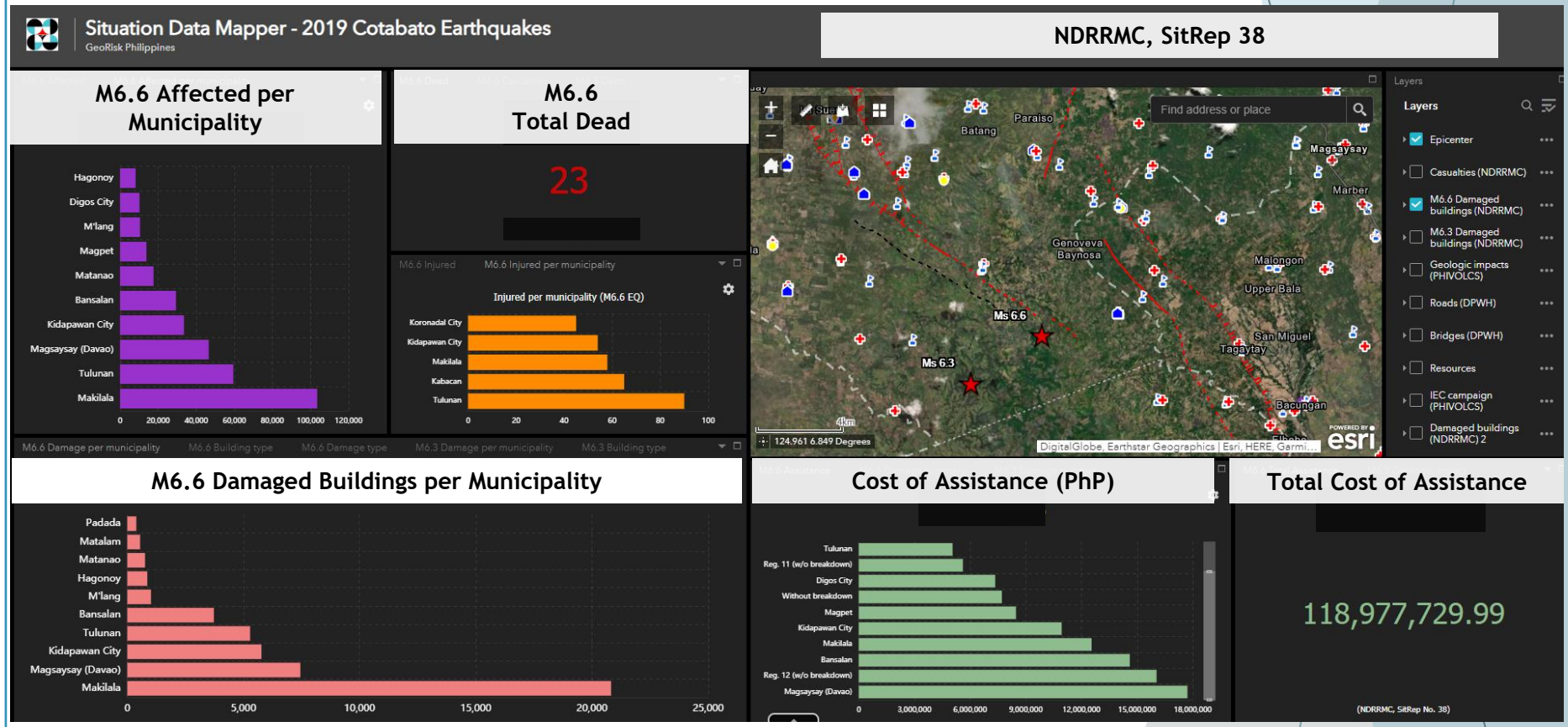
DATA INPUT

GeoMapperPH
GEORISKPH

For Development of

SITUATION DATA MAPPER &

AGENCY DASHBOARDS



GeoRiskPH RESULTS

DATA ACCESS

Map & Feature SERVICES

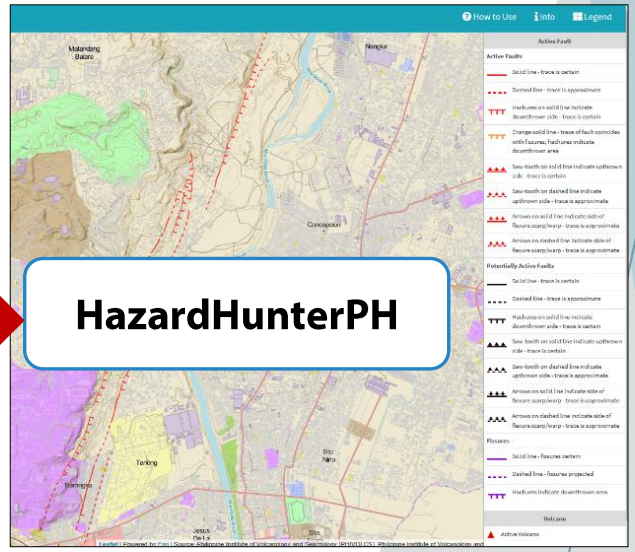
For Efficient sharing of Information

SINGLE URL for GOVERNMENT INFORMATION

Data Access Format from GeoRiskPH Database

- Use of a **single URL (API) for specific information** that can be used in other GIS interfaces and platforms for detailed analysis

Access Control	**All**
Visibility	Public
Context	/af/1.0.0
Production	**http://xxxxx.georisk.gov.ph/arcgis/rest/service/PHIVOLCS/ActiveFault/**
Date Last Updated	6/6/2019. 5:01:46PM



GeoRiskPH RESULTS

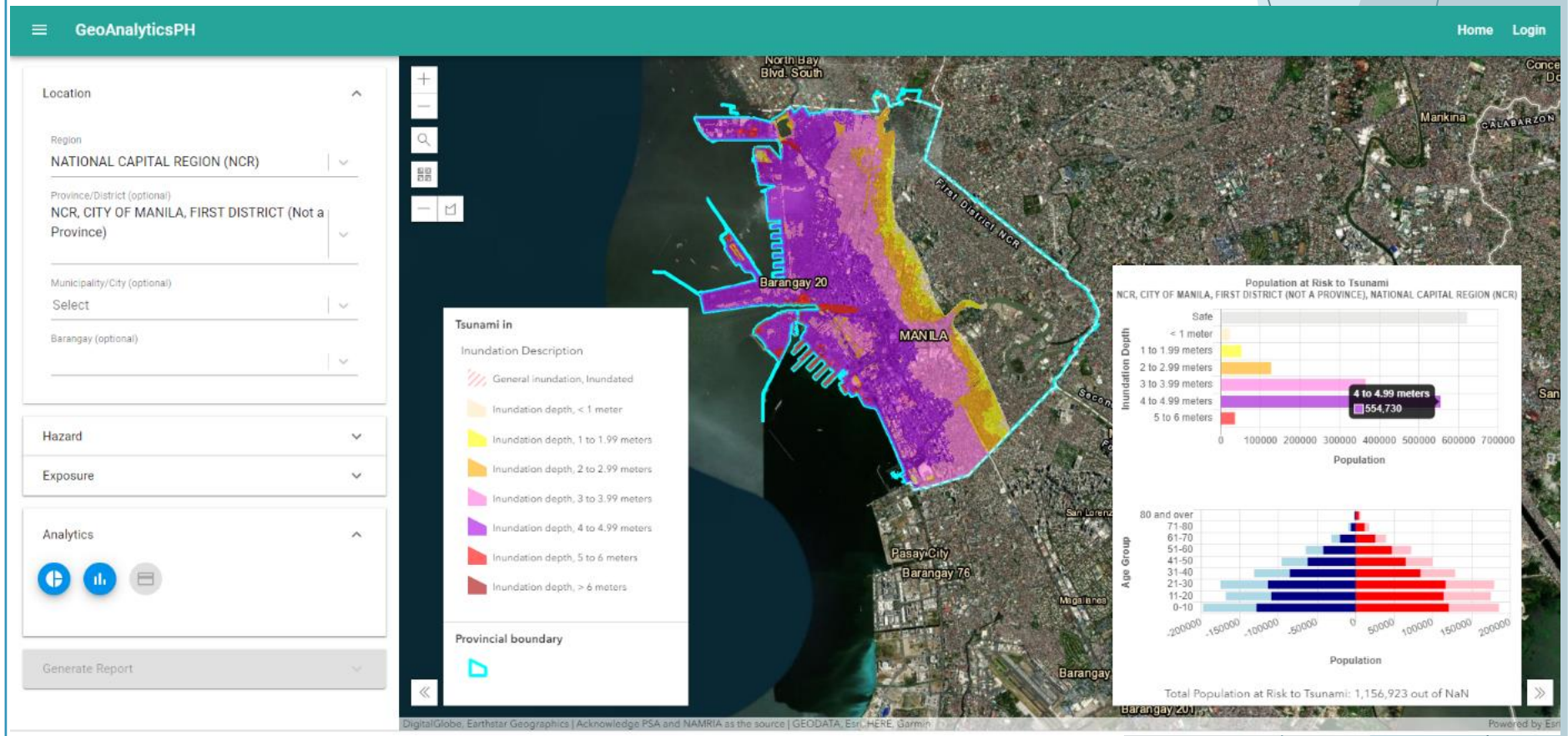
EXPOSURE ASSESSMENT

GeoAnalyticsPH

GEORISKPH

For **VISUALIZATION & ANALYTICS**

For National Government Agencies, Local Government Units



GeoRiskPH RESULTS

EXPOSURE ASSESSMENT

GeoAnalyticsPH
GEORISKPH

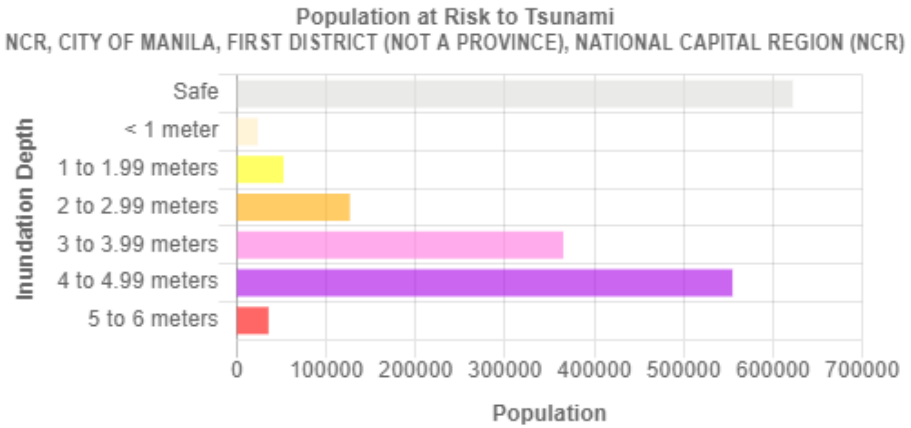
For **VISUALIZATION & ANALYTICS**

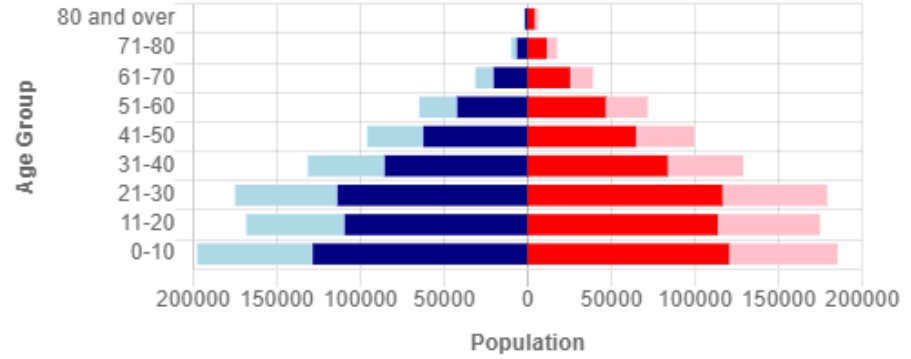
For National Government Agencies, Local Government Units

CITY OF MANILA
POPULATION EXPOSURE

Total People Exposed to Tsunami:**1,156,923**

Limitation: Census spread equally in the area
Data Sources:
Tsunami - PHIVOLCS, 2013
Census and admin boundary - PSA, 2015





Total Population at Risk to Tsunami: **1,156,923** out of **1,779,154 (65.03%)**

GeoRiskPH RESULTS

EXPOSURE ASSESSMENT

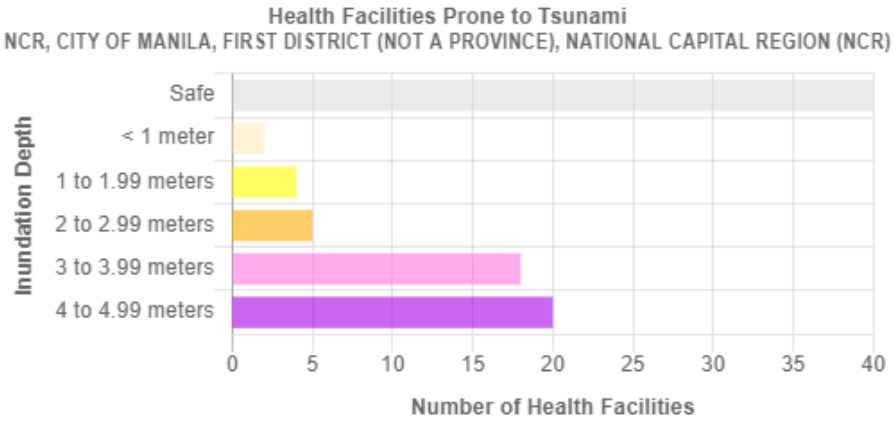
GeoAnalyticsPH

GEORISKPH

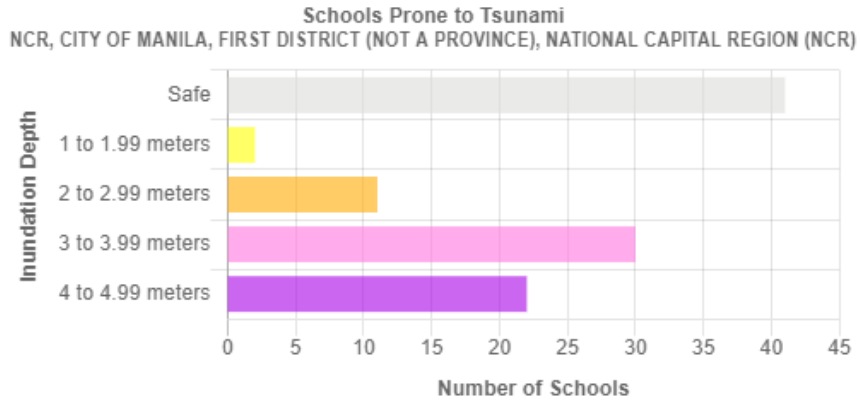
For **VISUALIZATION & ANALYTICS**

For National Government Agencies, Local Government Units

CITY OF MANILA
CRITICAL FACILITY EXPOSURE



Total Health Facilities Prone to Tsunami: **49** out of **89** **(55.06%)**



Total Schools Prone to Tsunami: **65** out of **106** **(61.32%)**

Data Sources:
Tsunami - PHIVOLCS, 2013
Schools - DepEd, 2015
Health Facilities - DOH, 2016

GeoRiskPH RESULTS

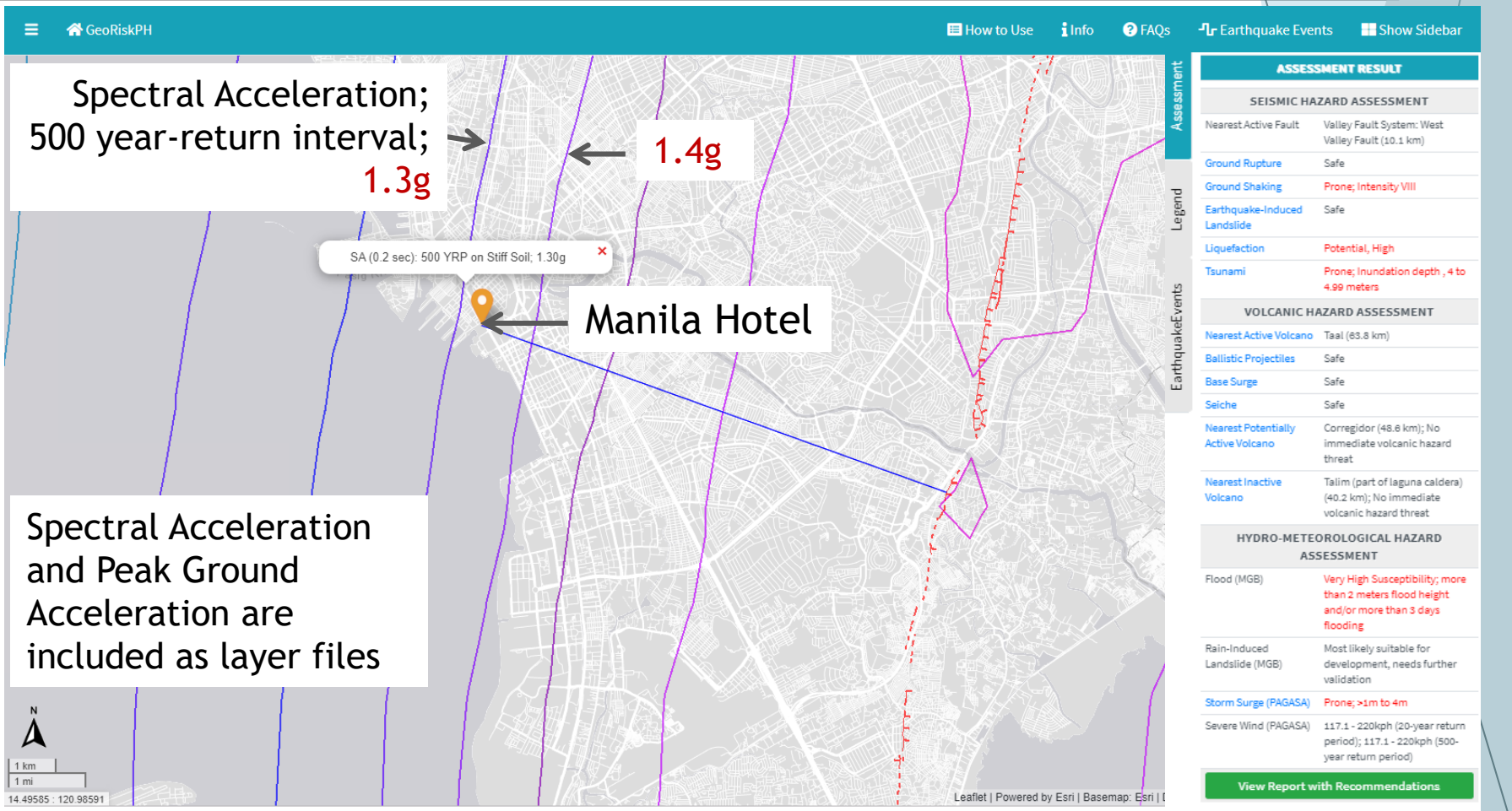
HAZARD ASSESSMENT

HazardHunterPH

GEORISKPH

For ONE-STOP SHOP
HAZARD ASSESSMENT SERVICE

For Individuals and Institutions



GeoRiskPH RESULTS

HAZARD ASSESSMENT

HazardHunterPH

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For ONE-STOP SHOP
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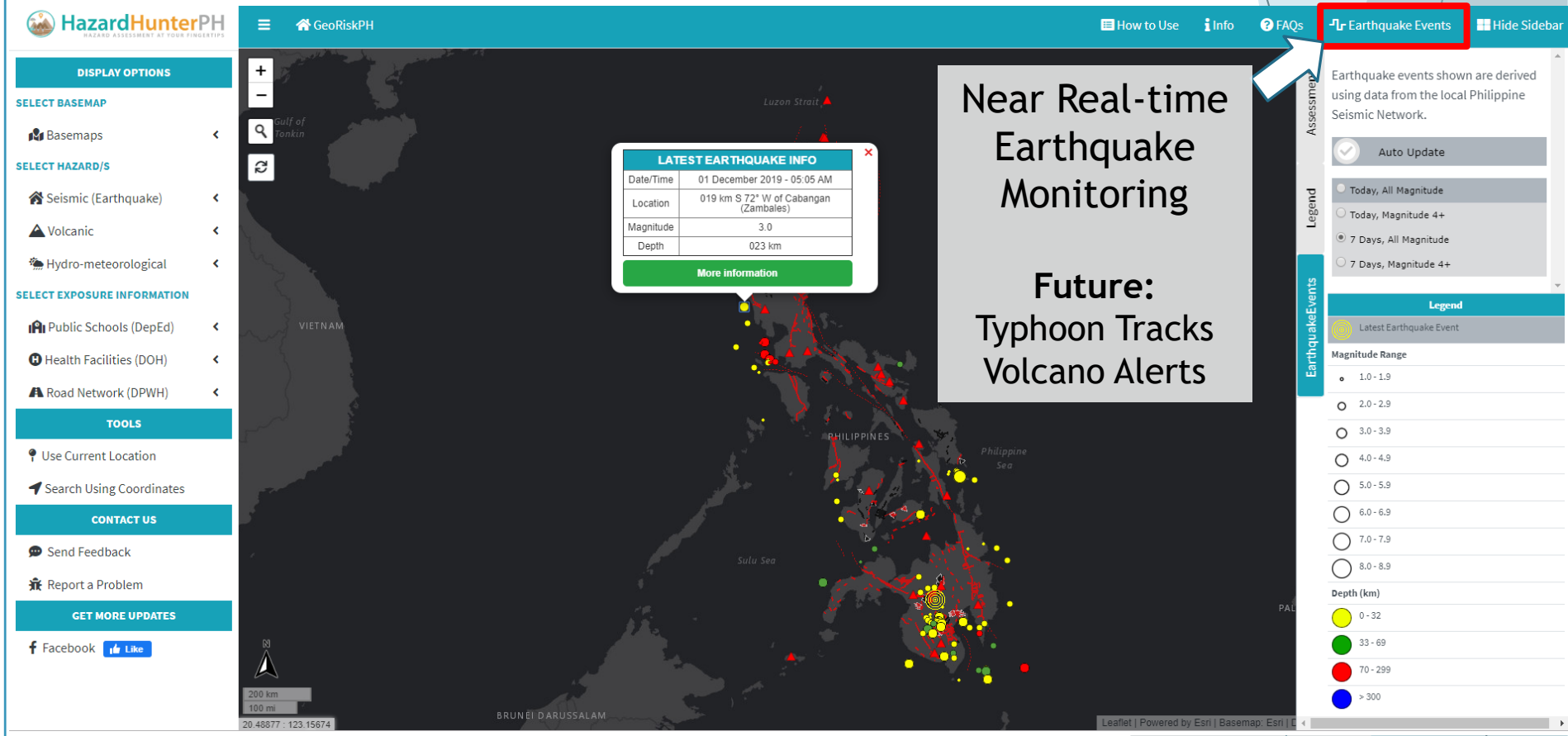


Near Real-time Earthquake Monitoring

Future:
Typhoon Tracks
Volcano Alerts

GeoRiskPH RESULTS

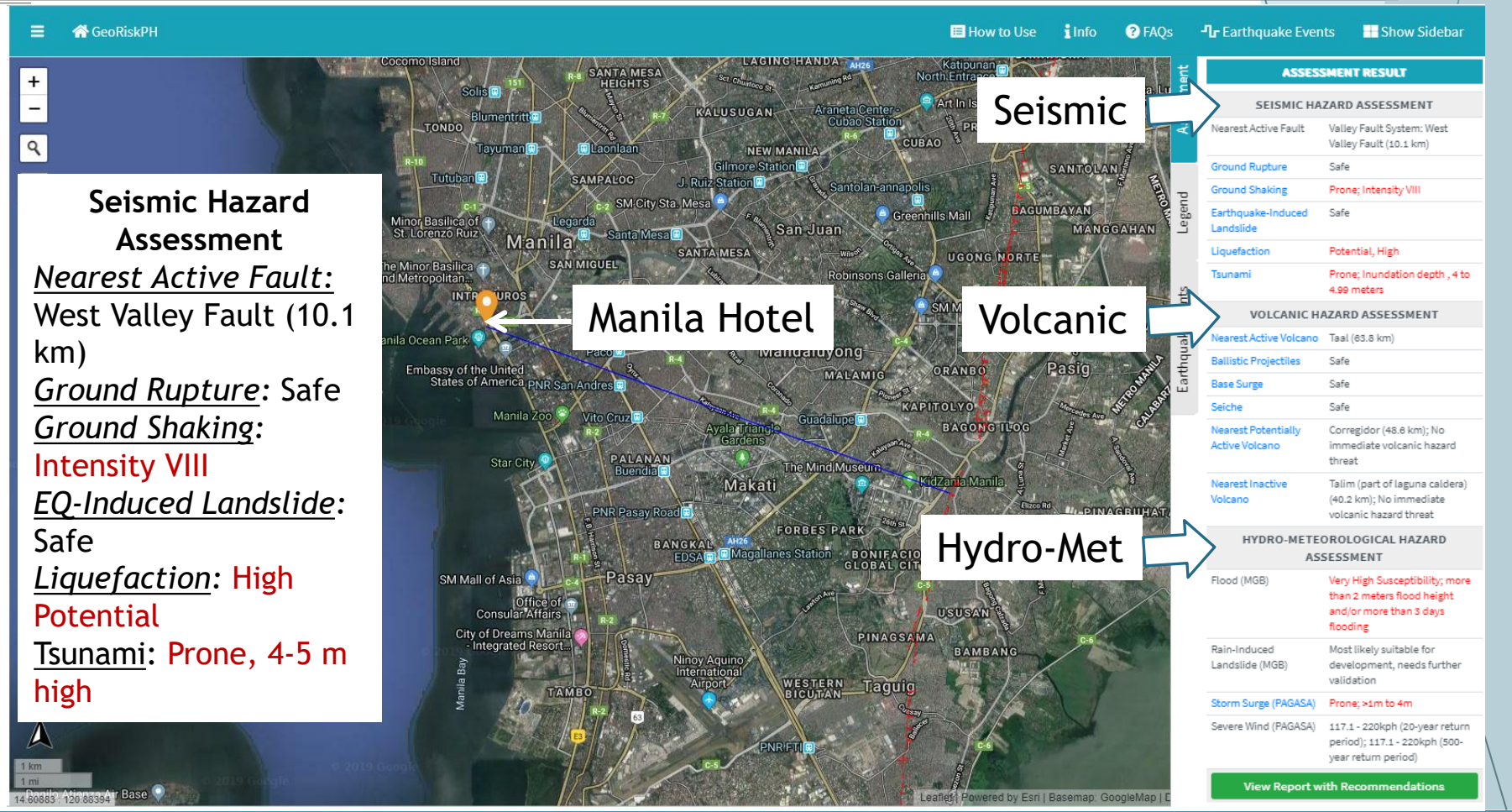
HAZARD ASSESSMENT

HazardHunterPH

GEORISKPH

For ONE-STOP SHOP
HAZARD ASSESSMENT SERVICE

For Individuals and Institutions



GeoRiskPH RESULTS

DOST-PHIVOLCS

Republic of the Philippines
Department of Science and Technology
PHILIPPINE INSTITUTE OF VOLCANOLOGY AND SEISMOLOGY

DATE 3 December 2019
COORDINATES 14.58392 , 120.97409

SEISMIC HAZARDS ASSESSMENT

GROUND RUPTURE	LIQUEFACTION	EARTHQUAKE-INDUCED LANDSLIDE	TSUNAMI
Safe; Approximately 10.1 km from the Valley Fault System	**Potential, High**	**Safe**	**Prone; Inundation depth , 4 to 4.99 meters**

EXPLANATION AND RECOMMENDATION

- ✓ All hazard assessments are based on the available susceptibility maps and the coordinates of the user's selected location.
- ✓ Ground rupture hazard assessment is the distance to the nearest known active fault in the area. The recommended buffer zone, or Zone of Avoidance, against ground rupture hazard is at least 5 meters on both sides of the active fault or from its zone of deformation.
- ✓ Fissure, with its related ground subsidence, may not be a potential source of earthquake. However, fissures and ground subsidence may develop further if the condition that generated them continued to persist, or as a response to strong ground shaking. The recommended buffer zone, or Zone of Avoidance, against fissuring is at least 5 meters on both sides of the fissure.
- ✓ All sites may be affected by ground shaking in the event of an earthquake.
- ✓ Ground shaking and liquefaction hazards can be mitigated by following the provisions of the National Building Code and the Structural Code of the Philippines.
- ✓ Avoidance is recommended for sites with earthquake-induced landslide hazard unless appropriate engineering interventions are in place.
- ✓ Tsunami threat to people's lives can be addressed by community preparedness and a tsunami evacuation plan. Advice for tsunami evacuation comes from public agencies and the local government. But more importantly, coastal communities must learn to evacuate themselves when they recognize the three natural signs of tsunami, which are 1) strong ground shaking, 2) unusual rise or fall of sea level, and 3) strong or unusual sound coming from the sea.

DENR-MGB

Republic of the Philippines
Department of Environment and Natural Resources
MINES AND GEOSCIENCES BUREAU

DATE 3 December 2019
COORDINATES 14.58392 , 120.97409

HYDRO-METEOROLOGICAL HAZARDS ASSESSMENT

FLOOD	RAIN-INDUCED LANDSLIDE
Very High Susceptibility; more than 2 meters flood height and/or more than 3 days flooding	**Most likely suitable for development, needs further validation**

EXPLANATION AND RECOMMENDATION

- ✓ All hazard assessments are based on the available susceptibility maps and the coordinates of the user's selected location.

Flood

- ✓ Areas with low susceptibility to floods are likely to experience flood heights of less than 0.5 meters and/or flood duration of less than 1 day. These include low hills and gentle slopes that have sparse to moderate drainage density.
- ✓ Areas with moderate susceptibility to floods are likely to experience flood heights of 0.5 meters up to 1 meter and/or flood duration of 1 to 3 days. These are subject to widespread inundation during prolonged and extensive heavy rainfall or extreme weather conditions. Fluvial terraces, alluvial fans, and infilled valleys are also moderately subjected to flooding.
- ✓ Areas with high susceptibility to floods are likely to experience flood heights of 1 meter up to 2 meters and/or flood duration of more than 3 days. Sites including active river channels, abandoned river channels, and areas along riverbanks, are immediately flooded during heavy rains of several hours and are prone to flash floods. These may be considered not suitable for permanent habitation but may be developed for alternative uses subject to the implementation of appropriate mitigation measures after conducting site-specific geotechnical studies as deemed necessary by project engineers and LGU building officials.
- ✓ Areas with very high susceptibility to floods are likely to experience flood heights of greater than 2 meters and/or flood duration of more than 3 days. These include active river channels, abandoned river channels, and areas along riverbanks, which are immediately flooded during heavy rains of several hours and are prone to flash floods. These are considered critical geohazard areas and are not suitable for development. It is recommended that these be declared as "No Habitation/No Build Zones" by the LGU, and that affected households/communities be relocated.
- ✓ The implementation of appropriate mitigation measures as deemed necessary by project engineers and LGU building officials is recommended for areas that are susceptible to various flood depths. Site-specific studies including the assessment for other types of hazards should also be conducted to address potential foundation problems.

DOST-PAGASA

Republic of the Philippines
Department of Science and Technology
PHILIPPINE ATMOSPHERIC, GEOPHYSICAL AND ASTRONOMICAL SERVICES ADMINISTRATION

DATE 3 December 2019
COORDINATES 14.58392 , 120.97409

HYDRO-METEOROLOGICAL HAZARDS ASSESSMENT

STORM SURGE	SEVERE WIND
>1m to 4m	**• 117.1 - 220kph (20 - Year Return Period) • 117.1 - 220kph (500 - Year Return Period)**

EXPLANATION AND RECOMMENDATION

Storm Surge

- ✓ The storm surge hazard maps identify coastal areas where flooding may happen if a storm surge is predicted.
- ✓ A storm surge ("*daluyong ng bagyo*") is the abnormal rise in sea level that occurs during tropical cyclones or "bagyo". It happens when a very strong tropical cyclone blows-off excessive amounts of seawater toward low-lying coastal communities.
- ✓ It is catastrophic and life-threatening because a storm surge can cause massive inland flooding, sometimes in unimaginable heights. It is even more dangerous when the storm surge coincides with a high tide.
- ✓ Areas susceptible to storm surge inundation of 0.5 to 1 meter are categorized as "low to moderate risk" zones. Low-lying communities are advised to prepare to evacuate, stay away from the coast or beach, remind household members of disaster preparedness and communication/coordination plans, emergency and evacuation kits, and listen/follow PAGASA for the latest weather update.
- ✓ Areas susceptible to storm surge inundation of 1.1 to 4 meters are categorized as "high to very high risk" zones. Communities may anticipate a life-threatening scenario, follow evacuation guidelines from local authorities, expect damage to community and infrastructures, cancel all marine/coastal activities, and listen/follow PAGASA for the latest weather update.
- ✓ Areas susceptible to storm surge inundation of above 4 meters are zones with "highest risk" to storm surge inundation. Storm surge is catastrophic. Significant threat to life, so mandatory evacuation is enforced. Storm surge will severely damage communities and coastal/marine facilities.
- ✓ For storm surge-prone communities, the most important considerations are 1) the strength of the tropical cyclone, 2) the height of the surge, and 3) if the community is located in a low-lying areas.

Assessment | Legend | EarthquakeEvents

ASSESSMENT RESULT

SEISMIC HAZARD ASSESSMENT	
Nearest Active Fault	Valley Fault System: West Valley Fault (10.1 km)
Ground Rupture	Safe
Ground Shaking	Prone; Intensity VIII
Earthquake-Induced Landslide	Safe
Liquefaction	Potential, High
Tsunami	Prone; Inundation depth , 4 to 4.99 meters
VOLCANIC HAZARD ASSESSMENT	
Nearest Active Volcano	Taal (63.8 km)
Ballistic Projectiles	Safe
Base Surge	Safe
Seiche	Safe
Nearest Potentially Active Volcano	Corregidor (48.6 km); No immediate volcanic hazard threat
Nearest Inactive Volcano	Talim (part of laguna caldera) (40.2 km); No immediate volcanic hazard threat
HYDRO-METEOROLOGICAL HAZARD ASSESSMENT	
Flood (MGB)	Very High Susceptibility; more than 2 meters flood height and/or more than 3 days flooding
Rain-Induced Landslide (MGB)	Most likely suitable for development, needs further validation
Storm Surge (PAGASA)	Prone; >1m to 4m
Severe Wind (PAGASA)	117.1 - 220kph (20-year return period); 117.1 - 220kph (500-year return period)

View Report with Recommendations

GeoRiskPH IMPACT

Efficiency & Savings:

(1) HazardHunterPH: Improvement by **about 5,000%** for point location-based hazard assessment, **from 1-3 days** (in PHIVOLCS alone) **to ~15seconds.** Stakeholders do not need to go to national agencies to get assessment reports, unless the area needs detailed assessment. Individuals may save on transportation costs plus other related expenses.

GeoRiskPH IMPACT

Efficiency & Savings:

(2) GeoAnalyticsPH: Improvement by **about 700%** for administrative boundary-based hazard assessment (with maps, graphs and analytics), **from ~7days to ~15minutes.** Stakeholders do not need to spend to get data from government agencies, since these are in the integrated system. Local Government Units do not need to hire consultants to produce maps and analytics.

GeoRiskPH IMPACT

Efficiency & Savings:

(3) GeoMapperPH: Government Sectors may be able to efficiently update their databases for use by the National Government down to the local levels. Government agencies and Local Government Units without GIS software to collect and contribute information into the GeoRiskPH integrated system or the National Exposure Database may use GeoMapperPH for free.

GeoRiskPH IMPACT

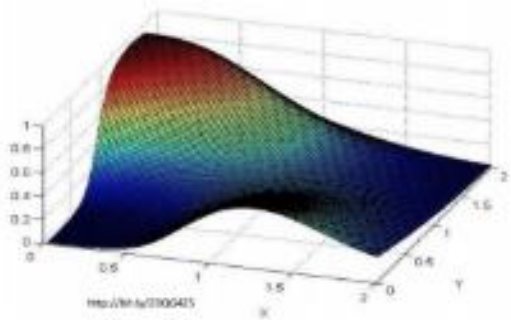
Collaborations:

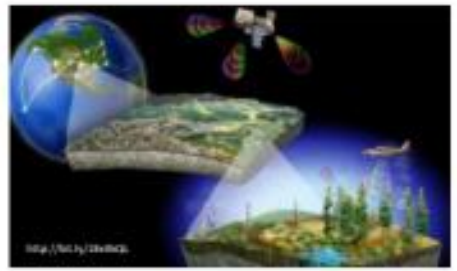
1- Department of Education
2- Department of Health
3- Department of Public Works and Highways
4- Department of Finance (Bureau of Treasury)
5- Housing and Urban Development Coordinating Council (SHFC, NHMFC)
6- Local Government Units
7- Others

GeoRiskPH IMPACT

- In the future, we would want to increase more the **Ease of Doing Business** and increase the number of **Science-based policies** that would consequently **increase the resilience of the Nation**

Current State	New Methodologies	Future State
Ease of Doing Business; Science-based Policies/Plans Formulated	GeoRiskPH	Ease of Doing Business; Science-based Policies/Plans Formulated
Manual Repetitive Operations		Manual Repetitive Operations





Acknowledgment:
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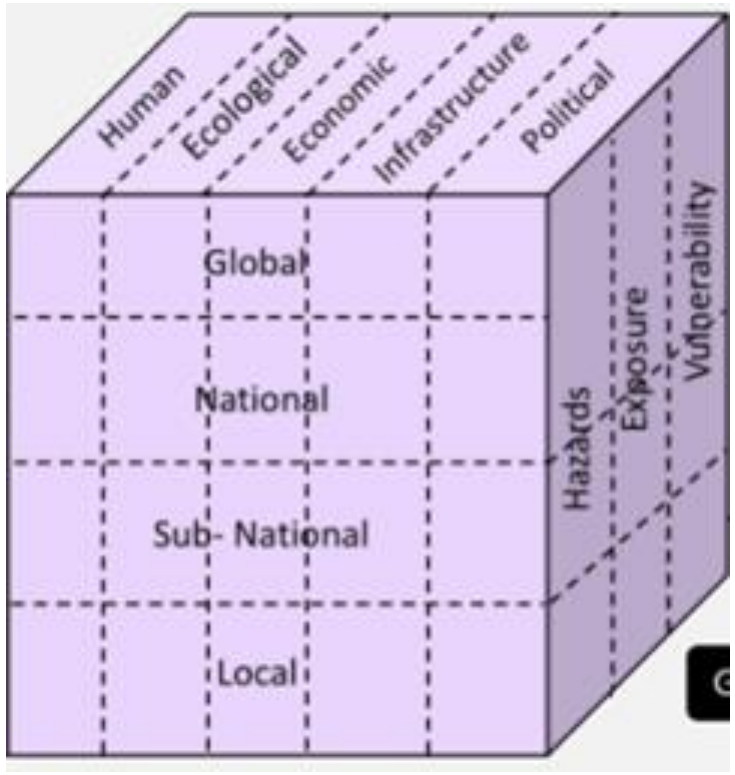
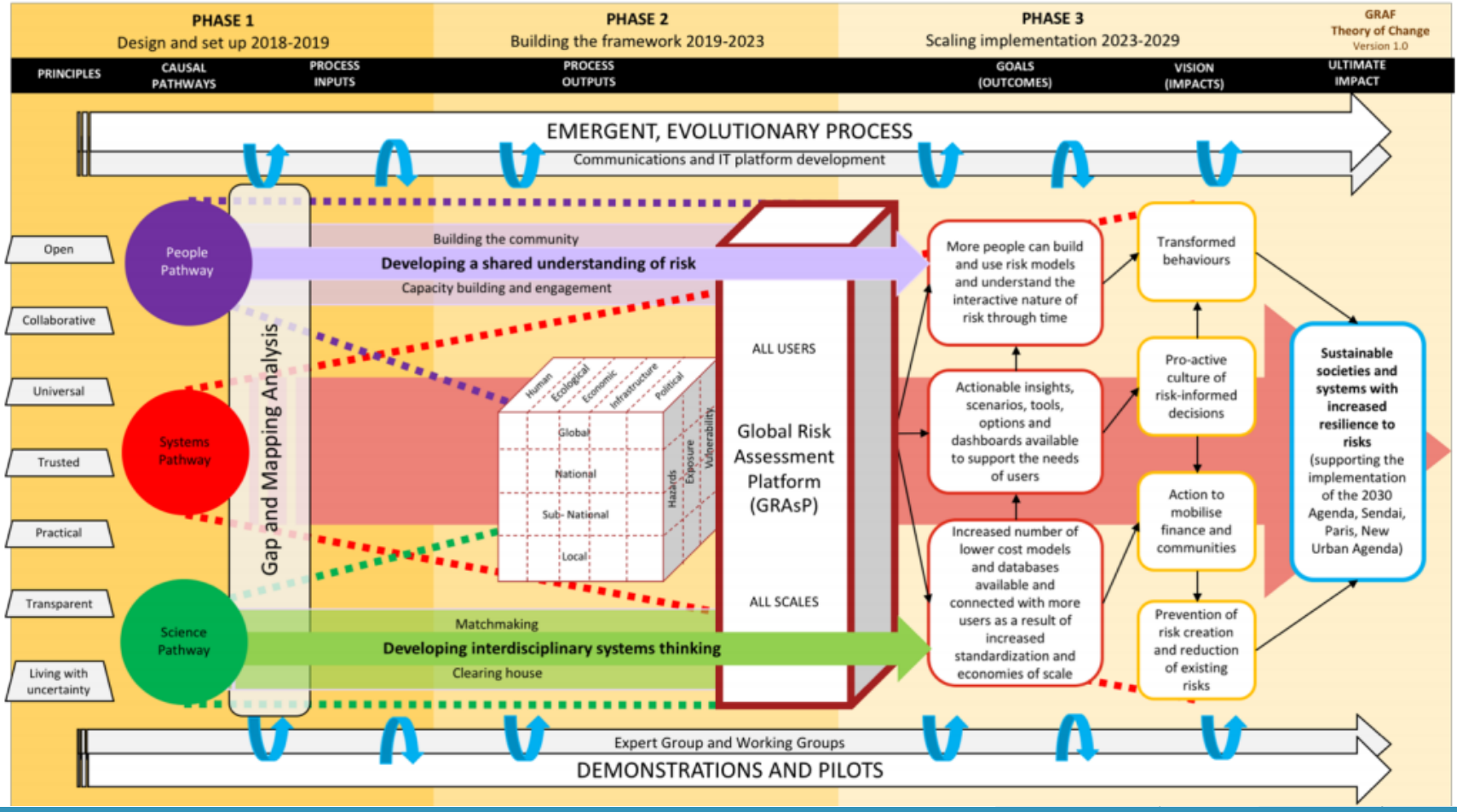
Benjamin, Melanie, Crystal & Roberto, and
Peace Corps Response Volunteer, Marion Dawn

GeoRiskPH GLOBAL IMPACT

GLOBAL RISK ASSESSMENT FRAMEWORK (GRAF) CUBE





GeoRiskPH

- With **strategically harmonized technological innovations** for disaster risk reduction, **increased collaborations among government agencies**, **strong leadership** and **leadership support**, the Philippines is indeed striding towards a new landscape in risk valuations, preparing the nation to level up with world-class standards, even leading other countries to follow our path

GeoRiskPH
INNOVATIONS FOR RESILIENCE

GEOSPATIAL INFORMATION MANAGEMENT AND ANALYSIS PROJECT
FOR HAZARDS AND RISK ASSESSMENT IN THE PHILIPPINES

CALL FOR ACTION

The task at hand may be daunting, but with each one of us contributing, helping each other, the Geoscience Community could indeed help in making the Philippines Resilient and the current efforts, sustainable.

Thank you!


HazardHunterPH
GeoRisk Philippines - Home | Fac
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Password
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The GeoRiskPH Initiative
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or
Create New Account