120M

Tsunami

## **Disaster Risk Reduction (Tsunami Hazard)**

**Updated 10 October 2023** 

### **Overall Strategies**

### a. Human Resource

- Training human resource in the analysis of multi-natural hazard mapping and modeling for seismic and hydro-geologic hazards.
- Increase and availability of experts.
- · Capacity Building and Training for stakeholders and beneficiaries.
- Partnership with LGUs for community-based warnings
- Trained human resource on integrating tsunami hazard information in DRR plans at the local levels

### b. R&D Technologies

- Maintenance and updating of data platforms.
- · Establishment of accurate and precise early warning systems for multi-natural hazards.
- Updating Vulnerability and Risk
- Operationalization of outputs from the stakeholders by the mandated agencies.

### c. Facilities and Services

 Establishment of GIS and remote sensing processing laboratories for big data analytics.

### d. S&T Policies

· Dialogue and coordination with LGUs and policy-makers for concrete applications.

### POSSIBLE SOLUTIONS

10M

and

**Further** 

analysis

of maps

prone

generation

and models

for tsunami-

areas in the

**Philippines** 

50M Other alternative Early Warning **Systems** (EWS) for tsunami (lowcost, locally fabricated and developed detection systems)

> 2023 Turned over cleared EWS to **PHIVOLCS**

Further analysis and

2022

generation of maps and models for tsunami-prone areas in the Philippines

Hazard

Modelling, Exposure Database Development, and Impact

Assessment Integrated operational real-time monitoring networks for tsunamis

 Nationwide Exposure

15M

 Communitybased early warning plan Capacity

building/ effective risk communication for coastal

Database for **Tsunamis** 

15M

Optimized and Freelyaccessible Early

Warning and Alarm Systems for Coastal Communities Nationwide

2025

communities

Adopted monitoring networks by **PHIVOLCS** Capacitated LGUs

2026

50M

Tsunami

Vulnerability Maps

for all coastline

communities

with trained communities

**MILESTONES** 

accurate tsunami early detection and warning system Systems

Working and

2024

monitored by LGUs and **PHIVOLCS** 

### 50M

Legend

 Risk Assessment Maps for Tsunamiprone Areas in PAR

 Community-based Risk communication, capacity building and prepared-

ness

VISION

Readily accessible maps and models for the most vulnerable and high-risk areas capable of early detection and warning for tsunamis

2028

Updated VA maps for all coastlines

2027

Areas with RA studies for tsunami.

· Effective Risk Communication, Capacity building and preparedness for Communities

### **Overall Outcomes**

### a. Human Resource

 Trained human resource on tsunami processing and analysis.

### b. R&D Technologies

- High-resolution tsunami maps and models
- · Low-cost and Locally-developed instrumentation for early warning

### c. Facilities/Services

- Laboratories for data processing tsunami maps and
- · Establishment of platform for information and dissemination, communication plan and other tools for communication

### d. S&T Policies

• Policy recommendation to LGUs in tsunami-prone areas and PHIVOLCS as the mandated agency.



assessments/analysis



15M

Tsunami mapping

based on historical

geomorphological

and geological

earthquakes

evidence of past

and modeling





R&D			Budget Allocation ('000)									
Technologies	Project Title	2022	2023	2024	2025	2026	2027	2028	Status			
Updated nationwide Earthquake Hazard Maps	Investigation and numerical modelling of Philippine tsunamis based on historical, geomorphological and geological evidence of past earthquakes	-	-	-	-	-	-	-	Completed			
Further analysis and generation of maps and models for tsunami-prone areas in the Philippines and Capacitated LGUs with trained communities	Deterministic Liquefaction and Tsunami Hazard Mapping of Selected Low-lying Areas in the Philippines using GIS, AI, and Geophysical Techniques		13,427	11,949					Ongoing			



## Updated 10 October 2023

### **Overall Strategies**

### a. Human Resource

- Training human resource in the analysis of multi-natural hazard mapping and modeling for seismic and hydro-geologic hazards.
- · Increase and availability of experts.
- · Capacity Building and Training for stakeholders and beneficiaries.
- Partnership with LGUs for community-based warnings
- · Trained human resource on integrating tsunami hazard information in DRR plans at the local levels

### b. R&D Technologies

- Maintenance and updating of data platforms.
- · Establishment of accurate and precise early warning systems for multi-natural hazards.
- Updating Vulnerability and Risk Maps.
- Operationalization of outputs from the stakeholders by the mandated agencies.

### c. Facilities and Services

 Establishment of GIS and remote sensing processing laboratories for big data analytics.

### d. S&T Policies

 Dialogue and coordination with LGUs and policy-makers for concrete applications.

### **POSSIBLE SOLUTIONS**

### 15M Nationwide Earthquake Hazard Mapping and Modeling thru Alternative Methods (Al.

crowdsourcing,

technologies/

techniques)

RS.

seismic

10M **Updating** of Earthquake Model through new and faster alternative techniques (including onshore and

## mapping in PAR) 2022

offshore

Updating of nationwide Earthquake Hazard Map (Onshore and pre-identified 2021 Offshore areas)

10M

### 100M

- Updating of Exposure **Philippines**
- Additional reference for earthquakes historical Earthquake data digital files
- Quantifying Earthquake Impacts (Damages, Casualties and Losses)
- Nationwide Exposure Database for Earthquakes

- Data Maps all over the
- Translation of earthquake-related vector data from the 1970s to digital files

## 15M

Risk Assessment Maps for Earthquakeprone Areas



2026 Updated RA maps

## 2025 Updated VA maps

- · Development of Exposure maps for the Philippines
- · Modeling earthquake Hazards from new and historical data

High resolution/quality nationwide earthquake hazard mapping

2024

Updated nationwide Earthquake Model

2023

Updated nationwide Earthquake Hazard Maps

## **MILESTONES**

### 30M

- · Post- earthquake fire assessment (ex. fire as a secondary hazard resulting Community-based Risk from earthquakes)
- Old edifices/ culturally important infrastructures damaged by earthquakes (vulnerability and propose immediate interventions)

2027

### **20M**

communication, capacity building and preparedness

2028

### VISION

Readilyaccessible maps and models for the most vulnerable and high-risk areas to earthquakes

Effective Risk Communication, Capacity building and preparedness for Communities

### **Overall Outcomes**

### a. Human Resource

Identification and

secondary hazards

Assessment of

resulting from

earthquakes

Trained human resource on tsunami processing and analysis.

### b. R&D Technologies

- High-resolution tsunami maps and models
- · Low-cost and Locally-developed instrumentation for early warning

### c. Facilities/Services

- · Laboratories for data processing tsunami maps and models.
- Establishment of platform for information and dissemination, communication plan and other tools for communication

### d. S&T Policies

· Policy recommendation to LGUs in tsunami-prone areas and PHIVOLCS as the mandated agency.







DOD To should die	Project Title		Ctatus							
R&D Technologies		2022	2023	2024	2025	2026	2027	2028	Status	
Updated nationwide Earthquake Hazard Maps and Models	Geospatial Information Management & Analysis Project for Hazards & Risk Assessment in the Philippines (GeoriskPH)	-	-		-	-	-	-	Completed	
	Integrative Studies on the Geodynamics of the Philippine and Taiwan Arc Systems									
	Accelerated Earthquake Multi-hazards Mapping And Risk Assessment Program of the Philippines	-	60,958	45,641	-	-	-	-		
Nationwide Earthquake Hazard Mapping and Modeling thru Alternative	Growth of an island arc (GAIA): Tectonic consequences and human impacts	3,562	3,562						Ongoing	
Methods (AI,RS crowdsourcing,seismic technologies/techniques)	Marine and onshore geophysical investigations of the Manila subduction zone	2,972	2,972							
	Paleoseismology and Hazard Assessment of Seismogenic Sources in Northern Luzon, Philippines			5,563	4,434					



P <sup>0</sup> D Toobhologico	Droiget Title		Status							
R&D Technologies	Project Title	2022	2023	2024	2025	2026	2027	2028	Status	
Updated nationwide Volcanic Eruption data	Marine and onshore geophysical investigations of the Manila subduction zone	2,972	2,972		-	-	-	-	Completed	
	Growth of an island arc (GAIA): Tectonic consequences and human impacts	6,546	6,546							
Alternative locally- fabricated instruments for measuring data and seismic activity	From Source Terranes to Basin Evolution (STroBE): Geochronology, Sediment Provenance, and Depositional History of the northern Cagayan Valley Basin			6,542	3,453	-	-	-	New	
	Volcano-hydrothermal system models of Philippine volcanoes: tracking the fluids and related hazards in Cagua and Hibok-hibok Volcanoes, Philippines			5,401	2,448	2,150			New	



15M

Risk

Assessment

prone Areas

2027

Updated RA maps

Maps for

Volcanic

Hazards-

Community-

preparedness

capacity

20M

## Updated 10 October 2023

### **Overall Strategies**

### a. Human Resource

- · Training human resource in the analysis of multi-natural hazard mapping and modeling for seismic and hydro-geologic hazards.
- · Increase and availability of experts.
- · Capacity Building and Training for stakeholders and beneficiaries.
- · Partnership with LGUs for community-based warnings
- · Trained human resource on integrating tsunami hazard information in DRR plans at the local levels

### b. R&D Technologies

- · Maintenance and updating of data platforms.
- · Establishment of accurate and precise early warning systems for multi-natural hazards.
- Updating Vulnerability and Risk Maps.
- Operationalization of outputs from the stakeholders by the mandated agencies.

### c. Facilities and Services

· Establishment of GIS and remote sensing processing laboratories for big data analytics.

### d. S&T Policies

· Dialogue and coordination with LGUs and policy-makers for concrete applications.

### POSSIBLE SOLUTIONS

30M Low-cost instrumentation for geophysicochemical monitoring and/or sampling/data collection volcanic gases and the volcanic crater

2022 Updated nationwide

## 20M

 Translation of active volcano vector data from the 1970s to digital files Geomorphologi

cal mapping and modeling of Active Volcanoes

 Nationwide Exposure Database for Volcanic Hazards

2023

Alternative

fabricated

and seismic

instruments for

measuring data

locally-

activity

2024 Updated maps and model incorporating new and

30M

Bathymetric

Mapping of

Features in

Volcanic

Lakes

Sub-lacustrine

2025

for active

volcanoes

historical data

**MILESTONES** 

Bathymetric data

15M

Volcanic

Hazards

Vulnerability

Maps for the

2026

**Updated VA Maps** 

**Philippines** 

### based Risk VISION communication. building and

Readily- accessible maps and models for most vulnerable and high-risk areas capable of early detection and warning for volcanic hazards

Effective Risk Communication. Capacity building and preparedness for Communities

### **Overall Outcomes**

### a. Human Resource

2028

 Trained human resource on tsunami processing and analysis.

### b. R&D Technologies

- · High-resolution tsunami maps and models
- · Low-cost and Locally-developed instrumentation for early warning

### c. Facilities/Services

- Laboratories for data processing tsunami maps and models.
- · Establishment of platform for information and dissemination, communication plan and other tools for communication

### d. S&T Policies

· Policy recommendation to LGUs in tsunamiprone areas and PHIVOLCS as the mandated agency.



10M

Updating additional

Volcanic Eruption

2021

Volcanic

**Eruption data** 

reference for

historical data





## Disaster Risk Reduction (Landslide Hazard)

Updated 10 October 2023

### **Overall Strategies**

### a. Human Resource

- Training human resource in the analysis of multi-natural hazard mapping and modeling for seismic and hydro-geologic hazards.
- Increase and availability of experts.
- Capacity Building and Training for stakeholders and beneficiaries.
- Partnership with LGUs for community-based warnings
- Trained human resource on integrating tsunami hazard information in DRR plans at the local levels

### b. R&D Technologies

- Maintenance and updating of data platforms.
- Establishment of accurate and precise early warning systems for multi-natural hazards.
- Updating Vulnerability and Risk Maps.
- Operationalization of outputs from the stakeholders by the mandated agencies.

### c. Facilities and Services

 Establishment of GIS and remote sensing processing laboratories for big data analytics.

### d. S&T Policies

 Dialogue and coordination with LGUs and policy-makers for concrete applications.

### **POSSIBLE SOLUTIONS**

### 50M

- Landslide thresholds based on different Lithological Types
- Rainfall threshold analysis for landslide hazard mapping and modelling for various geological and geomorphologic

various
geological and
geomorphologic
al conditions

2022

geological and geotechnical based research on slope failure mechanism Nationwide Exposure Database for Landslides

30M

and

Satellite

Based

and

· Radar-Based

Flashfloods

Landslides

Forecasting

Flashfloods

Engineering

30M

Centralized
 Operational
 Landslide
 Warning
 System in the
 PH

 Landslide thresholds and models for areas with mining activities

### 25M

Lahar/
 Landslide
 Models based
 on Climate
 Maps and
 Models

50M

Nationwide

Operational

Monitoring and

Warning System

Landslide

 Preliminary Vulnerability studies (sample sites)

Landslides
Forecasting

2026
Updated VA Maps

2025
Landslide Forecasting using Alternative

2024
Landslide models for mining areas and introduction of interventions

Methods

 Nationwide rain-induced and earthquakeinduced landslide thresholds database

• Landslide models in different typological substrates/ types

Operational monitoring networks for landslide forecasting

**MILESTONES** 

35M

Leaend

2027

National

Monitoring

Systems

updated by

mandated

agencies

and Warning

 Risk Assessment Maps for Landslide-prone Areas

**New/ Ongoing** 

 Communitybased Risk communication, capacity building and preparedness

VISION

Readily- accessible maps and models for most vulnerable and high-risk areas capable of early detection and warning for landslides

**Target** 

Updated RA Maps

Completed

 Effective Risk Communication, Capacity building and preparedness for Communities

### **Overall Outcomes**

### a. Human Resource

2028

 Trained human resource on tsunami processing and analysis.

### b. R&D Technologies

- High-resolution tsunami maps and models
- Low-cost and Locally-developed instrumentation for early warning

### c. Facilities/Services

- Laboratories for data processing tsunami maps and models.
- Establishment of platform for information and dissemination, communication plan and other tools for communication

### d. S&T Policies

 Policy recommendation to LGUs in tsunamiprone areas and PHIVOLCS as the mandated agency.

## 2021

10M

Updated

landslide

inventory of

earthquake-

induced and

rain-induced

landslide

forecasting

Landslide models incorporated in the existing activities of DENR- MGB

Republic of the Philippines
DEPARTMENT OF SCIENCE AND TECHNOLOGY
PHILIPPINE COUNCIL FOR INDUSTRY, ENERGY AND
EMERGING TECHNOLOGY RESEARCH AND DEVELOPMENT

Updating of landslide

maps and models

10M

OneDOST4U



D <sup>0</sup> D Tachnologica	Droiget Title		Status						
R&D Technologies	Project Title	2022	2023	2024	2025	2026	2027	2028	Status
Operational monitoring networks for landslide forecasting and Landslide models incorporated in the existing activities of DENR- MGB	Simulating Catastrophic Rainfall- triggered landslides and related sedimentation in the Phillipines (SCaRP)	4,910	5,071						Completed
Nationwide rain-induced and earthquake-induced landslide thresholds database and Landslide models in different typological substrates/ types	Landslide Investigations for Geohazards Preparedness and Timely Advisories in the Philippines (LIGTAS)	4,981							Ongoing
Landslide Forecasting using Alternative Methods	Deterministic Ground Shaking and Earthquake-Induced Landslide Hazard Modeling Using Geophysics, Remote Sensing, and Artificial Intelligence		17,078	16,646					Ongoing
	Landslide Investigations for Geohazards preparedness and Timely Advisories in the Philippines: Advanced Geospatial Approaches for DRRM(LIGTAS-AGAD)			16,827	11,674	11,497			New



**POSSIBLE** 

**SOLUTIONS** 

20M

Improvement

Prediction

Forecasting

for extreme

Forecasting

Assessment

and Risk

Cloud/

High-

time

resolution

Near real-

Detection/

toring for

weather

Forecasting

2022

Micro-

30M

Updating of

and models

typhoon maps

Mapping/Moni

events

· SOPs for

of the

and

### **Overall Strategies**

### a. Human Resource

- · Training human resource in the analysis of multi-natural hazard mapping and modeling for seismic and hydro-geologic hazards.
- · Increase and availability of experts.
- · Capacity Building and Training for stakeholders and beneficiaries.
- · Partnership with LGUs for community-based warnings
- · Trained human resource on integrating tsunami hazard information in DRR plans at the local levels

### b. R&D Technologies

- · Maintenance and updating of data platforms.
- · Establishment of accurate and precise early warning systems for multi-natural hazards.
- Updating Vulnerability and Risk Maps.
- Operationalization of outputs from the stakeholders by the mandated agencies.

### c. Facilities and Services

· Establishment of GIS and remote sensing processing laboratories for big data analytics.

### d. S&T Policies

· Dialogue and coordination with LGUs and policy-makers for concrete applications.

· Application of predictive analytics on magnitude TC rapid intensification

150M

Artificial (AI)

Intelligence

in Weather

Forecasting

for Tropical

Storm surge

forecasting

using wind

and wave

current for

the country

surge models

Automation

of storm

Cyclones

- Nationwide Intensity **Forecast** Guidance of **Tropical** Thunderstorms and Tropical
- Impact-Based Cyclones Ocean Forecast System for Marine Activities and related Thunderstorm Disasters e.g.
  - Ship Route Gale warning Visualization Bow Echo
  - Detection for Tornado Warning

2023 and warning system Modeling for rapid intensification and

## intensity forecasting for PAR

2024

- · Storm surge forecasting using wind, wave current and other parameters in open sea setting
- Multi-hazard Impact-based Forecasting
- Database for Storm Surge, Lightning and Thunderstorms and Severe Wind Models and Risk Assessment

Working and accurate

storm surge detection

• Severe Wind Maps and Models (nationwide), Vulnerability Curves for Severe Wind Exposure of Different Building Types, Exposure Database and Risk Assessment for Cebu City

### 150M

- · Development of Multi-**Model Prediction** System
- Application of Model Output Statistics (MOS) in NWP forecast Application of
  - Development of **NOWCASTING System** for the Philippines
  - High-resolution Data Assimilation and Ensemble forecasting system- Ensemble **Prediction System** (EPS)
  - Establishment of ocean forecast system including ocean literacy programs

2025

Updated

in PAR

Visualization of TCs

**MILESTONES** 

### 150M

- Typhoon Structure/Wind Radii/Intensity Change Modelling and forecasting
- Development of tornado detection system
- Weather Modification Research

2027

2026 Intensity level short term forecast for TCs in PAR

150M

Impact-based

Forecasting and

Risk Assessment

Risk Assessment for the rest of the country at municipality/city

Impact-based

### 50M

Leaend

· Vulnerability and Risk Assessment Maps for Tropical Cyclone-prone Areas

**New/ Ongoing** 

· Community-based Risk communication. capacity building and preparedness

### VISION

Readily- accessible maps and models for most vulnerable and high- risk areas capable of early detection and warning for tropical cyclones

**Target** 

Updated VA and RA Maps

Completed

Effective Risk Communication, Capacity building and preparedness for Communities

### **Overall Outcomes**

### a. Human Resource

2028

 Trained human resource on tsunami processing and analysis.

### b. R&D Technologies

- · High-resolution tsunami maps and models
- · Low-cost and Locally-developed instrumentation for early warning

### c. Facilities/Services

- Laboratories for data processing tsunami maps and models.
- · Establishment of platform for information and dissemination, communication plan and other tools for communication

### d. S&T Policies

· Policy recommendation to LGUs in tsunamiprone areas and PHIVOLCS as the mandated agency.







DOD To along logica	Due in at Title		Chatria						
R&D Technologies	Project Title	2022	2023	2024	2025	2026	2027	2028	Status
Cloud/Thunderstorm High-resolution Near real-time	A Dispersive Long-Wave Model for Predicting Coastal Flooding due to Storm Surges and Surface Waves in Manila Bay								Completed
Detection/Mapping/Monitoring for Micro-weather Forecasting	Understanding Lightning and Thunderstorms for Extreme Weather Monitoring and Information Sharing (ULAT)	15,625							Completed
Severe Wind Maps and Models, Vulnerability Curves for Severe Wind Exposure of Different Building Types, Exposure Database and Risk Assessment for Cebu City	Severe Wind Hazard and Risk Assessment for Cebu City								Completed
Multi-hazard Impact-based Forecasting	Weather and Climate Science for Service Partnership for South-East Asia: Building a Safer Community to Weather and Climate Variability through Science and Innovation	6,034							Completed
Improvement of the Prediction and Forecasting for extreme events	Scaling Up Climate Information Services for Societal Benefits (CLIM' UP)								Ongoing
Application of predictive analytics on magnitude TC rapid intensification	T i iliappinoonito onaraotonotioo, impaoto ana rataro		3,233	1,765					Ongoing
Nationwide Intensity Forecast Guidance of Tropical Thunderstorms and Tropical Cyclones	Advancing scientific and technical capabilities in support to economic development through the improvement of forecast capability on weather, marine meteorology and short-range climate (IFC-WMMSRC)	11,210	11,206						Ongoing
Ocean Forecast System for Marine Activities and related Disasters e.g. Ship Route Gale warning Visualization	Establishment of Seamless Prediction Capability on Typhoon, Marine Meteorology and Short-Range Climate (MECO-TECO VOTE Phase III)			14,922	12,686	12,381			New





### **Overall Strategies**

### a. Human Resource

- · Training human resource in the analysis of multi-natural hazard mapping and modeling for seismic and hydro-geologic hazards.
- · Increase and availability of experts.
- · Capacity Building and Training for stakeholders and beneficiaries.
- · Partnership with LGUs for community-based warnings
- · Trained human resource on integrating tsunami hazard information in DRR plans at the local levels

### b. R&D Technologies

- · Maintenance and updating of data platforms.
- · Establishment of accurate and precise early warning systems for multi-natural hazards.
- · Updating Vulnerability and Risk Maps.
- Operationalization of outputs from the stakeholders by the mandated agencies.

### c. Facilities and Services

· Establishment of GIS and remote sensing processing laboratories for big data analytics.

### d. S&T Policies

· Dialogue and coordination with LGUs and policy-makers for concrete applications.

### POSSIBLE SOLUTIONS

### 40M

- Intelligent storm drain/canal sensors and/or systems
- Street level/ barangay level/ community level nearreal time river monitoring and early warning system for all rivers nationwide
- Municipality / City Level Early Warning **Forecasting** for Floods

20M Updating of flood maps and models

2022

30M

Community

or Barangay

Level Near-

Forecasting

Vulnerable

subsidence

Urban/river

flooding

real time

Flood

Areas

Land

for

Automated collection of data from storm drains and canals

2021 Flood monitoring systems (river inputs and heavy rains) and community-based EWS

### 25M

Flood

Early

using

Warning

Advance

(Radar,

**Technology** 

Resolution

Modelling

and others)

Convective

Modelling

Ensembled

Scale

and

- Forecasting & Advanced Space Technology for Real-Time Flood Monitorina: Internet of Things (IoT) Approach and Cloud Satellite, High Computing in Flood Forecasting Sedimentological
  - and geomorphological approach in flood hazard models: Identifying recurrence pattern using direct evidence
- Forecasting Nationwide Exposure Database for **Landslides** 
  - 2024

Floods and heavy rains Forecasting using **Alternative Methods** 

2023 Repository of Locationbased land subsidence

and river flood reports

## **MILESTONES**

2025

25M

Strengthening

Nowcasting of

Thunderstorm

Rainfall (Radar,

and Heavy

QPE, QPF,

MCS)

Recurrence patterns

and introduction of

interventions

### 20M

 Flood Vulnerability and Risk Assessments for critical Coastal Areas

Land subsidence

## 2027

Legend

**New/ Ongoing** 

Vulnerability and

Risk Assessment

Studies for Urban

Community-based

communication,

capacity building

and preparedness

prone Areas

Risk

and River Flooding-

Nationwide

50M

2026 Urban flood maps and models with means of validation/ verification

· Vulnerability and Risk Maps for Land subsidence and urban/river flooding

maps and models for highly Vulnerable and High-Risk Areas for Floods and Heavy Rains

Updated

### VISION

Readily- accessible maps and models for most vulnerable and high- risk areas capable of early detection and warning for floods and heavy rain

**Target** 

Communication, Capacity building and preparedness for Communities

Completed

### **Overall Outcomes**

### a. Human Resource

2028

 Trained human resource on tsunami processing and analysis.

### b. R&D Technologies

- High-resolution tsunami maps and models
- · Low-cost and Locally-developed instrumentation for early warning

### c. Facilities/Services

- Laboratories for data processing tsunami maps and models.
- · Establishment of platform for information and dissemination, communication plan and other tools for communication

### d. S&T Policies

· Policy recommendation to LGUs in tsunamiprone areas and PHIVOLCS as the mandated agency.





R&D Technologies	Project Title	2022	2023	2024	2025	2026	2027	2028	Status
Urban/river flooding	Croset Cities Colution to Links								
Intelligent storm drain/canal sensors and/or systems	Smart Cities Solution to Urban Flooding (SMART Turf) Program	14,411							Ongoing
Strengthening Nowcasting of Thunderstorm and Heavy Rainfall (Radar, QPE, QPF, MCS)	Establishment of Seamless Prediction Capability on Typhoon, Marine Meteorology and Short- Range Climate			14,990	12,559	12,240			New



## Climate Change Adaptation (Climate Change-Related Hazards)

**POSSIBLE** 

**SOLUTIONS** 

20M

and

the

Means of

Verification

projections

for coastal

projections

2022

flooding

### **Updated 5 December 2023**

### **Overall Strategies**

### a. Human Resource

- Training human resource in the analysis of multi-natural hazard mapping and modeling for seismic and hydro-geologic hazards.
- · Increase and availability of experts.
- · Capacity Building and Training for stakeholders and beneficiaries.
- · Partnership with LGUs for community-based warnings
- Trained human resource on integrating tsunami hazard information in DRR plans at the local levels

### b. R&D Technologies

- · Maintenance and updating of data platforms.
- · Establishment of accurate and precise early warning systems for multi-natural hazards.
- Updating Vulnerability and Risk Maps.
- Operationalization of outputs from the stakeholders by the mandated agencies.

### c. Facilities and Services

· Establishment of GIS and remote sensing processing laboratories for big data analytics.

### d. S&T Policies

### 50M

- Thermal and environmentalrelated land-use scenarios
- Impact- Land subsidence due to based Forecasting for Severe · Impacts of climate Wind. Heavy Rains, Flooding, Landslides, and Storm
- Mapping, m odeling/proj ections and instrumenta tion for extreme phenomena validation of

Surge

- Green spaces in major urban
- Impact & Risk Assessment for other sectors
- Subsidence hazards -Engineering geology and geotechnical applications and monitoring system for karst subsidence

· Sectoral impacts and

risk assessment of

possible changes in

rainfall, temperature,

wind, humidity, and

other meteorological

**Ensembled Forecasting** 

change-driven droughts

development of related

and extreme rainfall

Convective Scale

anthropogenic and

Modelling and

natural ground

deformation

events in the

hazards

elements

### 100M

- centers
- using climate projections

Multi-scale monitoring and prediction of climate extremes

## 15M

2026

Public Use

## 100M

Legend

 User Interface · platforms (UIPs) for

Services

Sectors

Information Systems for

Communicating Weather, Flood, and Climate Risks

· Socio-Economic Valuation of

· Loss and Damage related to

· Climate Change Scenarios:

Provinces in the Philippines

· Impact-based forecasting of

Matching Tool (ERMaT)

Operational climate Impact

and Risk Assessment for

agriculture, water, and health

generation technologies for

drought monitoring and

impact- based forecasting

2027

Climate Change events

Top Most Vulnerable

El Nino -induced

drought/ENSO Risk

· Development of next

Meteorological Products and

Space Weather Monitoring System

**New/ Ongoing** 

- Common Monitoring and **Evaluation of Climate** Actions in the Philippines
- Nationwide Vulnerability and Risk Assessment Studies for Extreme Weather Phenomena. Temperature Extremes or Sea Level Rise/Flooding
- Community-based Risk communication, capacity building and preparedness

### VISION

Readily- accessible maps and models for most vulnerable and high- risk areas capable of early detection and warning for climate change-related hazards

**Target** 

- Areas with RA studies for tsunami
- Communication, Capacity building and preparedness for Communities

Climate Change Data for Updated Database and the most vulnerable in PAR

2028

**Overall Outcomes** 

Completed

### a. Human Resource

 Trained human resource on tsunami processing and analysis.

### b. R&D Technologies

- · High-resolution tsunami maps and models
- Low-cost and Locally-developed instrumentation for early warning

### c. Facilities/Services

- · Laboratories for data processing tsunami maps and models.
- Establishment of platform for information and dissemination, communication plan and other tools for communication

### d. S&T Policies

 Policy recommendation to LGUs in tsunami-prone areas and PHIVOLCS as the mandated agency.

## 2024

2023

Sectoral Impacts of Climate Changerelated effects

**MILESTONES** 

interventions

Recurrence patterns

and introduction of

2025

Field-validated thermal and environmental-related land-use scenarios

 Developed low-cost and local instruments/sensors for extreme phenomena

Field validated values for Coastal Flooding, Land Surface Temperatures, Urban Heat Island and Micro-climate projections

2021 Database/repository of Coastal Flooding, Land Surface Temperatures, Urban Heat Island, Micro-climate

· Dialogue and coordination with LGUs and policy-makers for concrete applications.

ensemble models and projections with the Philippine Area of Responsibility (PAR) as the domain



30M

Coastal

rise (in

meters)

flooding

projections

from sea-level

Land Surface

**Urban Heat** 

Island and

Micro-

Temperatures,

climate ensem

ble model and

projections

OneDOST4U



R&D Technologies	Project Title	2022	2023	2024	2025	2026	2027	2028	Status	
Thermal and environmental- related land-use scenarios  Mapping, modeling/projections a nd instrumentation for extreme phenomena	Survey of Heatwaves in the Philippine Seas (SHIPS)  Providing High Resolution (5km) Climate Change Projections in Philippines using WRF	2,868	2,912						Ongoing Completed	
Impact-based Forecasting for Severe Wind, Heavy Rains,	Weather and Climate Science for Service Partnership for South-East Asia: Building a Safer Community to Weather and Climate Variability through Science and Innovation	6,034							Completed	

