



DEPARTMENT OF SCIENCE & TECHNOLOGY
Philippine Atmospheric, Geophysical &
Astronomical Services Administration

2017 ANNUAL REPORT



The Weather and Climate Authority

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CITIZEN'S CHARTER

I. Mandate/Mission/Vision/Values/Functions

1. Mandate

Provide adequate, up-to-date data, and timely information on atmospheric, astronomical and other weather-related phenomena using the advances achieved in the realm of science to help government and the people prepare for calamities caused by typhoons, floods, landslides, storm surges, extreme climatic events, and climate change, among others, to afford greater protection to the people.

Provide science and technology-based assessments pertinent to decision-making in relevant areas of concern such as in disaster risk reduction, climate change adaptation and integrated water resources management, as well as capacity building.

Ensure that the country fulfills its commitments to international meteorological and climate change agreements.

2. Mission

We deliver reliable and relevant weather-related information, products and services to develop communities resilient to typhoons, floods, rain-induced landslides, storm surges, extreme climatic events, climate change and astronomical hazards.

3. Vision

The Center of Excellence for weather-related information and services helping develop a disaster and climate-resilient nation.

4. Values

Spirituality

Patriotism

Integrity

Innovation

Commitment

Excellence

5. Functions

- Maintains a nationwide network pertaining to observation and forecasting of weather and flood and other conditions affecting national safety, welfare and economy;

- 58 Synoptic Stations
- 24 Agromet Stations
- 11 Upper-air Stations
- 12 Radar Stations

- 2 sets High Frequency Doppler Radar (HFDR)
 - 3 Automated Observing System (AWOS)
 - 83 Automatic Weather Stations (AWS)
 - 87 Automatic Rain Gauge (ARG)
 - 1 Wind Profiler
 - 43 Climat/Rain Stations
- Undertake activities relative to observation, collection, assessment and processing of atmospheric and allied data for the benefit of agriculture, commerce and industry;
 - Engage in studies of geophysical and astronomical phenomena essential to the safety and welfare of the people;
 - Undertake researches on the structure, development and motion of typhoons and formulate measures for their moderation; and
 - Maintain effective linkages with scientific organizations here and abroad and promote exchange of scientific information and cooperation among personnel engaged in atmospheric, geophysical, astronomical and space studies.

II. Performance Pledge and Feedback and Redress Mechanisms:

1. Performance Pledge

We, the professional and dedicated officials and employees of the Philippine Atmospheric, Geophysical and Astronomical Services Administration (PAGASA), commit to:

Provide service promptly, efficiently and with utmost courtesy by authorized personnel with proper identification from Mondays to Fridays. 8:00 AM to 5:00 PM, without noon break; for Administration support and other similar services and **24/7 whole year round for forecasting services,**

Adhere to strict compliance with service standards, with written explanation for any delays in the services we offered;

Give timely response to complaint about our services the soonest and take corrective measures accordingly;

Assure that every client's comments, suggestions and needs are given importance.

Satisfy our customers' needs by acting on their feedback and informing them of any developments first hand;

Allow the public access to information on our programs, activities and services through our website (www.pagasa.dost.gov.ph**) or through SMS, and our hotline 434-RAIN (7246), 927-1335 and 434-2696, FOLLOW US ON TWITTER @dost-pagasa, <https://twitter.com/dost-pagasa>. LIKE US ON FACEBOOK DOST_pagasa <https://www.facebook.com/PAGASA.DOST.GOV.PH>**

Above all, we pledge to serve everyone with utmost honesty, dedication, respect and understanding, for we believe that in so doing, we are also serving and honoring our country and God Almighty.

2. Feedback and Redress Mechanisms

Please let us know how we have served you by:

- a. Accomplishing our Feedback Form available at the lobby and put in the drop box located at the front desk or give to the employee of the division concerned.
- b. Sending your feedback through our website (**www.pagasa.dost.gov.ph**) or call our hotline 434-RAIN (7246), 927-1335 and 434-2696, FOLLOW US ON TWITTER @dost-pagasa, <https://twitter.com/dost-pagasa>. LIKE US ON FACEBOOK DOST_pagasa <https://www.facebook.com/PAGASA.DOST.GOV.PH>

Your written/verbal complaints shall immediately be attended to.

Thank you for helping us improve our services.

SERVICE STANDARDS

I. Processed Data (Daily Summaries, rainfall maps, etc.)

Who May Avail of the Services : General Public

Fees : Minimum of P1,000 weather certificate first 3 pages

: Php 36.00/yr/parameter for monthly data

: Php 360.00/yr/parameter for daily data

How to Avail of the Services

Step	Client/Customer	Activity	Maximum Duration	Person In Charge
1	Register with the guard and seek the assistance of the personnel from the Section concerned.	Attend to the inquiries/needs of the client	30 minutes	Guard/Personnel from Section Concerned
2	A written request from the party. Fill out required form.	Inquire from climate databank the availability of the data	30 minutes	Personnel from the Section concerned
3	Pay at the Cashier	Process the request and the customer of the appropriate charges by preparing the Order of Payment	30 minutes	Personnel from the Section concerned
4	Execute conforme that data is to be used only for specified purpose.	Release data/maps to client upon presentation of receipt	15 minutes	Personnel from the Section concerned
5	Accomplish Feedback Form	Solicit client's appraisal of services provided	15 minutes	Personnel from the Section concerned

II. Other Services (Calibration, Planetarium Services)

Who May Avail of the Services : General Public

Fees : Minimum of P510 depending on the instrument calibrated

: P25 per person for planetarium services

How to Avail of the Services

Step	Client/Customer	Service Provider	Maximum Duration	Person In Charge
1	Register with the guard and seek the assistance of the personnel from the Section concerned.	Attend to the inquiries/needs of the client	30 minutes	Guard/Personnel from Section Concerned
2	A written request from the party. Fill out required form	Consult with the Division in charge of the desired services	30 minutes	Personnel from the Section concerned
3	Conform with the arrangements discussed.	Discuss and finalize arrangement like fees, date services can be provided, the equipment and services needed, etc.	1 hour	Personnel from the Section concerned
4	Pay the Charges at the Cashier.	Provide the services agreed upon	1 - 2 hours	Personnel from the Section concerned
5	Accomplish Feedback Form	Solicit client's appraisal of services provided	5 minutes	Personnel from the Section concerned

III. For weather forecast/reports/updates proceed to Weather Division at WFFC Building located a few meters from the PAGASA Main Office

MESSAGE FROM THE **DOST SECRETARY**

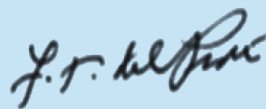
I would like to extend my warmest congratulations to the Philippine Atmospheric, Geophysical and Astronomical Services Administration (PAGASA) for its outstanding performance throughout the year.

The consistent improvement in its services resulting from the intense desire of its workforce to contribute something great to the progress of the nation truly deserves recognition and respect, not only from our countrymen but also from relevant international organizations and communities. PAGASA owes this phenomenal turnaround to the support given by the national government that has bestowed trust and confidence to the competence and capabilities of PAGASA's men and women. In return, service is rendered with the sincerest effort to serve the country and the public. The investment made by the government in terms of modernizing facilities and accelerating human resource development is evidently paying off.

The approval of the Implementing Rules and Regulations of Republic Act No. 10692 otherwise known as the PAGASA Modernization Act of 2015 before the year ended is expected to bring PAGASA to the level of a world class hydro meteorological services organization.

I would like to reiterate my continued support to the future undertakings of PAGASA as I affirm my trust and confidence in the organization.

Congratulations and Mabuhay!



FORTUNATO T. DE LA PEÑA



REPORT OF THE **PAGASA ADMINISTRATOR**

Before the year 2017 ended, the Implementing Rules and Regulation (IRR) of Republic Act 10692, otherwise known as the PAGASA Modernization Act of 2015, was jointly issued by the Department of Science and Technology (DOST), PAGASA and Department of Budget and Management (DBM). This is a milestone in the history of PAGASA paving the way for the realization of the weathermen's dream to make the agency at par with the more advanced international meteorological agencies.

This welcome development is a confirmation of the trust and confidence placed by higher government authorities on the competence and capabilities of the PAGASA to provide effective and efficient weather service.

Before the approval of the said IRR, the Agency has completed various programs and projects expected to help the smooth implementation of R.A. 10692. Foremost among these is the Doppler Weather Radar Program which includes the completion of the Zamboanga Doppler Radar Station.

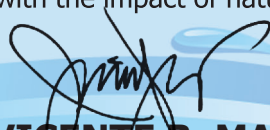
Likewise, the Grant-in-Aid Radars from JICA have been formally turned over to PAGASA including the Aparri and Guiuan radars. In addition, the rehabilitation works on the Busuanga and Daet radars are now in full swing which are expected to be completed as scheduled. High Frequency Doppler Radars (HFDR) have also been



installed in strategic coastal areas throughout the country. All of these would greatly help attain the near perfect target accuracy in weather forecasting and severe weather warnings.

In the area of flood forecasting, two flood forecasting and warning centers were recently completed in flood prone areas in Mindanao. These are the Kabangkalan River Basin Flood Forecasting Center and the Agusan Del Sur River Basin Warning Center. The population in these flood-risk communities is now assured of early warning advisories from PAGASA to mitigate disasters due to floods. Relative to this, the agency conducted a series of Information and Education Campaign (IEC) on flood forecasting as well as a number of flood drills in various pilot areas.

With the virtual implementation of the PAGASA Modernization Act of 2015, the country is much assured of the provision of adequate and timely forecasts to cope with the impact of natural disasters caused by hydro-meteorological disasters in the coming days.



VICENTE B. MALANO

SUMMARY

2017 is considered another challenging year for PAGASA because of the occurrence of 22 Tropical Cyclones (TCs) that entered the Philippine Area of Responsibility (PAR), with four (4) TCs categorized as Typhoon (TY), five (5) Severe Tropical Storms (STS), eight (8) Tropical Storms (TS) and five (5) Tropical Depressions (TD). Nine (9) of these TCs had made landfall. These TCs enhanced the monsoons (Southwest and Northeast) that brought significant rainfall which caused flooding and landslides in affected areas during their passage.

Also, the El Niño Southern Oscillation (ENSO) neutral conditions in the Tropical Pacific Ocean were observed in the first half of 2017 with a slight probability forecast for El Niño (EN) to develop in the 2nd quarter of the year due to observed warmer than average Sea Surface Temperature (SSTs). However, during the 2nd half of the year, the EN development diminished and La Niña developed in the later part of the year. The cool conditions were closely monitored because it consistently evolved until the last quarter of the year. A La Niña watch was first issued in October 2017 and the first La Niña advisory was issued in December 2017 to inform that La Niña conditions were already observed in the Tropical Pacific which was also predicted to continue in 2018.

As the demand for more accurate, timely and reliable weather and climate information increases, the enactment of the PAGASA Modernization Act of 2015 is very timely as it aims to fully equip the Agency to meet these growing demands. Significant to its implementation, was the signing of the IRR by DOST, PAGASA and DBM after series of deliberations and several public consultations conducted. The Agency is also working on the finalization of the PAGASA Modernization Program (PMP).

Relative to modernizing the Agency's resources is its continuous acquisition and installation of six (6) more Doppler Radars in strategic locations nationwide including the restoration of the Baler Doppler Radar Station. PAGASA also has three (3) mobile X-Band Radars deployed in Central Office in Quezon City, Baler and El Salvador. Also, the establishment of Flood Forecasting and Warning Systems (FFWSs) contributes to the further improvement of the Agency's other significant service which is the issuance of flood bulletins. Aside from the existing operational FFWSs in Pampanga, Agno, Bicol, Cagayan and Pasig-Marikina, two (2) more operational FFWSs located in Tagum-Libuganon River Basin and Cagayan de Oro River Basin are being utilized by the Agency.

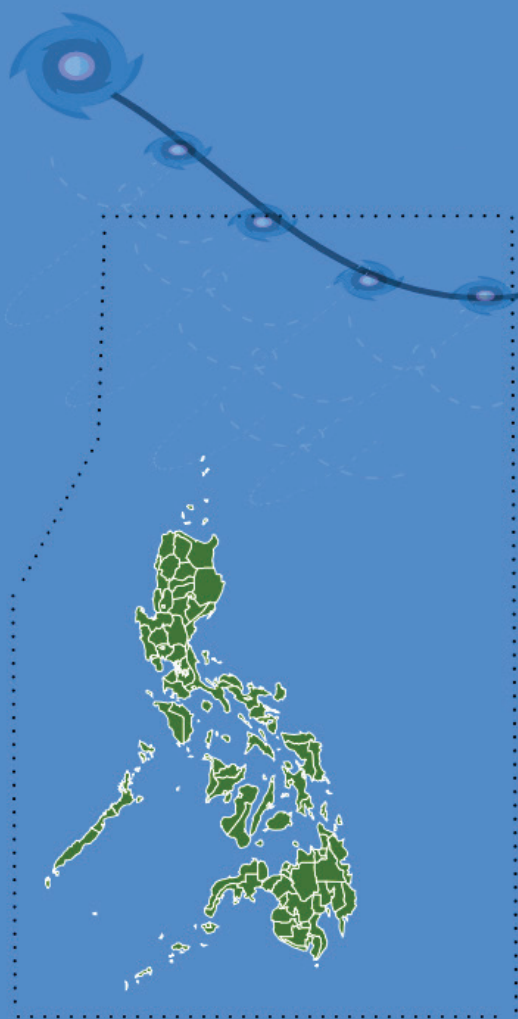
PAGASA is also working on completing 11 more FFWSs in selected River Basins. Some other vital equipment that the Agency has acquired in order to deliver its various services were Automatic Weather Stations (AWS), HFDRs, Unmanned Sea Surface Vessel, Drones, Mobile Planetarium, Philippine Standard Time (PST) Clocks and Solar Telescopes.

PAGASA's essential role in the DOST's 11 areas/strategies in the Research and Development Agenda, more specifically, in the Climate Change and Disaster Risk Reduction, is monumental. Thus, the network and monitoring stations established in strategic locations all over the archipelago, in accordance with established criteria and technical standards, play a critical role in the delivery of PAGASA's services. These networks and monitoring stations include 58 Synoptic Stations, 24 Agromet Stations, 11 Upper Air Stations, 12 Operational Doppler Radar Stations, seven (7) Flood Forecasting and Warning Centers, two (2) sets of High Frequency Doppler Radars, three (3) Automated Observing System (AWOS), 83 Automatic Weather Stations (AWS), 87 Automatic Rain Gauges (ARGs), one (1) Wind Profiler, and 43 Climat/Rain Stations.

These observing networks/stations supported by capacity building activities have contributed to the effective delivery of the following major products and services of the Agency:

The Weather and Climate Authority

2017 PAGASA



WEATHER

- **731** Public Weather Forecasts
- **730** Shipping Forecasts twice
- **299** Gale Warnings/Advisories



TROPICAL CYCLONE

- **174** Advisories
- **268** Severe Weather Bulletins
- **224** International Warnings
- **1,849** Sigmet Information



FLOOD

- **4,463** General Flood Advisories for the non-telemetered river basins
- **115** Flood Bulletins for the telemetered Pampanga, Agno, Bicol and Cagayan (PABC) river basins



CLIMATE

- **11** National Climate Outlook Forum with **884** participants
- **10** Provincial Climate Forum with **1,086** participants



AGRI-WEATHER

- **365** Daily Farm Weather Forecasts and Advisories (FWFA) to **239,580** recipients
- **7,776** copies of 10-day Weather Agro-Climatic Review and Outlook
- **9** Monthly Assessment and Outlook & **2** Seasonal Climate Outlook



TRAININGS

- **12** Technical in-house training courses with **333** participants
- **17** Non-technical in-house training courses with **396** participants

The provision of weather, climate, flood, and other related information in a holistic perspective is a commitment that the Agency adheres to including the challenges it entails. PAGASA's dedication to serve the entire Filipino people will be effectively achieved with the continuous support and coordination by the different sectors, academes, Local Government Units (LGUs), other National Government Agencies (NGAs), international partners and donors and most importantly, the public.

HIGHLIGHT OF ACCOMPLISHMENTS

IMPROVEMENT OF PHYSICAL RESOURCES AND OPERATIONAL TECHNIQUES

Establishment/Acquisition and Repair/Rehabilitation of Various Observation Networks

- **Doppler Radars**



Construction of Busuanga Radar Building and its Access Road



Construction of Daet Doppler Weather Radar Building

Doppler Radar undeniably is one of the most reliable equipment being used by PAGASA in weather monitoring and forecasting. It measures the direction and speed, or velocity, of objects such as drops of precipitation. It commonly has

state-of-the-art antenna system that is capable of different scanning strategies to identify horizontal and vertical extent and properties of rain clouds. It is also equipped with fast data processing system that provides appropriate

product displays for severe forecasting decision support.

To date, the country has 12 operational Doppler Radars strategically located in Subic, Tagaytay, Mactan, Hinatuan, Iloilo, Tampakan, Quezon in Palawan, Zamboanga, Aparri, Virac, Guiuan, and Baguio.

PAGASA is looking forward to establishing Doppler Radar Stations in Busuanga, Daet, Agno, Bohol, Laoang, Masbate to cover the entire country including the restoration of the Baler Doppler Radar Station.

In addition, the Agency acquired three (3) Mobile X-Band Radars which were deployed in PAGASA Central Office, Baler and El Salvador in Mindanao. Furthermore, six (6) fixed X-Band Radars will soon be installed in selected river basins, particularly, in Isabela for Cagayan River Basin, Roxas City for Panay River Basin, Kabangkalan for Ilog-Hilabangan River Basin, Talakogon for Agusan River Basin, Panabo for Davao/Tagum-Libuganon River Basin and Kabacan for Mindanao River Basin.

Flood Forecasting and Warning System



Completion of Agusan del Sur River Basin Flood Forecasting and Warning Center

A FFWS is composed of hydro-meteorological monitoring facilities installed in strategic locations for real-time monitoring of rainfall and water level of a concerned river basin or watershed for flood

early warning purposes. It is designed to directly cater to the needs of the communities affected by floods through flood bulletins and warnings to be provided by the Local River Centers. It is a form of downscaling the flood warning service from the national scale to municipal scale as a way of bringing the PAGASA's services closer to the people.



Completion of Kabangkalan River Basin Flood Forecasting and Warning Center

PAGASA has seven (7) existing and operational FFWS located in Pampanga, Agno, Bicol, Cagayan, Pasig-Marikina, Tagum-Libuganon and Cagayan de Oro. PAGASA plans to establish additional FFWS in major river basins nationwide namely in Abulog, Abra, Ilog-Hilabangan, Jalaur, Panay, Agusan, Davao, Buayan Malungon, Mindanao, Agus and Tagoloan.

Automatic Weather Station (AWS)

The AWS is a monitoring station that is equipped with various sensors such as thermometer, anemometer, wind vane, hygrometer and barometer that measures different weather parameters. It can be deployed in remote areas and can operate on its own due to its solar power supply backed up by its internal rechargeable battery.

In 2017, PAGASA installed 22 AWS in 17 provinces in Luzon and five (5) in Visayas. The Agency plans to install 31 AWS in various provinces including selected provinces in Mindanao.



Completed Infrastructure Projects

The Agency has completed 14 infrastructure projects in 2017 which included construction of Busuanga and Daet Doppler Radar Buildings, Casiguran Synoptic Station building, Kabangkalan and Buayan Malungon Flood Forecasting and Warning Centers, rehabilitation of NCR-PRSD observation room and construction/improvement of other administrative-related buildings.





Construction of Daet Doppler Radar Building



Rehabilitation of perimeter fence and gate, powerhouse, storage room

Ceremonial Turnover of the JICA Grant Aid Project for the Improvement of Meteorological Radar System in the Philippines



DOST and PAGASA Officials and Guests: Dr. Rowena Cristina L. Guevara, DOST Undersecretary for R&D; Dr. Vicente B. Malano, PAGASA Administrator; Hon. Ben P. Evardone, Eastern Samar, 1st District Congressman; Prof. Fortunato T. De La Peña, DOST Secretary; Kazuhide Ishikawa, former Japan's Ambassador to the Philippines; Mr. Susumu Ito, JICA Chief Representative; Hon. Shalimar D. Tumar, Aparri Mayor and wife of Cagayan Governor Manuel N. Mamba (from left to right)

The Doppler Radar Stations of the Agency located in Virac, Guiuan and Aparri, were funded by the Government of Japan through the Official Development Assistance (ODA) under the JICA Grant Aid. These radars have state-of-the-art Doppler capabilities and solid state technology for enhanced detection features and increased coverage.

The said Grant amounted to ¥3.35B which consisted of radar equipment tower/building and display system at WFFC. The radar facilities of Aparri and Guiuan were completed in January and September 2013, respectively. Unfortunately, Guiuan Radar was destroyed during the passage of Typhoon Haiyan or locally remembered as Super Typhoon Yolanda in November 2013. However, it was rehabilitated through the "Sub-Project for Rehabilitation of Guiuan Meteorological Radar System" under the "Rehabilitation and Recovery Program for the Victims and Damages of Yolanda" funded by the Japanese Government. The total financial assistance of the whole program was ¥ 4.6B while ¥760M allotted for the rehabilitation of the Guiuan Meteorological Radar System.

Doppler Radars significantly contribute to the enhancement of the weather monitoring, forecasting and warning services of the Agency as they determine the possible rain rate of an impending weather system particularly that of TCs.



Guiuan Doppler Weather Radar Station

On 03 February 2017, PAGASA held the ceremonial turnover of the JICA Grant Aid Project at the grounds of Weather and Flood Forecasting Center (WFFC) in Quezon City. Key officials and dignitaries from the Governments of Japan and the Philippines attended the said event. Among the notable guests from Japan were former Japanese Ambassador to the Philippines, Mr. Kazuhide Ishikawa; JICA representative, Mr. Susumo Ito; and joined by other officials and experts from Japan Radio Co. Ltd. The government officials from the Philippines were led by DOST Secretary, Prof. Fortunato T. Dela Peña, DOST Undersecretary for R&D, Dr. Rowena Cristina L. Guevara, PCIEERD's Executive Director, Dr. Carlos Primo C. David, PAGASA Administrator, Dr. Vicente B. Malano and other members of the PAGASA Executive Staff.



Aparri Doppler Weather Radar Station

Others who graced the event were Hon. Ben P. Evardone, Eastern Samar, 1st District Congressman, Cagayan's Mayor, Hon. Shalimar D. Tumaru, and the wife of Governor Manuel Mamba, Atty. Mabel Villarica-Mamba. The Local Government Unit (LGU) representatives as well as from other National Government Agencies (NGAs) were also present. The members of the Media were on hand to cover the event including Mr. Nathaniel 'Mang Tani' Cruz, GMA Network resident meteorologist.

On the other hand, the Virac Doppler Radar Station was inaugurated by former President Benigno Aquino III on 02 May 2012.

Commissioning and Testing of High Frequency Doppler Radar (HFDR)

In 2015, the Marine Weather Forecasting using HFDR Project was funded by DOST-PCIEERD. It aims to strengthen the institutional capability of PAGASA in monitoring ocean hazard and in providing maritime advisory. Particularly, the project aims to install two sets of HFDR System that will aid in the collection of additional

observation data using state-of-the-art HF Radar-based signal to measure the ocean wave height, ocean surface current direction and current situation of the sea. The project will contribute in the further enhancement of the capabilities of PAGASA marine forecasters.



The HFDR Project team together with guests Brig. Dir. Padilla, Jr. and Mayor Norman Ong of Rizal, Palawan

The first set of HFDR System was installed in NETC, San Antonio, Zambales and Masinloc Power Plant in Zambales while the second set was installed in Brgy. Puntabaja, Rizal, Palawan and in Berong, Quezon, Palawan.



Brig. Dir. Padilla, Jr., Mayor Norman Ong of Rizal, Palawan and Ms. Nancy T. Lance, focal person of the HFDR Project

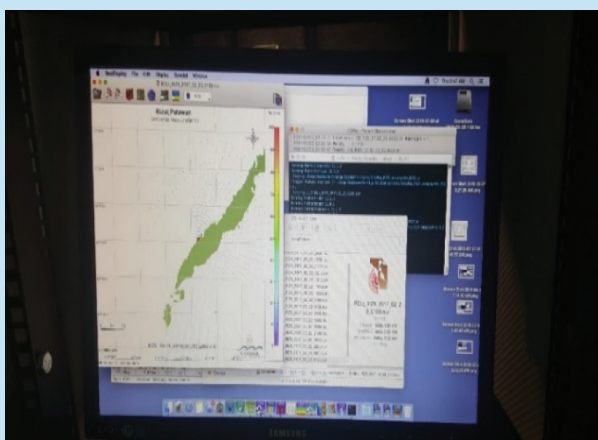


Ribbon cutting for the HFDR in Punta Baja, Palawan done by Brig. Dir. Padilla, Jr. and Mayor Norman Ong of Rizal, Palawan

On 23 February 2017, PAGASA conducted a ceremonial cutting of ribbon for the installed HFDR in Punta Baja, Palawan. The equipment will help boost the country's weather-forecasting capabilities specifically in providing shipping forecast.

The ceremonial cutting of ribbon of the HFDR project in Puntabaja, Rizal, Palawan was led by Brigadier General Restituto Padilla, Jr. of the Armed Forces of the Philippines (AFP) and Mayor Norman Ong of Rizal, Palawan.

With the full implementation of the PAGASA PMP, it is highly expected that the Agency will be able to further improve and upgrade its weather forecasting and observation facilities and capabilities specifically Marine Forecasting. The PMP includes the acquisition of additional 12 sets of HFDR that will be installed in coastal areas nationwide.



Sample data/Images from the Berong site

Inauguration of the Project, entitled "Establishment of Communication, Ocean and Meteorological Satellite (COMS) Analysis System in the Philippines"



The project was conceptualized in 2008 during the conduct of Training on COMS data by the Korea International Cooperation Agency (KOICA) and the Korea Meteorological Administration (KMA). The KMA found the project feasible for East Asian countries. Thus, a project proposal was submitted to the local KOICA office which aims to have an intensive monitoring and enhanced support of local weather forecast; develop early warning system for hazardous weather and disaster; strengthen capacity and provision of meteorological information and analysis; provide service and produce weather forecast through expansion and improvement of Meteorological infrastructure and its experts and cope with climate partnership through the acquisition of the accumulated technical and operation know-how from KOREA and share related information and research results. Subsequently, the project was approved and implemented in 2014.

The COMS, Korea's first geostationary multi-purpose satellite stationed at an altitude of 36,000 km above the Earth's equator and at a longitude of 128.2°E, performs the duties of meteorological and ocean observations and communications services. It has five (5) channels (one (1) visible and Four (4) infrared) which generate 16 types of analysis data used in weather forecasting and numerical weather prediction.



The COMS Satellite Receiving System is based at the PAGASA Central Office with four (4) local workstations located at the PAGASA Regional Services Division (PRSD) in Northern Luzon, Southern Luzon, Visayas and Mindanao.

The project was completed in March 2016 and inaugurated on 17 May 2017 at the Broadcasting Room of the WFFC, PAGASA.

The ceremonial unveiling of the project marker was the highlight of the event which was attended by key officials of PAGASA, led by Dr. Vicente B. Malano and officials of KOICA Philippines, headed by the Country Director, Mr. SHIN Myung Seop, who gave the keynote speech. The officials of Soletop and Weather PIA were also present to witness the event. Other attendees were Undersecretary Ricardo Jalad, Executive Director of the NDRRMC, and other media personnel.

A Press conference was held at the WFFC Media Room after the inaugural program.

Project Launch and Ceremonial Groundbreaking of the Rehabilitation of Equipment for the Project to strengthen Flood Forecasting and Warning System (FFWS) in the Bicol River Basin

The BRBFFWC Project funded by the Japanese Government through the Japan International Cooperation System (JICS) aims to minimize flood-related disasters in Bicol through effective flood forecasting and warning which is an effective measure that complements the structural flood



DOST and PAGASA Officials with Honorable Guests: PAGASA HMD Chief, Engr. Roy A. Badilla; Dep. Administrator for O&S, Dr. Landrico U. Dalida, Jr.; Second Secretary of the Embassy of Japan, Mr. Shintaro Ichiki; DOST Secretary, Prof. Fortunato T. De La Peña; Gov. Miguel Luiz Villafuerte of Camarines Sur; Japanese Embassy's Minister Takehiro Kano, PAGASA Administrator, Dr. Vicente B. Malano, Albay Public Safety and Emergency Management Representative, Mr. Jake Nuñez (from left to right)

mitigation program of the Philippines. This project is included in the Programme for the Improvement of Capabilities to Cope with Natural Disasters caused by Climate Change.

The project will upgrade/rehabilitate the structures and equipment of the existing Flood Forecasting and Warning System in the Bicol River Basin as the existing structure is already outdated. The upgraded structure will enable observations to be regulated in hourly basis during the event of an impending weather disturbance such as TCs. The observed data together with the forecast rainfall from PAGASA will be analyzed for further issuance of flood warnings.

The Project had its official launching at CamSur Watersports Complex in Pili, Camarines Sur and ceremonial groundbreaking at Central Bicol State University on December 9, 2017 with no less than the DOST Secretary Fortunato T. De La Peña and Minister Takehiro Kano, Deputy Chief of Mission and Head of Political Section of the Embassy of Japan as the Guests of Honor.

The said activity was also attended by the Honorable Miguel Luis R. Villafuerte, Governor, Province of Camarines Sur, Mr. Shintaro Ichiki, Second Secretary for Infrastructure, Economic Section of the Embassy of Japan, Dr. Georgina J. Bordado, President, Central Bicol State University for Agriculture (CBSUA), Mr. Jukes Nuñez, Asst.



Ceremonial Groundbreaking: Engr. Eufonio Garcia, Engr. Roy A. Badiilla, Dr. Landrico U. Dalida, Jr., Dr. Georgina J. Bordado, President of the Central Bicol State University of Agriculture (CBSUA), Secretary Fortunato T. de la Peña, Mr. Takahiro Kano-EOJ, Mr. Shintaro Ichiki-EOJ, Dr. Vicente B. Malano (left-right)



Ceremonial switching of stations to be rehabilitated

Head of Albay Public Safety and Emergency Management Office (APSEMO) representing Gov. Al Francis Bichara of the Province of Albay, Mayor Margarita N. Aguinillo, Municipality of Buhi and the different Local Disaster Risk Reduction and Management Officers (LDDRMOS) where a station will be constructed, members of the top management of CBSUA, Ms. Marghieth Garcia, representative from the Crown Agents (the Procurement Agent for the Project), Project Consultant Team headed by Mr. Yasushi Azuma, Project Contractors Team from Kanematsu, Japan Radio Co., Ltd. (Main Manufacturer), Takashio Power International Corp., representatives from the Department of Finance, International Finance Group (DOF-IFG) and regional offices within the Bicol Region. The event was covered by both national and local media.

The success of the event was made possible thru the unselfish support of the LGUs of Camarines Sur from the Provincial, Municipal, Barangay

level as well as provision of additional support from the offices of EDMERO, CBSUA and the Camarines Sur Police Provincial Office.

Completion of the Deployment of Early Warning System (DEWS) Project



The DEWS Project is a collaborative effort between the Advanced Science and Technology Institute (ASTI), PAGASA and the 17 DOST-Regional Offices (DOST-ROs). ASTI, the lead agency for this project, developed the locally made Hydrometeorological Devices which include Automatic Rain Gauges (ARGs), Water Level Monitoring Sensors (WLMS), and Warning Posts. PAGASA, on the other hand, provides the scientific backbone by determining the appropriate installation sites in accordance to the River Basin approach and conducting Hydrographic Survey to acquire the water level assessment used for establishing the critical levels. The DOST-ROs serve as the field unit and responsible for the installation and regular maintenance of all the hydromet devices in their respective regions.

The aim of the DEWS Project is to install Hydromet Devices all over the country particularly targeting the principal river basins. These principal river basins are non-telemetered, meaning that they do not have any flood monitoring equipment currently installed. For the 3-year duration of the Project, PAGASA conducted several activities to maximize the potential of these Hydromet Devices while also educating the local disaster units and recipient communities for integrating the system to their existing flood warning protocol.

Since its inception in July 2014, the project was able to deploy 362 Hydromet Sensors and seventy-eight 78 Warning Posts all over the country.

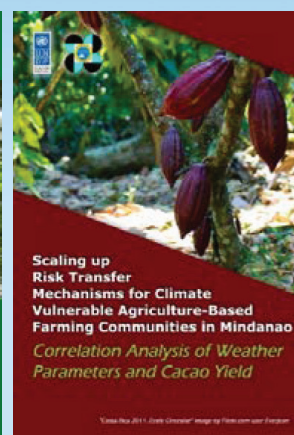
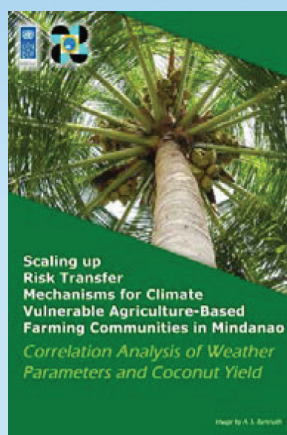
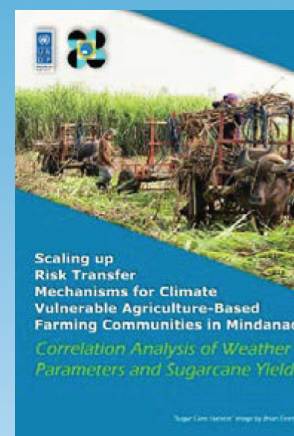
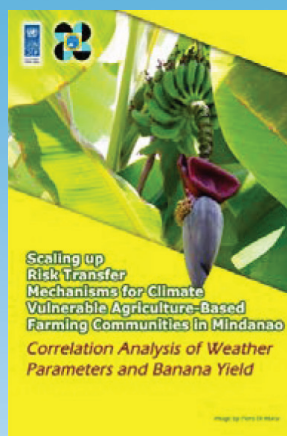
In December 2017, ASTI turned over to PAGASA all the hydromet devices coming from previous Hybrid and Hydromet Projects (almost a total of 1300 sensors), while the remaining devices under the DEWS Project is set for turn-over by the end of 2018. These hydromet devices will then be integrated to the current system of PAGASA to further empower its Weather and Flood Warning capabilities.

Completion of Weather Index-Based Insurance (WIBI) Mindanao Project "Scaling-up Risk Transfer Mechanisms for Climate Vulnerable Agriculture based Communities in Mindanao"



WIBI Mindanao Project: Concluding Conference held at Edsa Shangri-la Manila on December 5, 2017

The WIBI Mindanao Project is a three-year initiative of the United Nations Development Programme (UNDP), in partnership with the Philippine Crop Insurance Corporation (PCIC), with funding support from Global Environment Facility (GEF). It aims to reduce poverty by strengthening the resilience of vulnerable



agriculture-based rural communities in Mindanao through climate risk transfer mechanisms and productivity enhancement measures.

The project was officially launched on 01 June 2015 in Davao City and officially concluded on 31 December 2017 thru the WIBI Mindanao Project: Concluding Conference held on 05 December 2017 in Manila.

On the implementation of the WIBI Mindanao Project, PAGASA has agreed on the provision of relevant data needed for the computation of the weather based index as well as the establishment of a national preliminary correlation function for banana, sugarcane, coconut and cacao in major crop growing areas. In addition, PAGASA will provide historical weather data in Regions X and XI area of implementation necessary for designing and pricing of products in WIBI Mindanao Area.

The project produced four (4) research studies on the correlation between weather parameters and yield of the above-mentioned crops.

INTERNATIONAL COOPERATION ACTIVITIES

6th Bilateral Meeting on Cooperation in Meteorology between the KMA and PAGASA



At the kind invitation of **Dr. KO Yunhwa**, Administrator of the KMA, the delegation of the PAGASA, headed by Engr. Maximo F. Peralta, Assistant Weather Services Chief (AWSC), together with Engr. Arnel R. Manoos, Sr. Weather Specialist and Ms. Nancy T. Lance, AWSC, visited the headquarters of the KMA in Seoul, South Korea from 23-25 May 2017 to participate in the 6th bilateral meeting on cooperation in meteorology between KMA and PAGASA.

Dr. NAM Jaecheol of the KMA extended his warm welcome to the PAGASA delegation, and highly commended the cooperation between KMA and PAGASA in meteorology. Engr. Peralta on the other hand expressed his gratitude to the KMA for hosting the 6th bilateral meeting and for the enhanced cooperation between the two meteorological agencies.

Both agencies agreed on future activities such as cooperation on the enhanced utilization of the Communication, Ocean and Meteorological Satellite (COMS) receiving and analysis system in the Philippines, which was installed in 2015 through a project funded by KOICA and support

to KMA's future plans for satellite development and data service.

Also, PAGASA will be invited to training courses for weather forecasters and weather radar operation designed by the KMA and offered to members of the National Meteorological and Hydrological Services (NMHS) specifically to developing countries. Both sides will further discuss the request of PAGASA for conduct of Training on Cyber Security and Data/Products Dissemination.

KMA has also been implementing the Typhoon Committee (TC) Research Fellowship program and TAPs Technology Transfer Program for the members of the Typhoon Committee since 2004. To strengthen cooperation in the reduction of typhoon disaster through technical exchanges of Typhoon monitoring and prediction, PAGASA will participate in TC Research Fellowship Program, to be conducted by the National Typhoon Center of KMA.

Both agencies will collaborate for the development of typhoon analysis and prediction technologies and also agreed to have collaborative activities for the success of the on-going KOICA-funded project, entitled *Automation of Flood Early Warning System for Disaster Mitigation in Greater Metro Manila*.

The said meeting has strengthened the relationship between KMA and PAGASA in terms of exchanging scientific information and cooperation among personnel engaged in weather forecasting, research and development, financial aspects, and projects/activities implementation.

39th Meeting of the ASEAN Sub-Committee on Meteorology and Geophysics (SCMG)



The 39th Meeting of the ASEAN Sub-Committee on Meteorology and Geophysics (SCMG) in conjunction with the ASEAN 50th Anniversary with the theme "Partnering for Change, Engaging the World" was hosted by PAGASA on 3-5 May 2017 at the Conrad Manila Hotel, Pasay City.

Participants came from eight ASEAN member-countries, namely, Brunei, Indonesia, Malaysia, Myanmar, Singapore, Thailand, Viet Nam and host country the Philippines. ASEAN members, Cambodia and Lao PDR, were not represented.



Message from DOST Secretary de la Peña

DOST Fortunato T. De la Peña and Dr. Hrin Nei Thiam, Chairman of SCMG, provided the opening and welcome messages, respectively.

The ASEAN SCMG meeting is conducted annually which aims to continue formulation and implementation of plans to enhance regional co-



Message from SCMG-Chairperson, Dr. Hrin Nei Thiam

operation and collaborative efforts, and to raise the level of effectiveness of ASEAN meteorological and geophysical services.



Meeting Session

The 39th ASEAN SCMG meeting reviewed the implementation of projects proposed during the 38th SCMG meeting in Myanmar and discussed new climate services initiatives for the ASEAN region for timelines under the Ten-year 'Work Plan of SCMG for 2016-2025' which identified key strategies that would guide ASEAN members' cooperation in the fields of meteorology and geophysics.

Topics discussed included the Status Report on Monitoring Network of Tsunami Early Warning System in ASEAN, Status Report on Weather Radar Basis and Routine Maintenance and Real-Time Radar Rainfall Estimation and Forecasting, Progress Report on the "Early Warning System for Disaster Risk Reduction" Programme and Progress Report on the "Climate Change" Programme.

The 39th ASEAN SCMG meeting also included Open Sessions with non-ASEAN entities such as the China Meteorological Agency, Japan Meteorological Agency and Korea Meteorological Agency. The meeting also discussed the Harmonization of SCMG's Strategic Plan with WMO Strategic Plans, as well as the Integration of ASEAN SCMG Plan to national policies and decision-making.

Delegates to the 39th ASEAN SCMG Meeting took a brief city tour at the Rizal Park, National Museum, Manansan Handicraft and were honored with a farewell dinner and cultural show held at Barbara's Heritage Restaurant.



Visit at the National Museum



Visit at the Rizal Park



Cultural Show and Farewell Dinner at Barbaras

Signing of Bilateral Agreement and Commercial Contracts between New Zealand Meteorological Services and PAGASA



Signing of agreement executed by Dr. Flaviana D. Hilario, Dep. Administrator for R&D-PAGASA and Mr. Peter Lennox, CEO of New Zealand Met Service with the presence of Right Honourable (RT) Jacinda Ardern, Prime Minister of New Zealand



RT Hon. Jacinda Ardern, Prime Minister of New Zealand, Dr. Flaviana D. Hilario, and Dr. Renato U. Solidum, Usec. for DRR-CC

The Bilateral Agreement and Commercial Contracts between the New Zealand Meteorological Services and PAGASA was signed by Dr. Flaviana D. Hialrio, DA for R&D, PAGASA and Mr. Peter Lennox, CEO of New Zealand Met Service and witnessed by Right Honourable Jacinda Ardern, Prime Minister of New Zealand New World Hotel, Manila, on 14 November 2017.

The said agreement will help PAGASA in the dissemination of weather, flood and other weather-related information. The MetraWeather through the New Zealand Met Service granted PAGASA the right to use the licence named Weatherscape XT. This would enable production of scheduled weather bulletins for a maximum of six (6) minutes per day per broadcaster to be supplied to PTV 4, the Philippine government's official channel.

Dr. Renato U. Solidum, Jr., DOST Undersecretary for Disaster Risk Reduction and Climate Change (DRR-CC), and Mr. Peter Lennox, Chief Executive Officer of New Zealand Met Service, attended the event.

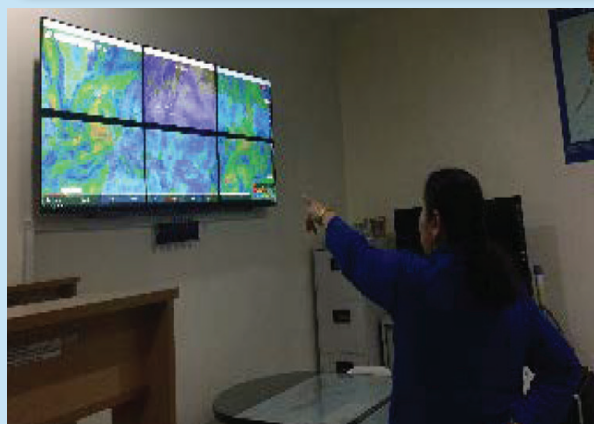
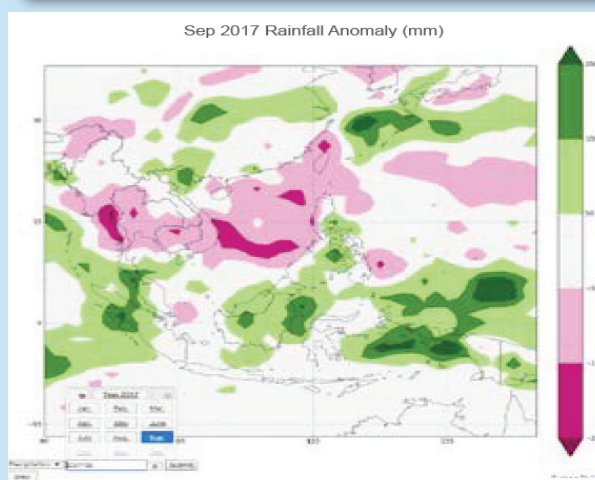
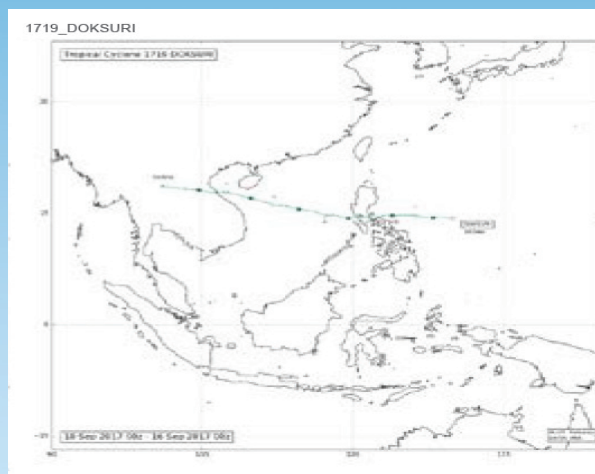
Regional Climate Centre (RCC) Network Meeting



THE NINTH ASEAN REGIONAL CLIMATE OUTLOOK FORUM (ASEANCOF-9)
Ha Noi, 15-17 November 2017

During the Regional Climate Centre (RCC) Network Meeting held in Manila in November 2016, PAGASA was identified by the World Meteorological Organization (WMO) to perform the mandatory functions as Lead-Centre for Climate Monitoring and as consortium member on Long-Range Forecasting in the Southeast Asian sub-region of Regional Association V (RA-V SEA RCC-Network). This will implement Resolution 5 of the Sixteenth Session of RA V (2-8 May 2014,

Jakarta, Indonesia) to "establish two WMO RCC-Networks in RA V, one network for the Southeast Asian sub-region and one network for the South-West Pacific sub-region".



Sample plots displayed in the web-based platform developed by PAGASA

The Southeast Asia Climate Diagnostics and Monitoring System, which could be accessed via <http://seacm.pagasa.dost.gov.ph/> is an application built on top of a Python-based web stack. It is an in-house, web based system for processing and analysis of climate data in aid of monitoring and forecasting, including display and plots of gridded data such as rainfall, surface temperature, sea surface temperature, sea level pressure and tropical cyclone tracks. Data is sourced from providers like Japan Meteorological Agency (JMA) and the National Oceanic and Atmospheric Administration (NOAA). Visualizations are then generated using UK Met Office open source libraries. On the front-end side, HTML5 is used, together with CSS, and Javascript. It can be scaled from big screens up to mobile phone resolutions.

This system will be further improved in the future and will also be utilized for issuance of Climate Watch/ Bulletins for NMHS and its stakeholders in Southeast Asia.

The provision of Climate Watch/Bulletins, in response to climatic extremes by NMHS in Southeast Asia, is an important component of the climate monitoring function while the provision of Tropical Cyclone for Long Range Forecast (TCLRF) is a compulsory forecast product of PAGASA as consortium member for Long Range Forecasting.

Through this effort, it will contribute in establishing PAGASA as the most reliable, accurate and credible national agency on weather and climate information through the provision of useful products and services. Likewise, the innovative and improved knowledge in terms of climate monitoring assessment related to ENSO variability such as droughts/dry spell, floods and other extreme weather events were enhanced. Ultimately, the web-based system has been developed to ensure better access to climate information and optimize relevance of climate information and services to all end-users, specifically, the ASEAN community.

2nd Taiwan West Pacific Global Forecast System Development Workshop and Experience – Exchange on S2S Forecast Tools and Climate Data Service



Photograph of Ms. Analiza Solis, Mr. Joseph Basconcillo and Mr. Robert Badrina (PAGASA Representatives) at the Central Weather Bureau of Taiwan together with other participants and lecturers of the workshop

The Workshop on 2nd Taiwan West Pacific Global Forecast System Development Workshop was participated by three (3) Project Staff of MECO-TECO VOTE Project Component 1E and 3. The workshop was held at Central Weather Bureau, Taipei, Taiwan from 6-8 June 2017. Speakers were mostly from the National Oceanic and Atmospheric Administration – Environmental Modeling Center (NOAA-EMC). There were more than 50 participants from the USA, Taiwan, China, Korea and the Philippines. Resource persons from NOAA –EMC discussed the latest development in weather and climate modelling and presented their plans to develop the world's best extended sub-seasonal-to-seasonal (S2S) climate prediction model; also the best community model for research and operations.

The S2S Prediction System could provide advance notice of potential hazards related to climate, weather and hydrological events across the country that will eventually support various economic sectors such as; agriculture, water resource management, among others.

Other International Cooperation Activities



Kick-Off Meeting of the Project "Automation of Flood Early Warning System for Disaster Mitigation in Greater Metro Manila" held at the PAGASA Amihan Conference Room on 31 January 2017



3rd Joint Coordination Committee (JCC) of the Project for Strengthening Capacity of Integrated Data Management of Flood Forecasting and Warning (PAGASA-JFreeDAM) held at B Hotel Grand Ballroom, Quezon City on 7 February 2017



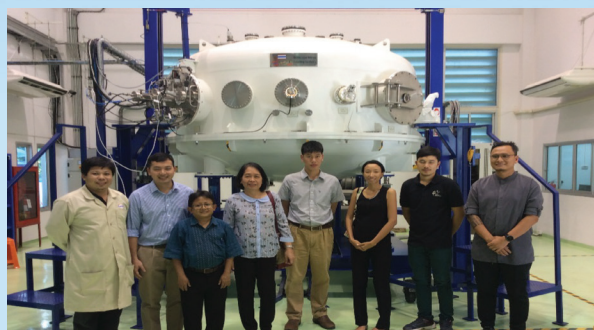
9th GEOSS Asia-Pacific Symposium, Tokyo, Japan, 11-13 January 2017, with Dr. Flaviana D. Hilario, Deputy Administrator for Research and Development (2nd row, 1st from right)



Seminar-Workshop on Wave Modeling and the Use of Japan Meteorological Agency (JMA) Wave Model held at the PAGASA Training Room from 13-17 March 2017



A visit of the Meteorology participants to the Meteorological Technology Exhibition during the field trip conducted at Southern Region Weather Center (SRWC), Taiwan.



A visit by the Southeast Asia Astronomy Network (SEAN) National Representatives from Vietnam, Indonesia, Philippines, Singapore and Thailand, in one of the facilities of the Princess Sirindhorn Astro Park, Chiang Mai, Thailand on 29 September 2017. Dr. Cynthia P. Celebre, Chief, RDTD, is the Philippine representative. (4th from left)



5th Meeting of the Intergovernmental Board on Climate Services Management Committee, Reading, United Kingdom, 19-20 October 2017, with Dr. Flaviana D. Hilario, Deputy Administrator for Research and Development (2nd row, 3rd from right)



Factory Acceptance Test (FAT) of four (4) units Microsemi Synch Server S-600, held at Microsemi Corporation Headquarters, Sta. Rosa, California, USA on 2-6 October 2017



The participants and committee members of the China-ASEAN Metrological Disaster Prevention Workshop attended by Messrs. Gener Quitlong and Bernard Punzalan II



A group photo of the participants of the Science Summit taken in front of the headquarters of the WMO with Dr. Cynthia P. Celebre at the Geneva, Switzerland on 20-22 October 2017 (3rd row, 3rd place from left)



17th Session of the Commission on Atmospheric Science attended by Dr. Cynthia P. Celebre, held at Salle Obasi, WMO Headquarters, Geneva, Switzerland on 23-24 October 2017



2017 APEC Climate Symposium, Can Tho, Vietnam, 18-20 August 2017, with Dr. Flaviana D. Hilario, DA for R&D, (2nd row, 5th from left)



SEAN History and Heritage Working Group "SH&H2017: Exploring the History of SE Asian Astronomy", Mandalay, Myanmar, 27-28 November 2017, with Ms. Ma. Rosario C. Ramos, Senior Weather Specialist, RDTD (1st row, 3rd from right)



Training of Microsemi SynchServer S600, Malaysia, 7-8 November 2017, with Engr. Alvin G. Anog, Weather Facilities Technician 1 – NLPRSD, Mr. Vince Karlo I. Iglesia, Weather Facilities Technician 1 – SLPRSD, Mr. Gibson T. Siamoc, Weather Facilities Technician 1 – VPRSD, Mr. Glenzen D. Cagande, Weather Facilities Technician 1 – MPRSD

INNOVATION

Development and Adoption of the New Format for 24-hour Public Weather Forecast and Shipping Forecast

PHILIPPINE ATMOSPHERIC, GEOSPHERIC, AND HYDROSPHERIC SERVICES ADMINISTRATION (PAGASA)
Weather Forecasting Division, Weather Station
801 C. Rd., 8000 Pasig, Metro Manila
801 C. Rd., 8000 Pasig, Metro Manila

24-HOUR PUBLIC WEATHER FORECAST

ISSUED AT: 5:00 PM ON AUGUST 2015
VALID BEGINNING: 5:00 PM TODAY (TUE), 5:00 PM TOMORROW

SYNOPSIS: SOUTH-WEST MONSOON AFFECTING VISAYAS, MINDANAO AND SOUTHERN LUZON. MEANWHILE, AT 4:00 PM TODAY, THE EYE OF TYPHOON "HANNY" WAS LOCATED BASED ON ALL AVAILABLE DATA AT 710 NM EAST OF BARCEL, BATANES (14°N, 128°E) WITH MAXIMUM SUSTAINED WINDS OF 100 KPH NEAR THE CENTER AND GUSTS UP TO 120 KPH. IT IS FORECAST TO MOVE WEST-NORTHWEST AT 20 KPH.

FORECAST: MONSOON RAINS WHICH MAY TRIGGER FLASHFLOODS AND LANDSLIDES WILL BE EXPERIENCED OVER MINDANAO AND WESTERN VISAYAS. CLOUDS SPERS WITH LIGHT TO MODERATE RAINS AND ISOLATED THUNDERSTORMS ARE EXPECTED OVER LUZON PROVINCES, CORDILLERA, REST OF CAGAYAN VALLEY, CALABARZON, BICOL REGION AND REST OF MINDANAO. PARTLY CLOUDY TO CLOUDY RAINS WITH ISOLATED THUNDERSTORMS WILL PREVAIL OVER THE METRO MANILA AND THE REST OF THE COUNTRY.

MODERATE TO STRONG WINDS BLOWING FROM THE NORTHWEST TO WEST WILL PREVAIL OVER SOUTHERN AND CENTRAL LUZON AND CORDILLERA FROM THE SOUTHWEST OVER THE REST OF THE COUNTRY. THE SOUTHERN MONSOON WILL BE MODERATE.

RAINFALL: RAINFALL AMOUNTS TO 10-20 MM IN THE SOUTHERN MONSOON AREA. RAINFALL AMOUNTS TO 10-20 MM IN THE SOUTHERN MONSOON AREA. RAINFALL AMOUNTS TO 10-20 MM IN THE SOUTHERN MONSOON AREA.

MAXIMUM TEMPERATURE: 32.0°C
MINIMUM TEMPERATURE: 24.0°C
RELATIVE HUMIDITY: 75-85%
WIND DIRECTION: NORTHWEST
WIND SPEED: 10-20 KPH

PREPARED BY: MAGDO / RBB
CHECKED BY: ADA

Old Format

PHILIPPINE ATMOSPHERIC, GEOSPHERIC, AND HYDROSPHERIC SERVICES ADMINISTRATION (PAGASA)
Weather Forecasting Division, Weather Station
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RELATIVE HUMIDITY: 75-85%
WIND DIRECTION: NORTHWEST
WIND SPEED: 10-20 KPH

PREPARED BY: MAGDO / RBB
CHECKED BY: ADA

New Format

The new format of 24-hour public weather forecast and shipping forecast that provide details on shipping zones, weather condition, wind direction and speed, wave height and sea condition was implemented in 2017. The old format was revised to make the weather forecast more concise but inclusive and understandable, and further laymanized for better appreciation of the stakeholders especially, the general public.

The new format was designed according to areas affected of a particular weather condition caused by a particular weather system, such as TCs and monsoons or simply by a localized thunderstorm. More importantly, the impacts of the prevailing weather condition were also included in the new format.

2017 Gawad PAGASA Innovation Award: Tropical Cyclone Severe Wind Probability Products (TCSWPP) - Guide to Forecasters

The Tropical Cyclone Severe Wind Probability Products was the recipient of the 2017 Gawad PAGASA Innovation Award for its locally developed and new methods employed in identifying provinces to be assigned under a specific Tropical Cyclone Warning Signals (TCWS). It is primarily intended for real-time forecasting use.



In recent years, several researches on Severe Wind Risk Analysis under various projects were undertaken. Recently, an increasing sensitivity of many sectors to an increased value of accurate weather and climate information motivated the agency to transition research and development results to operations. One important challenge in formulating accurate weather information, such as on Tropical Cyclones, is accounting the weather forecast uncertainty. WMO emphasizes the need to address this challenge and suggest the use of Probabilistic forecast instead of Deterministic forecast.

The TCSWPP aims to resolve some forecast uncertainty issues which may translate to an increased confidence in PAGASA forecasts and warnings. It is a tool to integrate multi-agency (PAGASA, Central Weather Bureau, Hong Kong Observatory, Japan Meteorological Agency, Joint Typhoon Warning Center, National Meteorological Center and Korea Meteorological Administration) forecast tracks and create a probabilistic forecast using the ensemble.

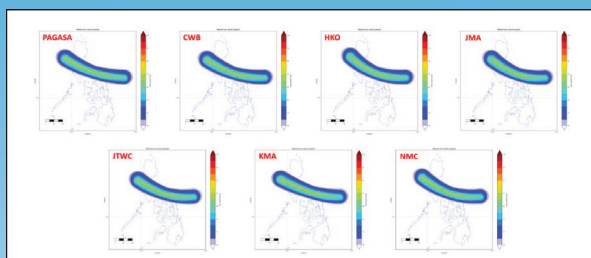


Figure 1. Multi-agency wind hazard map for Tropical Cyclone Rammasun (Glenda, 2014) generated using Tropical Cyclone Risk Model (TCRM). The model was initialized 1200 UTC 14 July 2014, 24 hours before it made landfall.

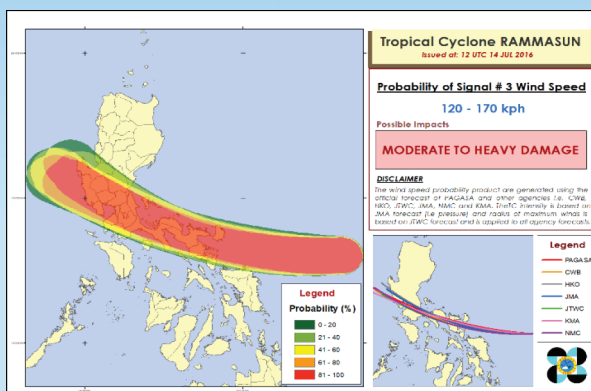


Figure 2. Probability of Signal #3 Wind speed of Tropical Cyclone Rammasun (Glenda, 2014) using the multi-agency wind field forecast. The map also shows the spread of the different agencies' forecast track.

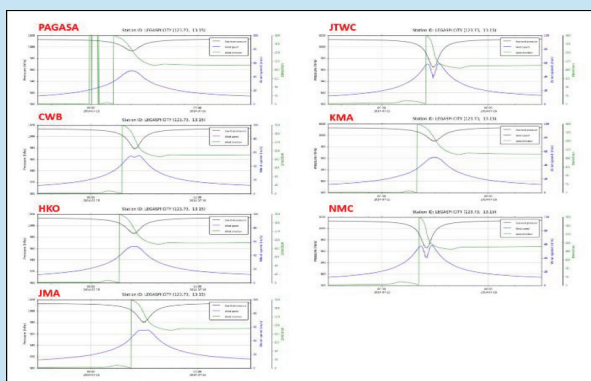


Figure 3. Multi-agency generated time series for Legaspi, Albay Station (nearest station to the track). The figure shows the pressure (gray), wind speed (blue) and wind direction (green).

The TCSWPP are composed of Probability Maps of respective TCWS, Table of Provinces under Respective probability thresholds and Multi-agency Pressure vs. Wind Speed and Direction Time Series for selected stations.

HUMAN RESOURCES DEVELOPMENT

PAGASA SCHOLARSHIP PROGRAM

List of Graduates

In 2017, the Scholarship Program of PAGASA has provided higher education opportunities to qualified individuals. These scholars have proven their capacity to strive harder and to serve government service on a higher level.



Mr. John Ariel T. Rojas
Master of Science in
Meteorology University of
the Philippines-Diliman



Mr. Joey H. Figuracion
Master of Science in
Meteorology University of
the Philippines-Diliman



Ms. Rosemarie Ann A. Marasigan
Master of Science in
Meteorology University
of the Philippines-Diliman



Mr. Bhenjamin Jordan L. Ona
Master of Science in
Meteorology University of
the Philippines-Diliman

CAPACITY BUILDING

Conduct of Seminar / Workshop on the Use of HFDR Data for Early Warning and Disaster Preparedness



The Information, Education and Communication (IEC) campaign is one of the components of the HFDR project that aims to increase the level of awareness and preparedness of the public on natural hazards and disasters.

After the ceremonial cutting of ribbon of the



HFDR Project on 23 February 2017, an IEC was conducted at the Municipal Hall of Puntabaja, Rizal, Palawan. The said activity was conducted to explain the use of HFDR data in early warning and disaster preparedness. It was participated by officials of LGUs involved in disaster and emergency response activities.

Mayor Norman Ong of Puntabaja, Rizal, Palawan, delivered the opening remarks where he noted that the installation of the HFDR in their province was their first collaborative undertaking with the national government. He expressed his happiness to have installed the equipment that has the capability to monitor the sea state condition. Brig. General Restituto Padilla, Jr. of the Armed Forces of the Philippine (AFP), said in his message that the installation could be of great help to the Philippine Navy and maritime in monitoring the sea state condition. He also added that an algorithm for the ship tracking detection is being undertaken in collaboration with the Mapua Institute of Technology (MIT).

Other topics discussed during the seminar were information on hydromet hazard, Rainfall Warning System (RWS) and Cloud Seeding Operation including the major products and services of PAGASA.

Information, Education and Communication (IEC) Campaign and Flood Drill of DEWS Project

A series of IEC Campaign and Flood Drills were conducted from September 2016 to November 2017, to give awareness to the beneficiaries on the use and purpose of the hydro meteorological monitoring system. The 2-day activity is composed of a seminar (IEC) and a Flood Drill to present the actual on-site testing of the Warning Post to the disaster officials.



IECs in Region XII, XIII, and CAR

Several resource speakers from different divisions of PAGASA took part in the activity during the seminar. The discussion covered several topics on *Understanding Hydromet Hazards, Climate Projection (in the local region) and Utilization of the Newly Established Flood Early Warning System*. On the other hand, technical aspects of the Hydromet Devices were discussed by ASTI.



Flood Drill Activity in Region XII and CAR

Date	Region	Host City/Municipality	IEC Participants	Flood Drill Participants
12-13 September 2016	Region VIII	Palo, Leyte	126	90
23-24 November 2016	Region VIII	Maydolong, Eastern Samar	89	120
12-13 May 2017	Region III	Balanga City	216	232
17-18 May 2017	Region XII	Surigao City	145	135
17-18 May 2017	Region XI	Davao City	136	72
23-24 May 2017	Region XIII	General Santos City	562	297
7-8 June 2017	Region II	Gonzaga, Cagayan	206	104
12-13 October 2017	CAR	Tabuk City, Kalinga	139	109
24-25 November 2017	Region VII	Tagbilaran City (IEC) Loboc (Flood Drill)	110	50
TOTAL		9 IEC & Flood Drills conducted		

Overall, PAGASA conducted nine (9) IECs & Flood Drills that covered eight (8) regions.

Climate Information and Service Delivery Program (CISDP) - Conduct of National Climate Outlook Forum (NCOF)/Provincial Climate Outlook Forum/La Niña Forum



The conduct of NCOF, Provincial COF, and La Niña Forum are intended to make the participants primarily understand climate variability and extreme events including its consequences. It also aims to communicate climate information and useful forecast to diverse users and decision makers to build the capacity of professionals at national and local level. This is to enable them to use climate information in decision-making related to agriculture, water resource management, and public health and disaster management. The target audience of the forum includes provincial and local government officials, members of the Disaster Coordinating Councils (DCCs), tri-media, interested private companies, LGUs, and other interested weather/climate information users i.e., farmers, fisher folks, etc. Overall, 11 NCOFs, 10 provincial COFs and two (2) La Niña Forum were held in 2017.

PAGASA, in partnership with the UN World Food Programme (WFP), USAID and DSWD, has organized the Provincial COF in nine (9) provinces. WFP provided funding support to PAGASA to build awareness and capacitate stakeholders on scientific forecasts and climate trends. Specifically, the objectives for each province's forum are the following:

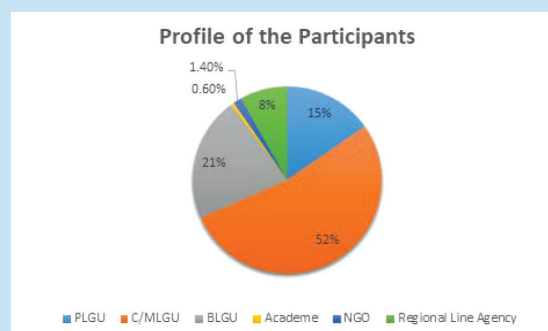
- Examine a six-month climate outlook for province and disseminate relevant information and education materials to stakeholders;

- Capacitate participants on typhoon tracking exercises and establish linkage to WFP's 72 Hour Assessment; and
- Capacitate provinces on use of WFP's 72 Hour Assessment tool

A total of 893 individuals participated (542 male, 351 female) in the forums with the breakdown as follows:

Date Conducted	Province	Male	Female	Total
May 9-10, 2017	Maguindanao	63	35	98
June 7-8, 2017	Laguna	57	32	89
June 20-21, 2017	Misamis Oriental	63	39	102
June 27-28, 2017	Iloilo	51	49	100
June 27-28, 2017	Benguet	60	50	110
July 11-12, 2017	Davao Oriental	69	35	104
July 19-20, 2017	Batangas	66	43	109
August 9-10, 2017	Cagayan	64	27	91
September 6-7, 2017	Sorsogon	49	41	90

The participants are representatives from the Provincial Disaster Risk Reduction Management Council and Office, City/Municipal LGUs, barangay LGUs, local non-government organizations (NGO), academe, and regional line agencies such as OCD, DILG, and DSWD, specifically, from the offices of DRRM and agriculture.



Source: WFP Report, 2018

Likewise, Provincial Forum on Looming La Niña was also conducted in Cebu City and Davao City. The conduct of the said provincial forum is due to PAGASA's forecast on the increasing chance of La Niña development and its early warning capabilities during the last quarter of 2017. The highlight of the discussion was on the La Niña development including its consequences as well as the need for precise La Niña mitigation strategies and interventions.

Climate Workshop for Visayas PRSD Personnel



Participants and CAD Lecturers during the Climate Workshop for Visayas PRSD Personnel

The conduct of one-day Climate Workshop is intended to make the PRSD personnel updated with the recent climate products and services, latest climate information and ENSO advisories. It also aims to further capacitate the PAGASA personnel assigned in the filed stations in communicating useful information and forecasts to target stakeholders such as decision makers in the various sectors, such as; agriculture, water resource management, public health and disaster management. This is also in anticipation of the increasing demand for lecturers on climate-related topics to better deliver PAGASA's climate services.

The workshop was being conducted since 2016. The topics being discussed were on Climate and ENSO Variability, Climate Change, Trends and Projections, Seasonal Climate Forecasting and Climate Workshop/Role-playing exercises.

List of Technical Courses Conducted

Training on the Operation and Maintenance of Basic Meteorological Instruments and PUMIS for NCR-PRSD

March 6-10, 2017

Hotel Stotsenberg, Clark Pampanga

Seminar/Workshop on Wave Modeling and the Use of Japan Meteorological Agency (JMA) Wave Model

March 13-17, 2017

PAGASA Central Office

Training on the Operation and Maintenance of Basic Meteorological Instruments and PUMIS for SLPRSD

March 28-30, 2017

PAGASA Central Office

Meteorological Technician Training Course

April 4, 2017

PAGASA Central Office

Training Workshop on Rainfall Warning System (RWS) and Local Weather Forecasting for PAGASA NCR-PRSD Personnel

April 20-21, 2017

Bayview Lake Hotel, Tagaytay City

1st PAGASA River Basin Flood Forecasting and Warning Centers Conference/Workshop

May 8-10, 2017

Grand Regal, Davao City

Refresher Course on Rainfall Warning System (RWS), Provision of Aeronautical Meteorology Products and Climate Workshop for Visayas PRSD Personnel

July 26-28, 2017

Wellcome Hotel, Cebu City

Workshop on PAGASA Warning Products/Information for DRRMOs of Metro Manila and Selected Cities/Municipalities

August 15, 2017

PAGASA Training Room

Refresher Course on Meteorological Observations, Practices and Procedures and CMO Conference for Northern Luzon PRSD Personnel

Sept. 19-22

Ciudad Fernandina, Vigan, Ilocos Sur

Meteorologist Training Course

October 17, 2017 to October 10, 2018

PAGASA Training Room

CMO/OICs Conference and Climate Workshop for NCR-PRSD Personnel

November 8-10, 2017

BSA Twin Tower Hotel, Pasig City

Refresher Course on Meteorological Observations, Practices and Procedures and CMO Conference for Mindanao PRSD Personnel

November 14-17, 2017

Seda Centrio Hotel, Cagayan de Oro City

List of Non-Technical Courses Conducted

GAD Midyear Assessment

July 4, 2017

AO Conference Room

Capacity Development on GAD HGDG

July 18 – 19, 2017

PAGASA Amihan Conference Room

Succession Planning for Leaders

July 20 – 21, 2017

PAGASA Amihan Conference Room

Re-Orientation on New Entrants cum Values Orientation Workshop

August 8 – 10, 2017

PAGASA Amihan Conference Room

Orientation & Sensitivity Awareness on PWD

August 30 – 31, 2017

PAGASA Amihan Conference Room

Strategic Performance Management for Leaders

September 7-8, 2017

PAGASA Amihan Conference Room

4 Cs of Change Management

September 14-15, 2017

PAGASA Amihan Conference Room

Orientation on SC Laws, Privileges & Benefits

September 28, 2017

PAGASA Amihan Conference Room

Gender Sensitivity Training

October 19-20, 2017

Caliraya Resort Club, Lumban, Laguna

Orientation Seminar cum Values Orientation Seminar for New Entrants

November 6-9, 2017

PAGASA Amihan Conference Room

Final validation of DOST GAD Kit

November 7-8, 2017

DOST

PCW GAD Budget Forum

November 9, 2017

COA Central Office

Completed Staff Work Training – CO

November 27-28, 2017

PAGASA Amihan Conference Room

End-VAW Film Showing - "BOSES"

November 29, 2017

PAGASA Amihan Conference Room

DOST GAD Focal Point Assembly

December 6-8, 2017

Emiramona Garden Hotel

Tagaytay City

GAD Year End Assessment

December 11-12, 2017

Seda Atria Hotel, Iloilo City

Completed Staff Work Training

December 13-14, 2017

PAGASA Amihan Conference Room

List of International Meetings/ Conferences Attended

Meeting on the collaborative SIGMET issuance demonstration

January 16-19, 2017

Tokyo, Japan

Implementation Planning Workshop on International Flood Initiative (IFI) in Asia Pacific, and the 9th Global Earth Observation System of Systems (GEOSS) Asia

January 10, 11 and 13, 2017

Japan

49th Session of the ESCAP/WMO Typhoon Committee

February 21-24, 2017

Yokohama, Japan

Global Modelling Science Workshop and Partnership Board Meeting

February 21-23, 2017

New Zealand

Radar Training Session

March 13 – April 7, 2017

Taiwan

Task Team Meeting on Tropical Cyclone Forecast Competency in the ESCAP/WMO Typhoon Committee Region

March 14-16, 2017

Guam, USA

15th Meeting of the Asia/Pacific Meteorological Information Exchange Working Group

March 20-22, 2017

Thailand

7th Meeting of the Asia/Pacific Meteorological Services Working Group

March 22-24, 2017

Thailand

InterMET Asia 2017 and World Bank - Global Facility Disaster Reduction and Recovery (WB-GFDRR) Hosted Delegate Programme

March 21-23, 2017
Singapore

Wrap-up Meeting of the Pilot Project on SIGMET Coordination in Southeast Asia

March 27-29, 2017
Singapore

Regional Learning Platform: Mainstreaming Disaster Risk Reduction for Poverty Eradication in Asia-Pacific

March 29-31, 2017
Bangkok, Thailand

13th Session of the Forum on Regional Climate Monitoring, Assessment and Prediction for Asia (FOCRAII)

April 24-26, 2017
Beijing, China

2017 APEC Typhoon Symposium

May 2-4, 2017
Taiwan

6th Bilateral Meeting

May 22-26, 2017
Korea

Multi-Hazard Early Warning Conference

May 22-23, 2017
Cancun, Mexico

Global Platform for Disaster Risk Reduction

May 24-26, 2017
Cancun, Mexico

21st Meeting of the Meteorology sub-group of the Asia/Pacific Air Navigation Planning and Implementation Regional Group

May 29 – June 1, 2017
Bangkok, Thailand

Regional Dialogue Platform on Forecast Based Financing

June 13-15, 2017
Vietnam

1st Steering Committee Meeting of the Southeastern Asia-Oceania Region Flash Flood Guidance Project

July 10-12, 2017
Indonesia

5th Taiwan-Philippines International Conference

July 17-20, 2017
National Chung-Cheng University, Taiwan

APEC Climate Symposium and Annual WG Meeting

August 18-20, 2017
Can Tho, Vietnam

3rd Regional Integrated Multi-Hazard Early Warning System (RIMES) Ministerial Conference and RIMES 9th Council Meeting

August 23-25, 2017
Port Moresby, Papua New Guinea

46th Session of the Intergovernmental Panel on Climate Change

September 6-10, 2017
Montreal, Canada

10th Annual Meeting of the Working Group on Tropical Meteorology Research and Workshop on Tropical Meteorology

September 21-23, 2017
Hongkong, China

6th Working Meeting for TC Working Group on Hydrology

September 25-28, 2017
Korea

Southeast Asia Astronomy Network (SEAAN) Charter Meeting

September 28-29, 2017
Chang Mai, Thailand

5th Session of the Committee on Disaster Risk Reduction

October 9-12, 2017
Bangkok, Thailand

8th Asia/Oceania Meteorological Satellite User Conference (AOMSUC-6)

October 16-21, 2017
Vladivostok, Russia

5th Meeting of the Intergovernmental Board on Climate Services Management Committee (IBCS MC-5)

October 19-20, 2017
Reading, United Kingdom

The Science Summit

October 20-22, 2017
Switzerland

17th Session of the Commission on Atmospheric Science (CAS-17)

October 23-24, 2017
Switzerland

Marine Technical Conference "Toward an Integrated Met-Ocean Monitoring, Forecasting and Services System"

October 23-24, 2017
Geneva, Switzerland

5th Session of the Joint World Meteorological Organization Intergovernmental Oceanographic Commission (WMO-OIC) Technical Commission for Oceanography and Marine Meteorology (JCOMM5)

October 25-29, 2017
Geneva, Switzerland

WMO International Conference on Automatic Weather Stations (ICAWS-2017)

October 24-26, 2017
Germany

13th World Meteorological Organization (WMO) Symposium on Education and Training (SYMET-XIII), Quadrennial Meeting of Directors of WMO Regional Training Centres and Meetings of Other Special Interest Groups

October 30 – November 2, 2017
Barbados, USA

12th Integrated Workshop

October 30 – November 3, 2017
Korea

Research Group Visit to the National Taiwan Normal University

November 15-25, 2017
Korea

Meeting of the Regional Sub-project Management Team (RSMT) for the Severe Weather Forecasting Demonstration Project in Southeast Asia (SWFDP-Sea)

November 20-23, 2017
Hanoi, Vietnam

Visiting Program for DRRM Organizations in the Philippines

November 23 – December 1, 2017
Japan

**2017 Meeting of the SEAN History and Heritage Working Group
Mandalay, Myanmar**

November 27-28, 2017

2nd Meeting of the Commission for Instruments and Methods of Observation (CIMO) Expert Team on Operational Meteorology (ET-OpMET-2)

November 27-30, 2017
Tokyo, Japan

4th International Workshop on Tropical Cyclone Landfall Processes and Project Progress Meeting

December 5-8, 2017
Macau, China

List of International Trainings Attended

World Climate Research Programme – The Jeju National University Training School on Monsoon Variability in Changing Climate

January 16-21, 2017
Korea

Final Phase Training of J-POW Project

January 16-21, 2017
Japan

6th Global Precipitation Measurement (GPM) Asia Workshop on Satellite Precipitation Data Utilization

January 18-19, 2017
Bangkok, Thailand

Master of Science in Environmental Science

ALVIN G. PURA

January 24, 2017 – July 20, 2018

Australia

Region V Dobson Intercomparison Campaign

February 13-24, 2017

Australia

1st Training Workshop on Sub-Seasonal to Seasonal Prediction for Southeast Asia

February 27 – March 3, 2017

Singapore

ASEAN NEXT 2017 – Workshop on Establishing ASEAN Hydroinformatics and Climate Data Center

March 6-10, 2017

Bangkok, Thailand

Year of Maritime Continent (YMC) 3rd Workshop

March 14-16, 2017

Malaysia

Training Course on Disaster Risk Communication

March 20-22, 2017

Bangkok, Thailand

10th COSMO/CLM/ART Tutorial/Workshop

March 27 – April 4, 2017

Langen, Germany

Factory Acceptance/Off-site Training for the Microstep-MIS, Climate Monitoring System

April 3-7, 2017

Bratislava, Slovakia

9th International Training Workshop Climate Variability and Predictions (91TWCVP) in the National Oceanic and Atmospheric Administration-US Agency for International Development (NOAA-USAID) Series

April 13-21, 2017

Pune, India

Typhoon Committee Research Fellowship

April 17-28, 2017

Jeju, Korea

Regional Workshop of the Technical Assistance (TA 8359): Regional Climate Projections Consortium and Data Facility in Asia and the Pacific

May 2-3, 2017

Bangkok, Thailand

Training Program on the Automation of Flood Early Warning System (EWS)

May 7-13, 2017

Korea

An Introduction to Field Techniques in Ethnoastronomy Workshop

May 14-19, 2017

Thailand

Counterpart Training Program of the PAGASA-JICA Project "Strengthening Capacity of Integrated Data Management of Flood Forecasting and Warning"

May 14-27, 2017

Japan

APEC Research and Technology Program 2017 (ART 2017)

May 15, 2017

Vietnam

WMO Regional Workshop on Aircraft Meteorological Data Relay (AMDAR) for RA V

May 22-23, 2017

Jakarta, Indonesia

Post-processing of Numerical Weather Prediction Outputs

May 21 – June 3, 2017

Korea

2nd Taiwan West Pacific Global Forecast System Development Workshop (TWPGFS2)

June 6-9, 2017

Taiwan

UM User Tutorial

June 5-9, 2017

2nd Convective Scale Modeling

June 12-14, 2017

UM User Workshop

June 14-16, 2017

International Training Course on Weather Radar Operation

June 12-23, 2017

Seoul, Korea

Training Program on Capacity Development for Flood Risk Management with Integrated Flood Analysis System (IFAS)

July 2-29, 2017

Japan

Training Analysis and Forecasting Integration System Training Session

July 10-14, 2017

Taiwan

Factory Level Training for Weather Radars

July 19-30, 2017

Finland

Radar Training Session

July 15-August 15, 2017

Taiwan

7th International Course on Flood Mitigation and Storm Water Management 2017

August 14-25, 2017

Malaysia

Training Program on Developing Computer Programming Skills

August 12-27, 2017

Malaysia

Training Development Workshop for Regional Training Institutions WMO RA II and RA V

August 28 – September 1, 2017

Melbourne, Australia

Urban Meteorology, Environment and Climate Services Course

August 28 – September 8, 2017

Puteri Johor, Malaysia

Capacity Building Type Workshop

September 11-14, 2017

Japan

2017 CMA Typhoon Forecaster Training Programme on Tropical Cyclone Analysis and Forecast

September 18-27, 2018

China

Training Program on the Reinforcement of Meteorological Services

September 11 – December 9, 2017

Japan

International Training Course on Aeronautical Meteorology Services

September 11-22, 2017

China

**Master of Science in Applied Meteorology and Climate with Management
BENISON JAY N. ESTAREJA**

September 18, 2017 – September 18, 2018

University of Reading, United Kingdom

10th Global Earth Observation System of Systems (GEOSS) Asia-Pacific Symposium

September 18-20, 2017

Hanoi, Vietnam

Common Alerting Protocol (CAP) Training Session and CAP Implementation Workshop

September 19-21, 2017

Rome, Italy

2017 Asia-Pacific Economic Cooperation (APEC) Research Center for Typhoon and Society (ACTS) Workshop on Extreme Weather Forecast and Water Resources Management

September 26-27, 2017

Hanoi, Vietnam

AMICAF Workshop "Analysis and Mapping of Impacts under Climate Change for Adaptation and Food Security the South-South Cooperation"

September 26-28, 2017
Bandung, Indonesia

Disaster Management Policy Program – Training Course on Flood Disaster Risk Reduction

September 15 - October 1, 2017
Japan

Foreign Training on Microsemi S-600

October 3-4, 2017
Malaysia

International Workshop on Rocket-based Cloud Seeding System

October 9-13, 2017
Petaling Jaya, Malaysia

WMO VCP Workshop on Implementation of ICAO Meteorological Information Exchange Model for the Exchange of Operational Meteorological Data

October 10-12, 2017
Hongkong, China

Joint Seminar of the International Telecommunication Union (ITU) and the World Meteorological Organization (WMO) "Use of Radio Spectrum for Meteorology: Weather, Water and Climate Monitoring and Prediction"

October 23-24, 2017
Geneva, Switzerland

Training Workshop on Synergized Standard Operating Procedures (SSOP-II) for Coastal Multi-Hazards Early Warning System

October 24-26, 2017
Nanjing, China

Networking Workshop

October 10-11, 2017
Jakarta, Indonesia

National Oceanic and Atmospheric Administration's (NOAA) 42nd Climate Diagnostics and Prediction Workshop

October 23-26, 2017
Oklahoma, USA

SeaSonde Training Program

October 23-27, 2017
California, USA

Training Program on the Improvement of Meteorological Satellite Data Analysis and Application Capacity

October 29 – November 24, 2017
Korea

China-ASEAN Meteorological Disaster Prevention Workshop

November 9-10, 2017
Haikou, China

6th International Workshop on Monsoon

November 13-17, 2017
Singapore

9th ASEAN Regional Climate Outlook Forum

November 15-17, 2017
Vietnam

ASEAN Committee on Disaster Management Working Group on Prevention and Mitigation for the Senior Official-Level Forum for Strengthening Institutional and Policy Framework on DRR and CCA Integration

November 16, 2017
Jakarta, Indonesia

Training Course for the DAET Weather Radar Project

November 27 – December 1, 2017
Raiffeisenstraße, Germany

Workshop on Operational System for Urban Flood Forecasting and Inundation Mapping (OSUFFIM)

November 28-30, 2017
Guanazhou, China

Training Workshop on SIGMET Coordination

December 4-6, 2017
Hongkong, China

2017 International Cooperation Workshop

December 13-16, 2017
PyeongChang, Korea

**List of Local Trainings/
Conferences Attended**

1st Quarter Meeting for 2017 and Bench Marking/Educational Tour

January 30 – February 3, 2017
Cagayan de Oro

1st Quarter Meeting for 2017 and Bench Marking/Educational Tour

February 10, 2017
Taguig City

Training Workshop on Radar for the Development of the National Ecosystem Extent Account and Map

February 13-17, 2017
NAMRIA Lecture Hall, Taguig City

Training on Statistical Data Management and Analysis Using Excel

February 20-24, 2017
PSRTI, Quezon City

National Climate Information Services Training of Trainors

February 21-23, 2017
Naga City

DA-ATI Training on Climate Smart Farm Business School

March 13-17 & 29-31, 2017
Pampanga

CSI Leadership Series, Competency-Based HR and Career Development and Succession Management Training Course

March 15-17 & 29-31, 2017
Quezon City

Two-day Back to Back Workshops on Valuation Assessment and Policy Dialogue on the Implementation of the Economics of Ecosystems and Biodiversity in the Philippines Project

March 16-17, 2017
Pasay City

Training and Capacity Enhancement on the Latest and Current Trends on Information and Records Management

March 22-24, 2017
Cebu City

Kick-Off Workshop

March 22, 2017
Manila

Radar Data Classification Workshop

March 27-31, 2017
NAMRIA, Taguig City

Training Workshop on the Revised 2016 Revised Implementing Rules and Regulations of RA 9184

March 29-31, 2017
San Juan City

Mentor Competency Development Workshop

April 4-5, 2017
Manila

Orientation on the Registry System for Environmental Impact Assessment Practitioners

April 5, 2017
Quezon City

1ST Philippine Association for Government Budget Administration (PAGBA), Inc. Quarterly Seminar and Meeting

April 5-8, 2017
Baguio City

Training/Seminar on Government Procurement Reform Act and its IRR and Updates

April 19-21, 2017
Manila

**Office of the Civil Defense Cordillera
Administrative Region Executive Course**
April 21, 2017
Baguio City

**ASEAN-National Organizing Committee –
Conference Management Training**
April 24-25, 2017
MIDAS Hotel, Manila

Financial Education Expo
April 27, 2017
Taguig City

Short Course on Python Programming
April 30 – May 28, 2017

**39TH Meeting of the ASEAN Sub-Committee
on Meteorology and Geophysics (SCMG)**
May 3-5, 2017
Conrad Hotel, Manila

Records and Information Management
May 16-17, 2017
Pasay City

**Inception Workshop on the Development
of an Enhanced Production and Risk
management in Agriculture Integrated
Decision Support System**
May 16-17, 2017
Makati City

**Customer Service Excellence for
Government Workers**
May 18, 2017
Sampaloc, Manila

Managing Records with the Law in Mind
May 29-31, 2017
Luneta, Manila

**National Selection Committee Orientation
and Desk Evaluation for the 19th Gawad
Kalasag**
May 30 – June 2, 2017

**One Day Incident Command System
Executive Course**
June 15, 2017
La Union

COMPTIA Network+
June 17 – July 15, 2017
Mapua Institute, Makati City

**Re-Entry Action Plan Monitoring and
Evaluation Session (REAP M&E)**
June 28-30, 2017
Astoria Plaza Hotel

Basic Incident Command System Training
August 16-18, 2017
Ermita, Manila

**Coaches Training on Enhanced Local
Climate change Action Planning for
Region 9, 10, 12 and ARMM**
August 21-26, 2017
Davao City

**Workshop-Consultation on NDRRMP
Review, Regional DRRM Plan Assessment
and Formulation of the national Disaster
Prevention and Mitigation Plan**
September 4-7, 2017
Pampanga

**Training Course on Basic Monitoring and
Evaluation**
September 11-13, 2017
DAP, Pasig City

**Module II – Advanced Concrete Design
in High Seismic Risk Region Training/
Seminar**
September 15-17, 2017
Quezon City

**2nd BGR-CCOP International Training on
Risk- Sensitive Spatial Planning for CCOP
Member Countries**
September 18-28, 2017
Quezon City

**Consultation Workshop for the NDRRMP
Review, Regional DRRMP Assessment and
formulation of a National Prevention and
Mitigation Plan**
September 19-22, 2017
Quezon City

Regional Workshop on Climate Change

September 20-24, 2017

Ilocos Sur

**Training Seminar on Cash Management
and Control System**

September 27-29, 2017

Quezon City

**Workshop Invitation for Developing Next-
Generation Decision Support Tools**

September 20-29, 2017

Muntinlupa City

**3rd Quarterly Seminar and Meeting of the
PAGBA**

October 4-7, 2017

Palawan

**3rd Quarter RDRRMC XII Full Council
Meeting**

October 12-13, 2017

Cotabato

Annual Convention-Seminar of the AGAP

October 18-21, 2017

Cebu

**Capacity Building for the members of
Agusan del Norte-Butuan City Airdshed
Governing and TWG**

November 7-10, 2017

Tacloban

Storm Surge Messaging Toolkit Workshop

November 24, 2017

Quezon City

Planning Officer's Year-end Conference

November 27-28, 2017

Pampanga

HUMAN AND FINANCIAL RESOURCES

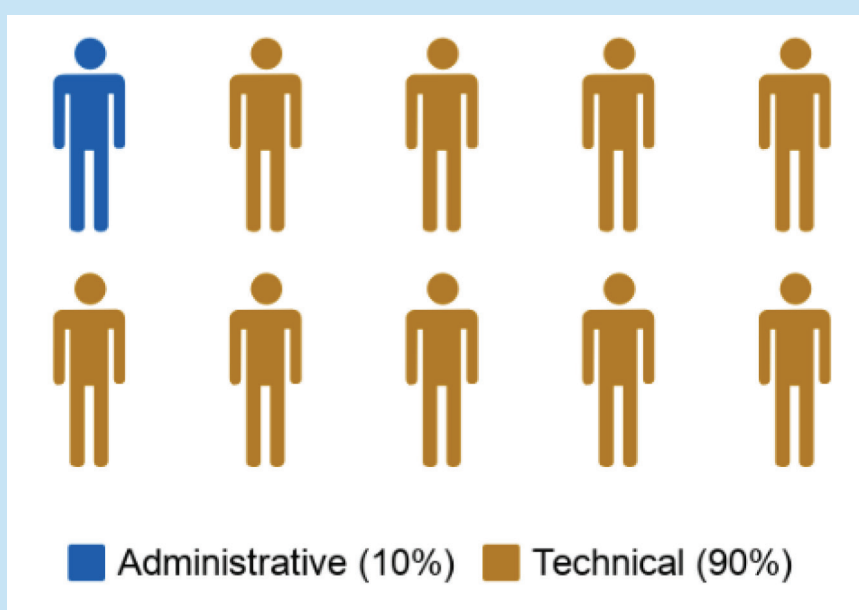
Manpower Resources

As of 31 December 2017, the total manpower complement of the Agency is 1156 with 113 employees involved in administrative functions and 1043 personnel in the technical services.

DISTRIBUTION OF PERSONNEL BY JOB CATEGORY

Reference: PLANTILLA OF PERSONNEL AND JOB ORDER as of DECEMBER 31, 2017

CATEGORY	FILLED-UP	VACANT	TOTAL	%
ADMINISTRATIVE	101	12	113	10%
TECHNICAL	848	195	1043	90%
TOTAL	949	207	1156	100%

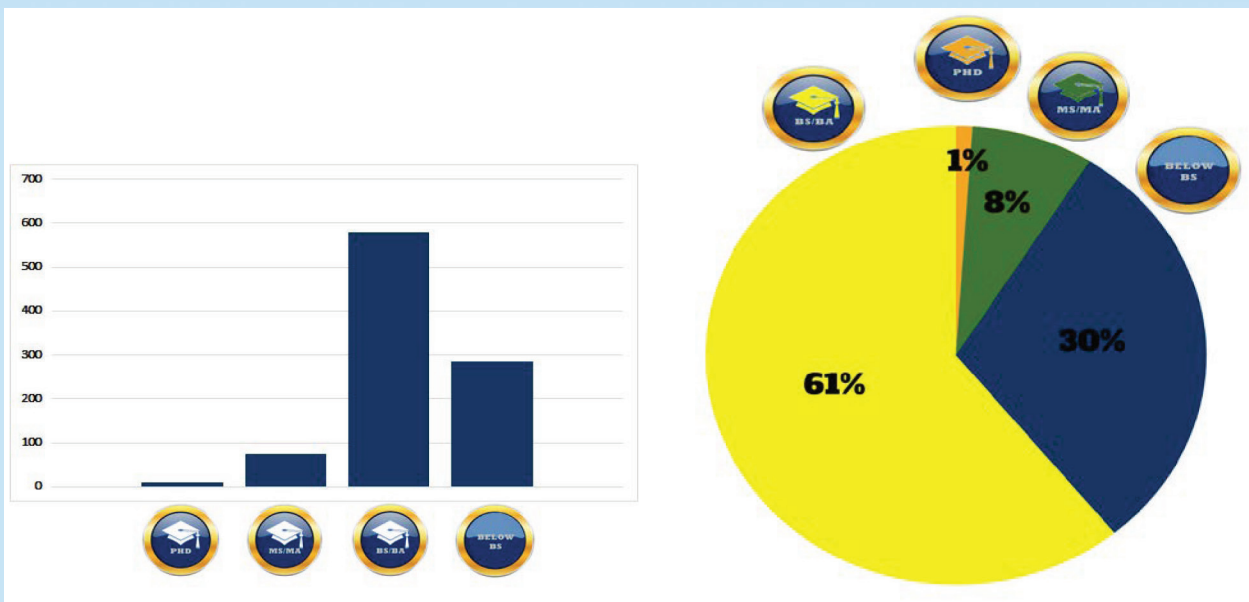


The table below shows that 663 out of 949 employees or 70% of the total population of the Agency are professionals. 61% of them have Bachelor's Degrees, 8% have Master's Degrees and 1% have Doctorate Degrees.

DISTRIBUTION OF PERSONNEL BY EDUCATION AND SEX

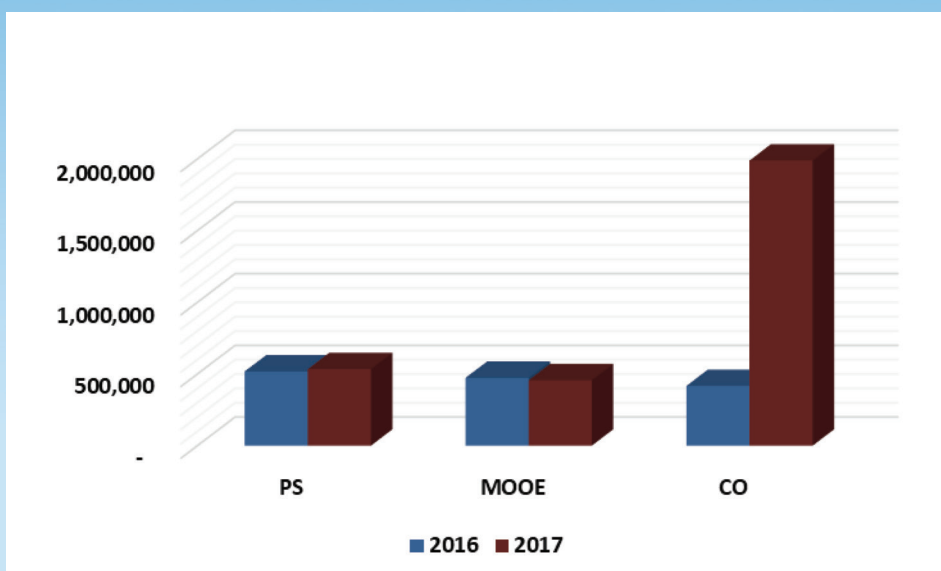
Reference: PLANTILLA OF PERSONNEL AND JOB ORDER as of DECEMBER 31, 2017

LEVEL OF EDUCATION	MALE	FEMALE	TOTAL NO. OF PERSONNEL	%
PHD	6	4	10	1.1%
MS/MA	33	42	75	7.9%
BS/BA	330	248	578	60.9%
BELOW BS	221	65	286	30.1%
TOTAL	590	339	949	100%



Comparative Budget Utilization, FY 2016-2017

Compared to the budget utilization in 2016, the utilization in 2017 had remarkably increased from 1,408,520.00 to 2,980,011.00 equivalent to 112%. The vast increase of utilization is due to the expenses in Capital Outlay.



COMPARATIVE EXPENSES (In Thousand Pesos)			
	2016	2017	%
PS	518,238	534,406	3%
MODE	473,389	456,400	-4%
Regular	454,424	454,851	
Locally-Funded Projects (LFPs)	-	1,549	
Cloud Seeding Operations	18,965	-	
CD	416,893	1,989,205	
Regular	404,363	1,477,867	
Locally-Funded Projects (LFPs)	1,923	510,913	
Cloud Seeding Operations	10,607	425	
TOTAL	1,408,520	2,980,011	112%

PUBLISHED RESEARCH PAPERS

In 2017, the research group of PAGASA was able to publish three (3) peer reviewed scientific journals:

Title: **Evaluation of Spatial Interpolation Techniques for Operational Climate Monitoring in the Philippines**
Authors: Joseph Q. Basconcillo, Ger Anne W. Duran, Aaron A. Francisco, Rusy G. Abastillas, Flaviana D. Hilario, Edna L. Juanillo, Ana Liza S. Solis, Anthony Joseph R. Lucero, Shalou-Lea A. Maratas
Publication: *Scientific Online Letters on the Atmosphere*

Title: **Climate Insights on Academic Calendar Shift in the Philippines**
Authors: Marcelino Q. Villafuerte, Edna L. Juanillo, Flaviana D. Hilario
Publication: *Philippine Journal of Science*

Title: **Correlation of Aerosol Optical Properties with Surface Meteorological Parameters over Mnaila**
Authors: Rhonalyn L. Vergara, Ernest Macalalad, Gerry Balagtas, Edgar A. Vallar, Maria Cecilia D. Galvez, Raquel V. Francisco
Publication: *American Scientific Publishers Advanced Science Letters, Vol. 23, Number 2, pp. 1448-1451, 2017*

AGENCY'S INCOME GENERATING RESOURCES

Below is the list of various PAGASA products and services which generated an income in the amount of **₱9,719,729.03**. Said amount was forwarded to the Bureau of Treasury.

PAGASA PRODUCTS AND SERVICES	GENERATED INCOME
Hydromet/Hydrologic Prediction and Frequency Analysis & Other Information (Rainfall Intensity Duration Frequency – RIDF)	₱ 83,900.00
Customized Climatological Data/Weather Publications	₱ 1,045,941.00
Weather Certifications	₱ 7,804,444.53
Accommodation of visitors to planetarium lectures & shows at Central Office	₱ 327,750.00
Mobile Planetarium Lectures / Stargazing / Telescoping on Tour to Schools in Luzon	₱ 50,500.00
Viewers to Stargazing and Telescoping Sessions	₱ 13,175.00
Astronomical Publications, Information and Certifications	₱ 20,760.00
Number of assorted meteorological instruments calibrated for various clients	₱ 373,258.50
TOTAL	₱ 9,719,729.03

OTHER ACCOMPLISHMENTS

Ceremonial Signing Held for the IRR of the PAGASA Modernization Act of 2015



(From left to right: Dr. Landrico U. Dalida, Jr., Dr. Vicente B. Malano, Secretary Fortunato T. de la Peña, Dr. Flaviana D. Hilario, and Engr. Catalino L. Davis)

Nearly three (3) years after its enactment, the Implementing Rules and Regulations (IRR) of the Republic Act 10692, otherwise known as the “The PAGASA Modernization Act of 2015”, has been completed after careful deliberation and series of public consultations.

Held on 16 October 2017 at the Philippine Science High School (PSHS), the signing of the IRR was conducted between DOST and PAGASA, headed by Secretary Fortunato T. de la Peña and Administrator Vicente B. Malano.

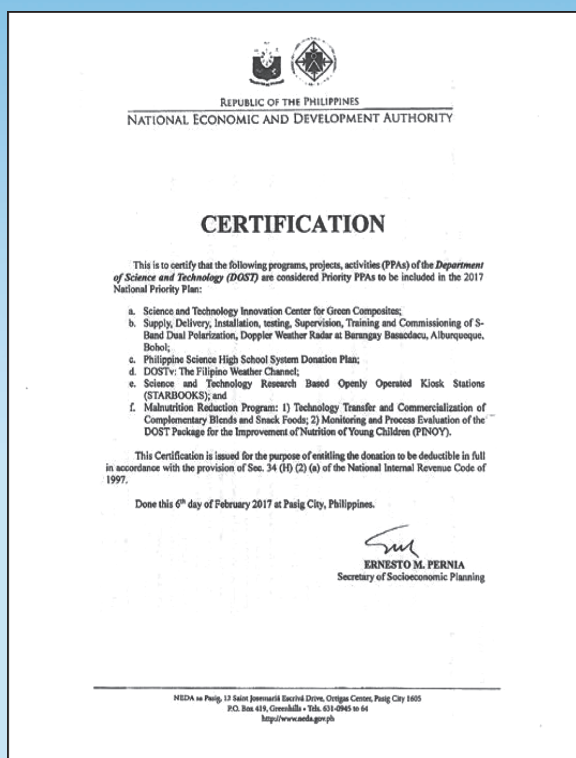
The event was witnessed by Dr. Carol M. Yorobe, DOST Undersecretary for S&T Services, Ms. Lilia T. Habacon, Executive Director of the PSHS, Dr. Josette T. Biyo, Science and Education Institute (SEI) Director, PAGASA Deputy Administrators Dr. Landrico U. Dalida, Jr., (Operations and Services) Dr. Flaviana D. Hilario (Research and Development) and Engr. Catalino L. Davis (Administrative and Engineering Services). Some members of the PSHS System Board of Trustees and Representatives were also present, namely, Dr. Leticia Peñano-Ho (Education for the Gifted Sector), Dr. Alan T.

Ortiz (Industry Sector) and Dr. Danilo C. Lachica (New and Emerging Technology).

DBM Secretary Benjamin E. Diokno also signed the IRR of the RA 10692 on 21 December 2017. RA 10692 aims to modernize PAGASA's technological operational capacity and strengthen its role as the premier national weather agency to attain its vision as a center of excellence for weather-related information services.

The long-awaited Modernization Act is a huge boost for the Agency as it comprises the modernization of physical resources and operational techniques through acquisition and development of state-of-the-art instruments, equipment, facilities and systems. This will also enhance the R&D capability as well as establish regional weather service centers, enhance weather data collection and information dissemination services, create human resource development and retention incentive program, and develop regional and international cooperation program.

Inclusion of PAGASA's Programs/Projects/Activities (PPA) in the 2017 National Priority Plan (NPP)



On 06 February 2017, the National Economic and Development Authority (NEDA) Technical Committee on the NPP, approved the inclusion of six (6) DOST Program/Project/Activities (PPAs) in the 2017 NPP.

The NPP is a list of PPAs in education, health, youth and sports development, human settlement, science and culture, and economic development. Inclusion of PPAs in the NPP will entitle private sector donors/donations to full donor's tax deduction. This is also one mode to mobilize private sector participation in the national development and financing the government's expenditure thrusts to free public resources for other development activities.

The six (6) PPAs included in the list were as follows:

1. Science and Technology Innovation Center for Green Composites by ITDI
2. Philippine Science High School System (PSHSS) Donation Plan by PSHS
3. DOSTv: The Filipino Weather Channel by STII
4. Science & Technology Research Based Openly Operated Kiosk Stations (STARBOOKS) by STII
5. Malnutrition Reduction Program by FNRI
6. Supply, Delivery, Installation, Testing, Supervision, Training and Commissioning of S-Band Dual Polarization, Doppler Weather Radar at Barangay Basacdaco, Alburquerque, Bohol by PAGASA

According to NEDA, the six (6) DOST PPAs are consistent with the existing government thrusts and the 0+10 Socioeconomic Agenda of the current administration and will make a significant contribution in the implementation of the Agency's mandates. More specifically, the Technical Committee on the NPP noted that the PAGASA project is supportive to the objectives of the Updated Central Visayas Regional Development Plan, 2014-2016, to build up the adaptive capacity and resilience of Central Visayas communities to disasters.

ANNUAL SCIENCE AND TECHNOLOGY CELEBRATIONS

National Astronomy Week



The 2017 National Astronomy Week (NAW) was held from 20-26 February 2017. Stargazing and telescoping sessions at the PAGASA Astronomical Observatory and free planetarium shows were the highlight of the said event. A mobile free planetarium shows were also conducted at the PAGASA Planetarium, Quezon City and Pili, Camarines Sur that benefitted 29 schools of the said province.

Other activities included in the celebration were the conduct of workshop on *Basic Potential and Observational Astronomy* for Public School Science Teachers participated by 64 Science Teachers and the Star Party Contest in which nine (9) high schools at Pili, Camarines Sur competed.

2017 National and World Meteorological Day (NWM Day)



The World Meteorological Organization (WMO) and its member states marked the World Meteorological Day (WMD) which commemorates the entry into force of WMO on 23 March 1950. March 23rd every year was also proclaimed in the Philippines as National Meteorological Day (NWM Day) by virtue of Presidential Proclamation No. 549.

Each year, the WMO chooses a theme for the celebration to focus on a relevant meteorological issue affecting the society and the environment. The theme of the 2017 celebration was "*UNDERSTANDING CLOUDS*", chosen to highlight the enormous importance of clouds for weather, climate and water. It emphasized that, clouds are central to weather observations and forecasts and are one of the key uncertainties in the study of climate change

PAGASA, as one of the members of WMO, led the commemoration of the 2017 WMD in the Philippines.

Some of the significant activities of NWM Day were the conduct of Scientific Forum, awarding ceremonies for the PAGASA Gawad and Loyalty, and conferment of PAGASA Wind Vane Awards. The Philippine Weathermen Employees Association (PWEA) sponsored some activities in

the form of fun games, to add excitement to the celebration.

A total of 114 persons actively participated in the Scientific Forum representing various sectors of the society like the academe, agriculture, disaster preparedness and private sectors.

The Loyalty awards were bestowed to the PAGASA employees who have served the Government for 10, 15, 20, 25, 30, 40 and 45 years. Awards for compulsory retirement, optional retirement and posthumous were also given during the event.

Lastly, the Wind Vane awards were conferred to outstanding individuals/organizations for valuable assistance to PAGASA. The awardees were Ms. Bettina F. Magsaysay, Mr. Rodolfo A. De Guzman, Mr. Rolando B. Distura, Mr. Leonardo Genesis T. Calingasan, Ms. Thelma P. Japzon, Ms. Jessica G. Gumop-as-Tirol, the United Nations – World Food Programme and the Oscar M. Lopez Center.

The culmination of the WMD 2017 celebration was a binding proof of a world level cooperation.

2017 National Women's Month Celebration (NMWC) - Make Change Work for Women

"let her beloved not only for her beauty and amiable character, but also for her strength of mind and loftiness of purpose, which enliven and raise the feeble and the timid and ward off all vain thoughts. Let her be the pride of her country and let her command respect."

- Dr. Jose Rizal, Letter to the Women of Malolos

To celebrate the 2017 National Women's Month, the PAGASA Gender and Development Focal Point System (GFPS), with the support of the PAGASA Executive committee, arranged a short film showing cum forum, which featured the musical-docu-drama *"Ang Kababaihan Ng Malolos"*. Held at the PAGASA's Amihan Conference room on 17 March 2017, it was attended by 34 PAGASA employees (32 females and 2 males).

Mr. Vicente "Bong" Enriquez, President of The Women of Malolos Foundation Inc. (WOMFI) and one of the great grandsons of one of the women featured in the film, was invited as guest speaker. He talked about the story and significance of how the movie's group of women wanting change, successfully fought for the education and empowerment of women in the Philippines during the oppressive Spanish colonial regime.

The struggle for change theme was timely and in line with the objective of the 2017 National Women's Month Celebration **"We Make Change Work for Women"**. According to the Philippine Commission on Women (PCW), this was inspired by President Rodrigo Roa Duterte's first State of the Nation Address (SONA) wherein he directed all government agencies to fully implement the Magna Carta of Women.

The PCW also said that the elements of the theme are "WE" which stands for Women's Empowerment, "Make Change Work" or the initials MCW" co-relates to the Magna Carta of Women and "Change", also means Compassionate and Harmonized Actions and Networks for Gender Equality.

The PGFPS once again actively participated in various activities lined up for the 2017 NWMC. To kick off the celebration on 27 February 2017, Dr. Flaviana D. Hilario, PGFPS Chairperson, announced the celebration and all activities to



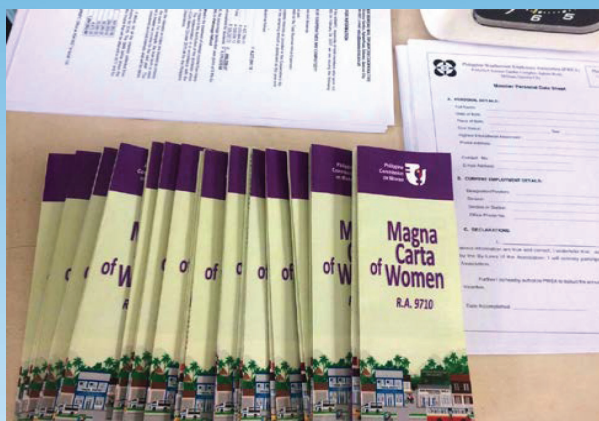
be conducted during the month of March.

MCW reading materials with contents suggested by the PCW were re-printed by the PGFPS and distributed to the PAGASA employees. Tarpaulins were also posted on Central Office Gender and Development (GAD) corners.

Five (5) female employees of the Agency attended the PCW's Women Inspiring Women Forum held at the Government Service Insurance System (GSIS) Theatre, Pasay City in celebration of the International Women's Day on 8 March 2017. The forum invited successful women leaders such as Ms. Lisa Macuja-Elizalde, Rep. Geraldine Roman, Atty. Jennifer Tauli-Corpuz and Rep. Emmeline Aglipay-Villar.

On 10 March 2017, seven (7) PAGASA employees (4 females and 3 males) joined the DOST NWMC held at the DOST compound, Bicutan, Taguig City. Formatted after the PCW's forum, the agency invited successful women entrepreneurs to give their respective testimonies.

The 2017 NWMC was another success which further encouraged PAGASA employees to take active roles in the upcoming GAD celebrations.



Typhoon and Flood Awareness Week (TFAW)



With the official declaration of the onset of the rainy season, PAGASA planned various activities for the observance of the TFAW.

TFAW is conducted every third week of June by virtue of Presidential Proclamation 1535, series of 2008. The theme for 2017 is *"Science-based Information for Safer Nation against Typhoon and Flood"*.

With support from the Philippines Science Journalists Association, Inc. (PSciJourn), other government agencies and the private sector, TFAW aimed to educate the public and promote hazards and mitigation awareness through public information dissemination campaigns on typhoon and flood awareness and mitigation.

Since the start of the month of June, PAGASA hanged streamers in its offices and field stations, as well as encouraged participation from other government agencies.

The Agency also conducted Typhoon and Flood Awareness Seminar for the local government of the 2nd district of Bohol. This was in partnership with the Science and Technology Committee of the House of Representatives headed by Congressman Erico Aristotle Aumentado.

Another major activity of the TFAW was the conduct of Media Seminar-Workshop for NCR. It aimed to establish a good working relationship with the media and help update their basic knowledge in meteorology particularly on DRRM. The three-day seminar on 23–25 June 2017 was held in Morong Bataan.

Aside from the danger of floods, the public was encouraged to be more aware and to prepare for other hazards associated with typhoon such as heavy rains, strong winds, storm surges, landslides, and mudflows.

National Science and Technology Week (NSTW)



In the 1950's, the National Science Development Board (forerunner of DOST) spearheaded the Philippine National Science Week celebration on the third week of November. It became the backdrop for conferring recognition and appreciation to outstanding scientists, researchers, inventors and institutions.

The NSTW was institutionalized in 1982, through Proclamation No. 2214, signed by Pres. Ferdinand E. Marcos, which designated the second week of July each year for its observance. However, in 1993, the NSTW celebration was moved from 2nd week to third week of July, through Proclamation No. 169, under the Ramos administration.

The Science and Technology Master Plan (STMP) was launched by the Aquino administration during the 32nd NSTW celebration in 1990 to establish the desired direction of S&T development in the country. The S&T Fair was included in the line-up of important activities of the NSTW during the same year. It became the banner activity throughout the 1990s.

The 2017 NSTW theme is *Science for the People* while the Disaster Cluster sub-theme is *Preparing for Extreme Disasters*.

The conduct of *Disaster Summit for School Children: A Science Experience for Kids* was one of the major activities of the celebration. It was originally intended for the DSWD scholars who are former street children so they could learn better appreciation and experience the wonders of Science.

The summit was held in two (2) batches at the World Trade Center in Manila on 11-12 July 2017. It aimed to teach the young generation on the importance of awareness and preparedness on extreme disasters brought by typhoons, earthquake, and even the dangers of radiation. It was organized by DOST-PAGASA, in collaboration with the Advanced Science and Technology Institute (ASTI), National Research Council of the Philippines (NRCP), PHIVOLCS, and Philippine Nuclear Research Institute (PNRI).

PAGASA was included in the familiarization tour/field trips of different schools, with kids as young as those in the nursery level. The tour included lecture on weather, and a planetarium show. Activities such as experiment on how clouds are formed, earthquake drill and demonstration on how to detect radiation were the other interesting components of the program.

Other important activities of the NSTW included various awards for basic and applied research, technology transfer, technology commercialization and S&T promotion, scientific meetings, technical and investment forums, technology demonstrations, and technical tours.

LIST OF 2017 PROJECTS

Foreign-funded Projects:

PROJECT	SOURCE OF FUNDS	STATUS
Scaling Up Risk Transfer Mechanisms for Climate Vulnerable Agriculture-based Communities in Mindanao (WIBI Mindanao Project)	UNDP	Completed
Services for the development of municipal level sub-seasonal surface wave height and solar radiation forecast products under UNFA/GLO/616/UND on Integrating Agriculture Sectors into National Adaptation Plan (NAP-AgS Project)	FAQ	On-going
Action Ready Climate Knowledge to Improve Disaster Risk Management for Small Holder Farmers in the Philippines (ACIAR ASEM Project)	ACIAR	On-going
Rehabilitation of the Equipment for the Project to Strengthen Flood Forecasting and Warning System in the Bicol River Basin (NPGA Bicol Project)	NPGA-Government of Japan	On-going
Japan's Non-Project Grant Aid for Provision of Japanese SMEs Products (NPGA Mindanao Project)	Government of Japan/JICS	On-going
Automation of Flood Early Warning System for Disaster Mitigation in Greater Metro Manila (KOICA 3 Project)	KOICA	On-going
Development and Implementation of User-Relevant End-to End Hydrological Forecast Generation and Application System for Disaster Mitigation in the Philippines (RIMES Project)	Government of India through RIMES	On-going
Resilience and Preparedness towards Inclusive Development (RAPID) Program under the Project Climate Twin Phoenix (PCTP) (RAPID Program)	UNDP	On-going
Strengthening Capacity of Integrated Data Management of Flood Forecasting and Warning (JFreeDAM Project)	JICA	On-going

Projects funded by other Government Institutions:

PROJECT	SOURCE OF FUNDS	STATUS
Deployment of Early Warning System in Disaster Prone Areas Dews Project	DOST - PCIEERD	Completed
Improvement of Forecast Capability on Weather, Marine Meteorology and Short Range Climate (MECO-TECO Program)	DOST - PCIEERD	On-going
Project 1: Typhoon Formation, Structure and Intensity Change in Western NP and Wave Observation and Modeling Project 2: Heavy Rain Monitoring and Forecasting in the Mountainous Area and Early Warning Landslides Project 3: Observations and Dynamical Downscaling of Seasonal and Sub-Seasonal Forecast		On-going
Hydro-Met Information, Risk Assessment, and Inter-linkages of Advisories (HIRAIA Project)	DOST - PCIEERD	On-going

GAA-Funded Projects

PROJECT	SOURCE OF FUNDS	STATUS
Advance Data Consolidation, Enhancement of Web and Dissemination including Mirror Forecasting Project	GAA	On-going
Advance Visualization and Enhancement of Weather Forecasting Project	GAA	On-going
Unified Communication Project	GAA	On-going
Integration of All Information System of HMD	GAA	On-going
Climate Monitoring and Prediction System (CLIMPS)	GAA	On-going
Farm Weather Information System	GAA	On-going
Sectoral Impact Modeling System	GAA	On-going

WAY FORWARD

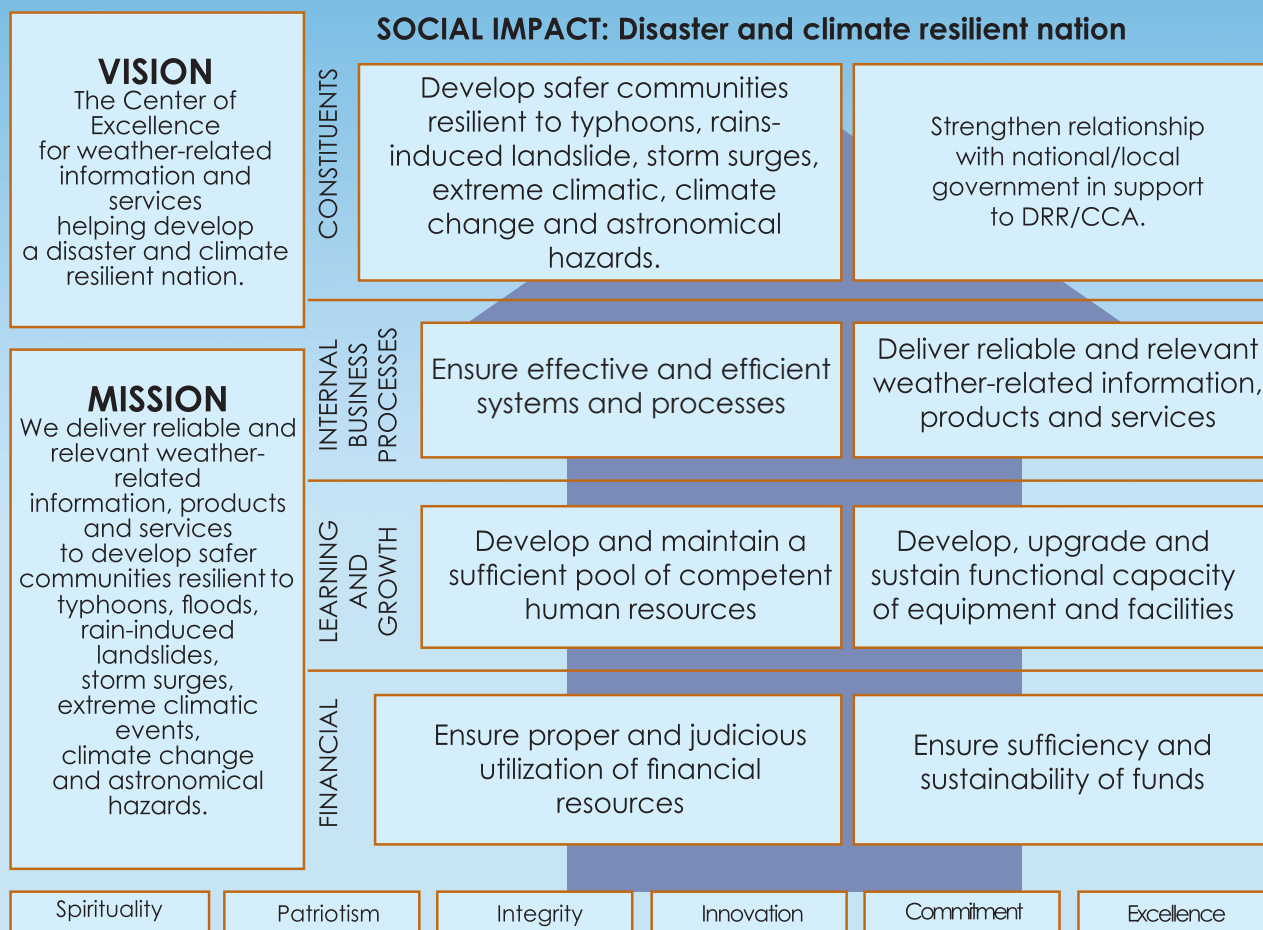


PAGASA acknowledges that various strategies should have to be done to deliver the kind of services that are expected of the Agency. A Performance Review and Analysis (PRA) on the performance of the functional units and Planning Conference was conducted on 19-21 January 2017. The conference identified key activities in 2017 and some pressing concerns that needed immediate solutions. Further, priority programs and recommendations were finalized.

In August 2017, a Strategic Planning workshop was conducted to produce the PAGASA 2018-2022 Strategic Plan wherein the new vision, mission and values of the Agency was reflected in the PAGASA Strategy Map for 2018-2022. In addition, priority programs and projects were identified to be implemented in the succeeding five (5) years.

PAGASA

2018-2022 STRATEGY MAP



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