Public-Private Engagement (PPE) in Weather, Climate and Water Services

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WMO Secretariat

8 September 2023

"We WELCOME

- *The **opportunities** for all stakeholders and the broader user community **that will result from a closer collaboration** among public, private and academic sectors;*
- ***The engagement of all sectors in addressing the societal needs** through weather, climate, water and other environmental information and services;"*

From the Geneva Declaration – 2019


WORLD METEOROLOGICAL ORGANIZATION

GENEVA DECLARATION – 2019:

BUILDING COMMUNITY FOR WEATHER, CLIMATE AND WATER ACTIONS

We, the delegates from 160 Member States and Territories of the World Meteorological Organization (WMO), meeting in Geneva from 3 to 14 June 2019 at the Eighteenth World Meteorological Congress, having considered:

declare as follows:

Today's Outline

- What is PPE? --- WMO's definition
- Why PPE?
- A variety of Modalities
  --- Challenges and Examples
- More Resources?
- On-going activities
- EW4All

- Discussion

Terminology – Public-Private Engagement

Public-Private Engagement (PPE):

Collaboration between NMHSs (and/or other public agents) and private sector entities to produce and deliver weather, climate, hydrological, marine and related environmental **information and services** while **respecting the public interest and the mandates of NMHSs** and **keeping in mind budgetary constraints**.

(WMO Guidelines for Public-private Engagement (2021 edition))

Drivers for Public-Private-Academic Engagement (1/2)
Growing needs

Agenda 2030 / <u>Sustainable Development Goals (SDG)</u>

Calling for engagement of non-state actors

Sendai Framework for <u>Disaster Risk Reduction</u> 2015-2030

"…There is a need for the public and private sectors and civil society organizations, as well as academia and scientific and research institutions, <u>to work more closely together and to create opportunities for collaboration</u> …"

Paris Agreement
(int'l treaty on <u>climate change</u>)

Public-Private sector participation is recognized as a key for integrated, holistic and balanced non-market approaches to assist in the implementation.

Drivers for Public-Private-Academic Engagement (2/2)
Changing environments and technologies

Why Public-Private Engagement (PPE)?

In short, this is because PPE will/can be beneficial to every stakeholder, collaboratively providing solutions to materialize further better services to all users, meeting various needs more **efficiently/effectively**, **sustainably**, **resiliently**, and with **even higher quality** utilizing **cutting-edge technology** while **maintaining and enhancing relevant missions, skills and expertise**.

Diversity between and within sectors

There is no one-size-fits-all because the situation depends upon Members

Public sector

- Various institutional arrangements, legal frameworks
- Business models, economic parameters
- Roles and responsibilities of NMHSs (e.g., with regard to hydrology, aviation …)
- Commercial (for-profit) spinoffs

Private sector

- Sub-sectors: equipment manufacturers, system integrators, media, service delivery, data brokers, observations, IT providers, consultants
- Size – from individuals to hundreds of employees
- Operations – local, national, regional, global
- Non-profit spinoffs

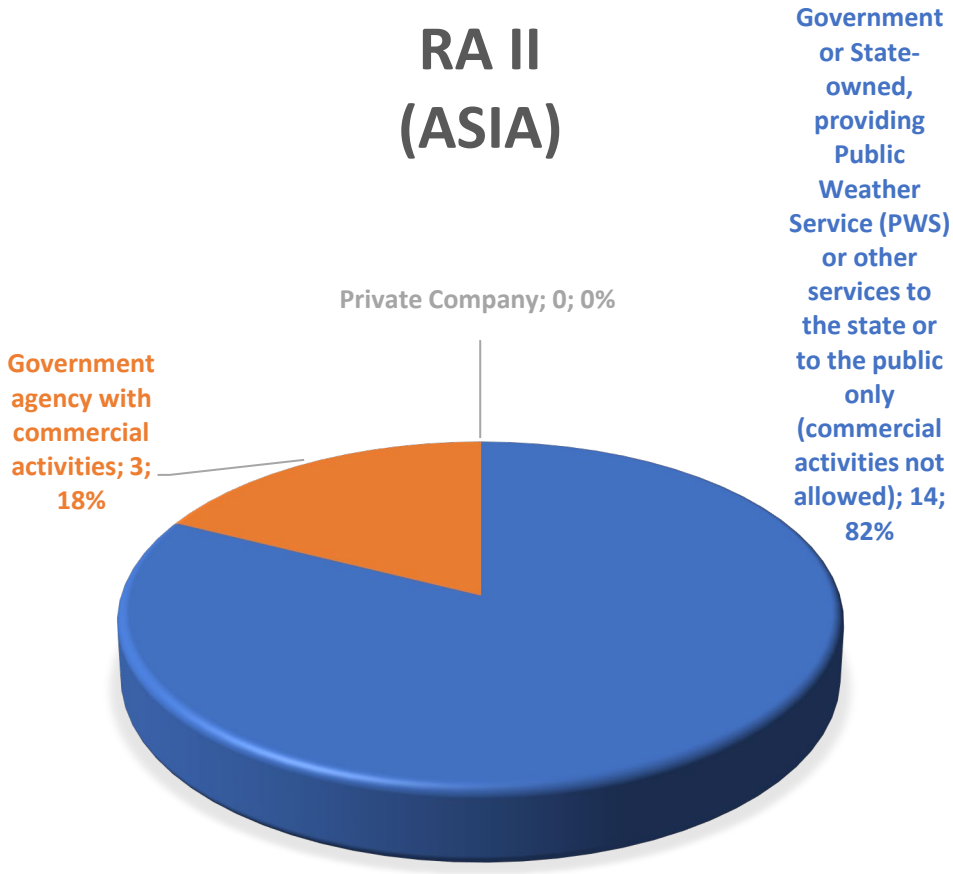
The three-sector weather enterprise public-private-academia

- Main issues between the public and private sector:
  - Engagement in the value chain – evolving with the technology and demand
  - Data ownership and data sharing
  - Roles and responsibilities
  - Funding, business approaches, markets

- Complaints from both sides: unfair competition, monopolism, protectionism, quality
- Net result – erosion of trust, barriers to achieve the full potential of the enterprise in the interest of society

Legal status of National Meteorological Services

RA II (ASIA)



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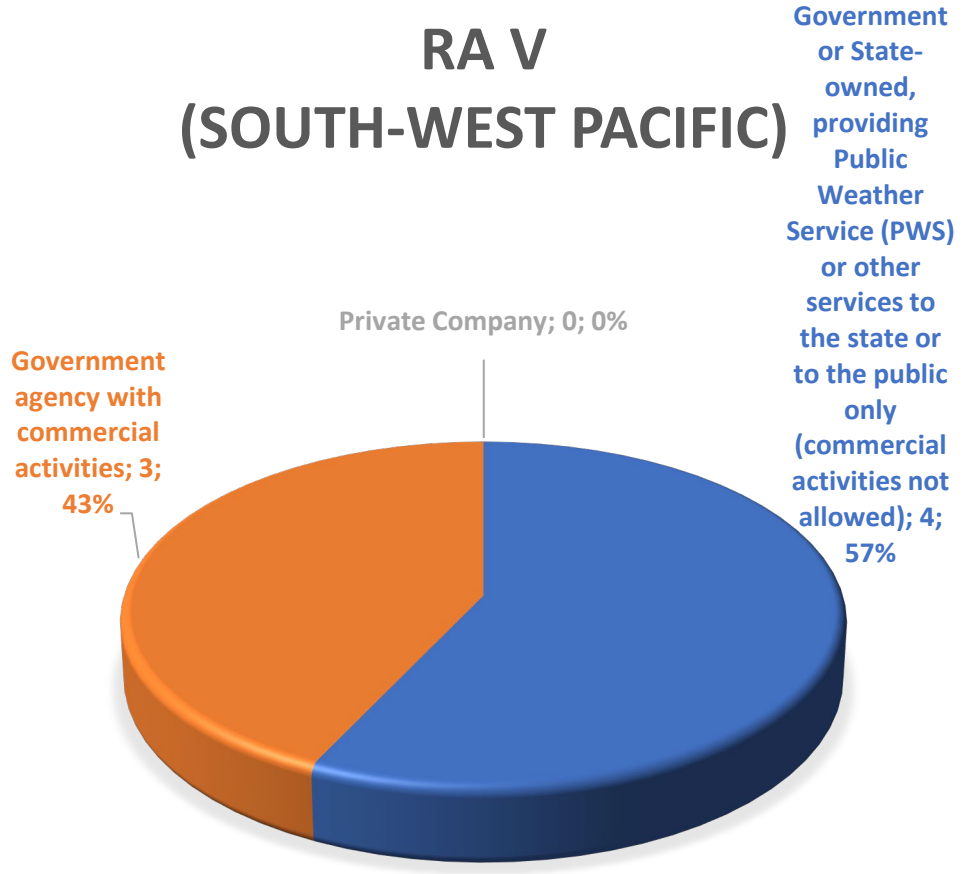
RA V (SOUTH-WEST PACIFIC)



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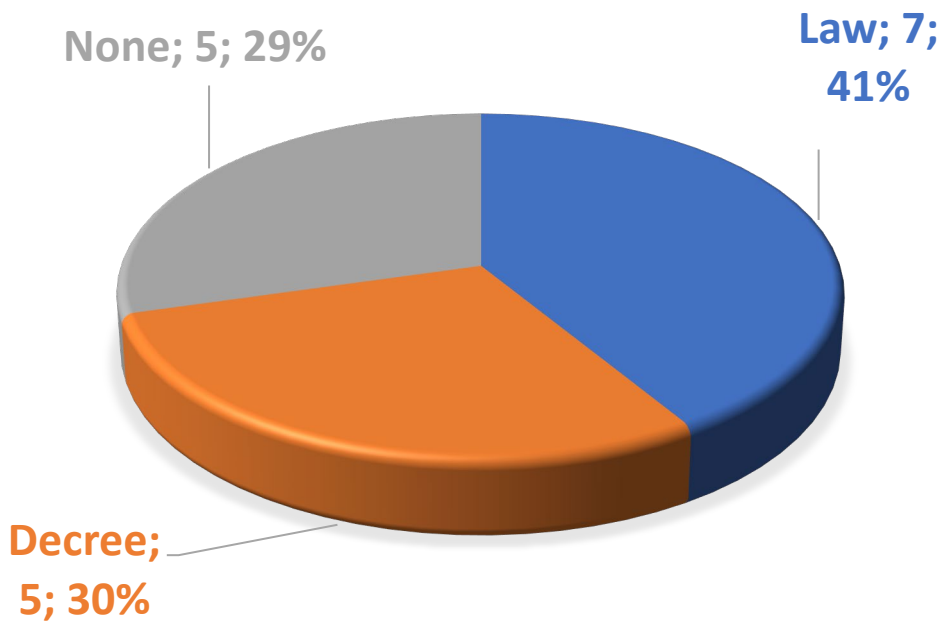
Legislative act regulating meteorology (or hydrometeorology)

RA II
(ASIA)



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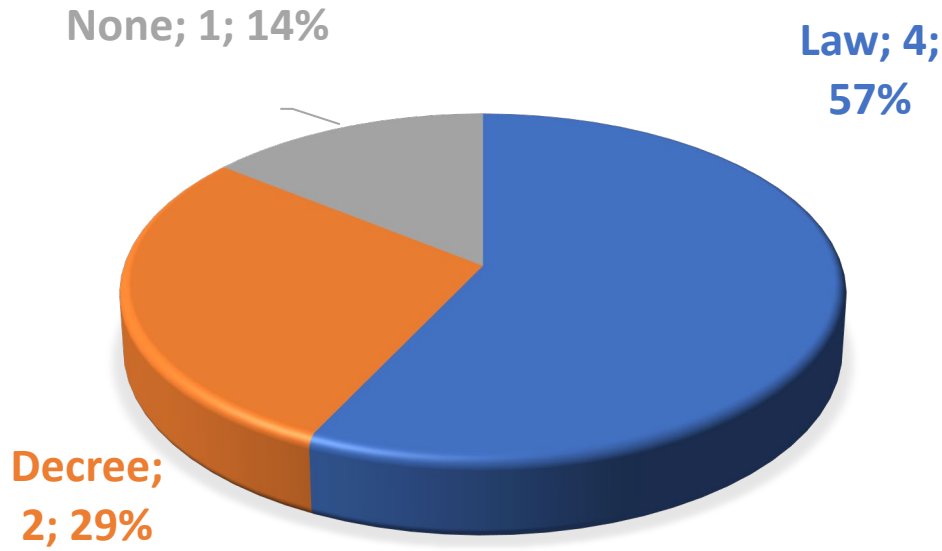

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Legislation provisions concerning private sector participation in the delivery of information

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Number of answers: 16/24

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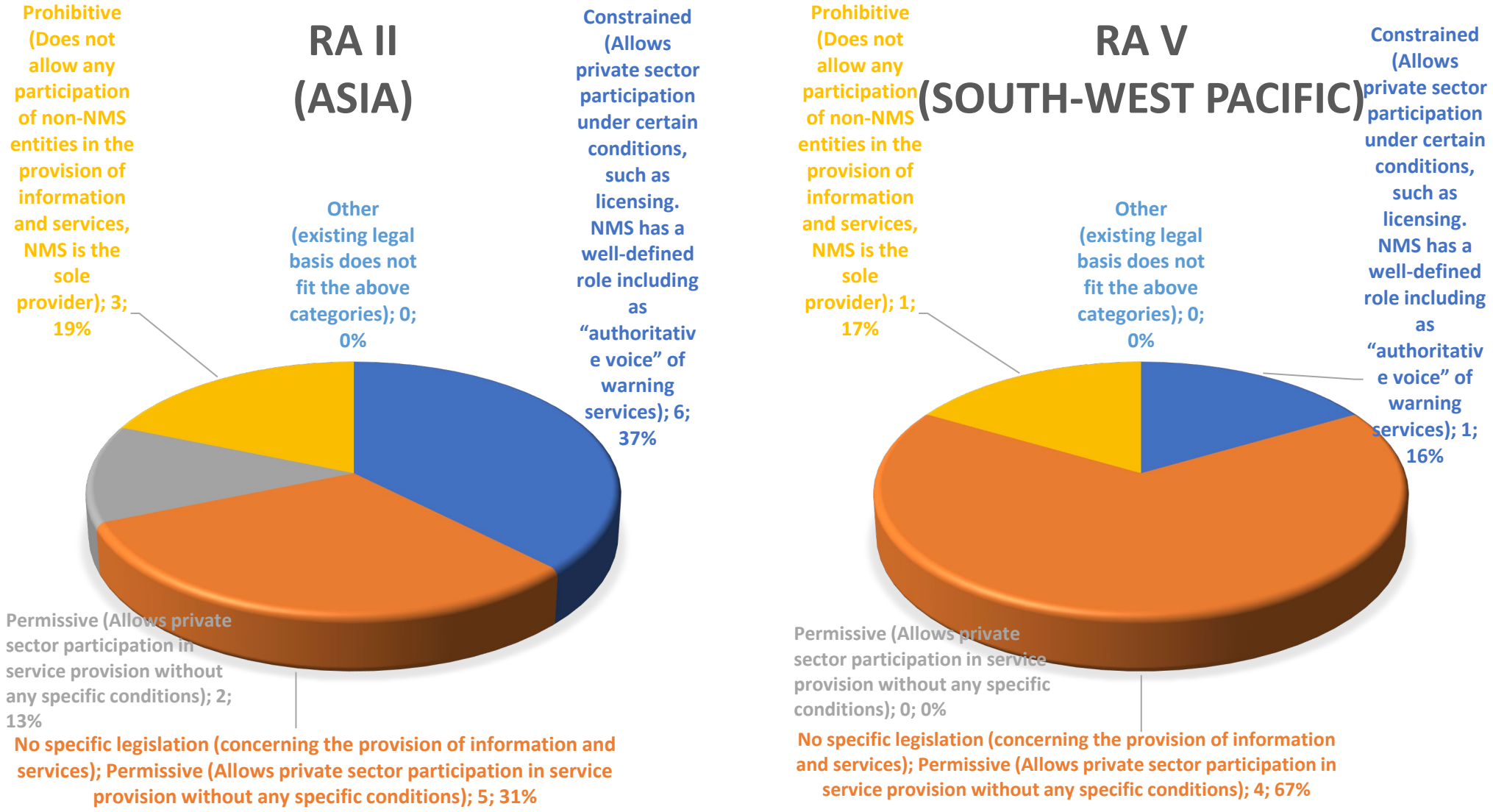

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Role of NMS as authoritative voice of warning services

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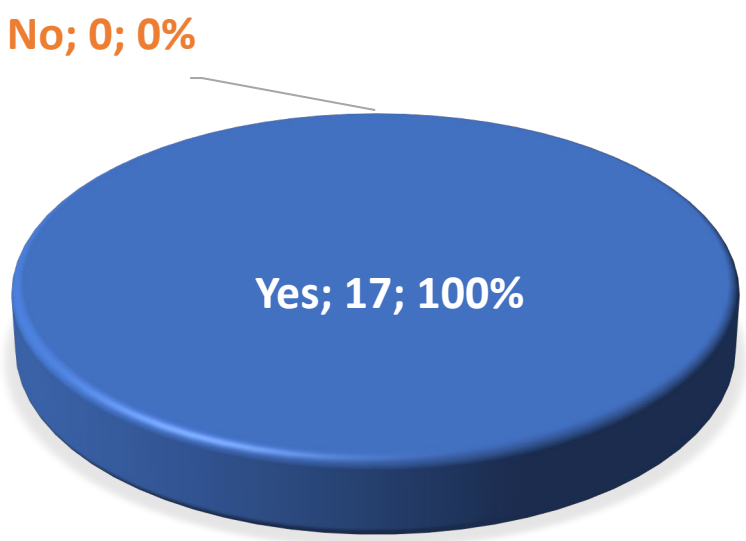

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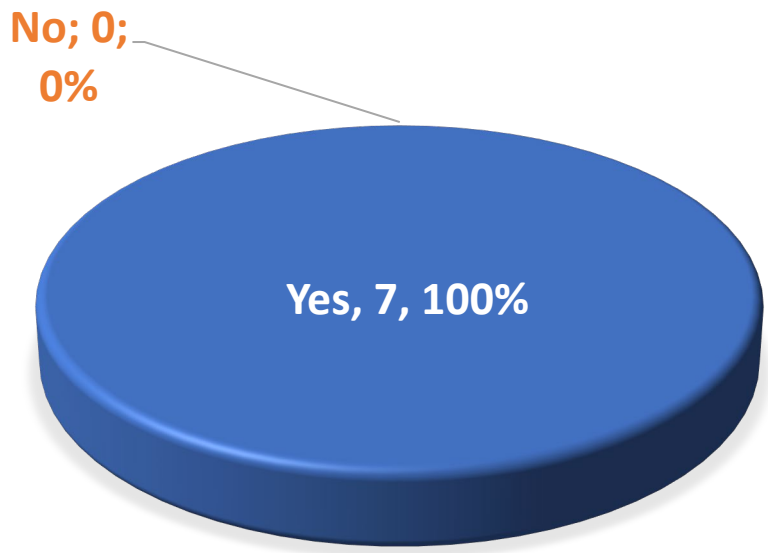

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Challenges…

- The private sector's evolution in capability and ongoing **Digital Transformation (DX) provide opportunities to WMO Members**, while in some/many Members there seems to remain **deep-rooted fear** to the private sector. **How can we dispel deep-seated fears?**
- To go forward in PPE, it is necessary to break through existing barriers such as:

- Lack of **mutual trust**

- Lack of **understanding** in opportunities and risks of PPE

- Lack of legislative/ institutional **framework**

- Insufficient Gov **funding**, which affects data sharing

- **<u>Dialogues</u>** through the Open Consultative Platform & Regional Forums
- **<u>Capacity Development</u>** through sharing good practices and training
- **Relevant <u>assistance</u> to WMO Members** to ensure regulator/promoter's roles
- Learning from **<u>business models; advocates needed</u>**

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WMO's Open Consultative Platform (OCP)

"PARTNERSHIP AND INNOVATION FOR THE NEXT GENERATION OF WEATHER AND CLIMATE INTELLIGENCE"

OCP-HL-1 (High-Level Round Table), June 2019

OCP-HL-3 on Evolving Roles and Responsibilities – Future of NMSs, June 2022

- The **Open Consultative Platform (OCP)**, established on the occasions of the 18th World Meteorological Congress in 2019, **serves as an open, constructive and participatory framework** for addressing the grand challenges of the global weather enterprise.
- In the spirit of collaboration, mutual respect, and trust, **the Platform enables all stakeholders to stay abreast of issues and opportunities**, both institutional and technological, **to motivate collaborative, win-win approaches and to nurture innovation**.
- **WMO plays a central global role** in facilitating the cooperation of WMO Member states and territories and their weather enterprise stakeholders.

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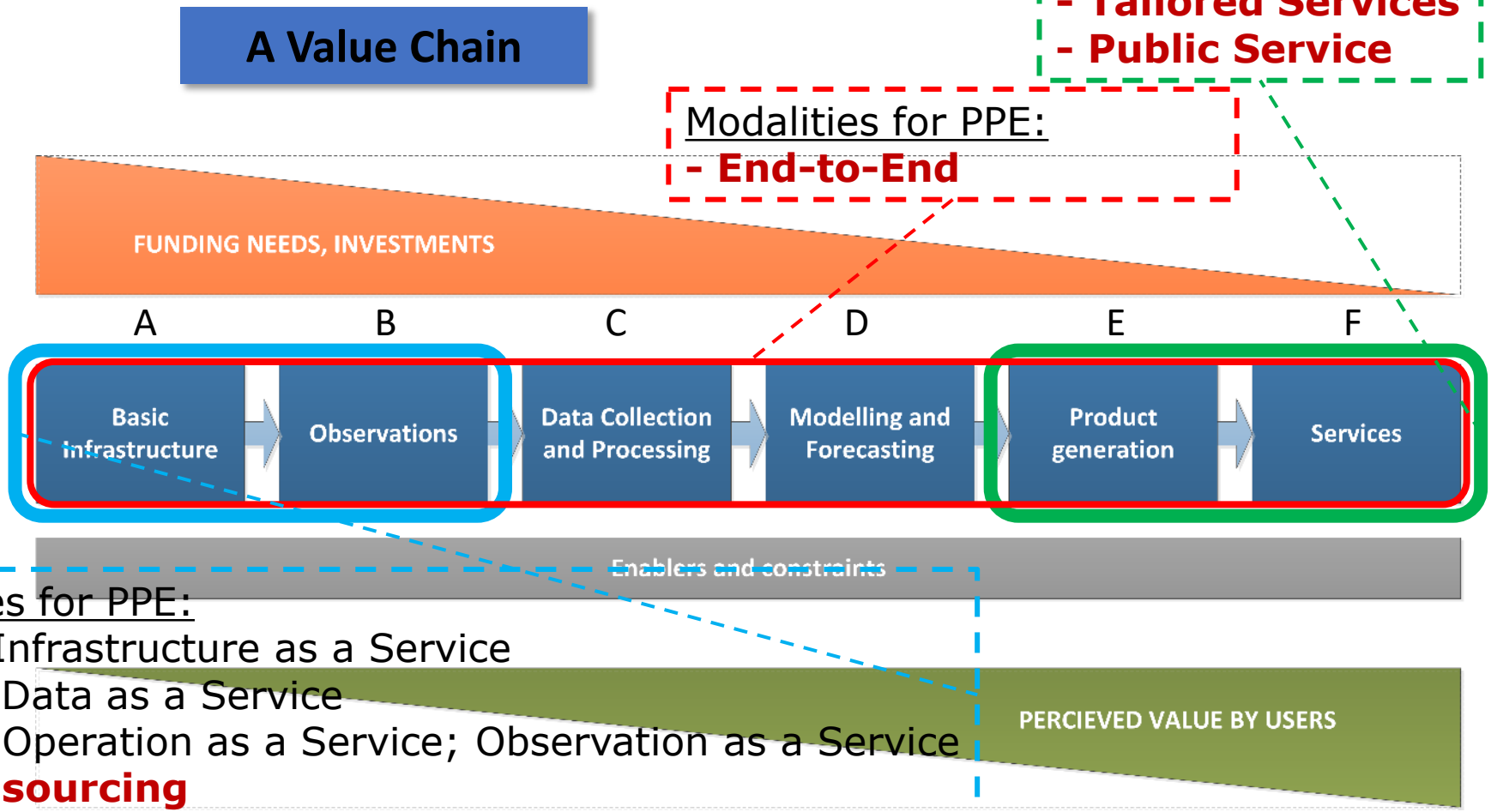
A Variety of Modalities for PPE

- There are a number of ongoing practices in many countries in a variety of modalities that fits in each NMHS's/country's context.

Modalities for PPE:
- **Tailored Services**
- **Public Service**

Modalities for PPE:
- **End-to-End**



Modalities for PPE:
- **IaaS** Infrastructure as a Service
- **DaaS** Data as a Service
- **OaaS** Operation as a Service; Observation as a Service
- **Crowdsourcing**

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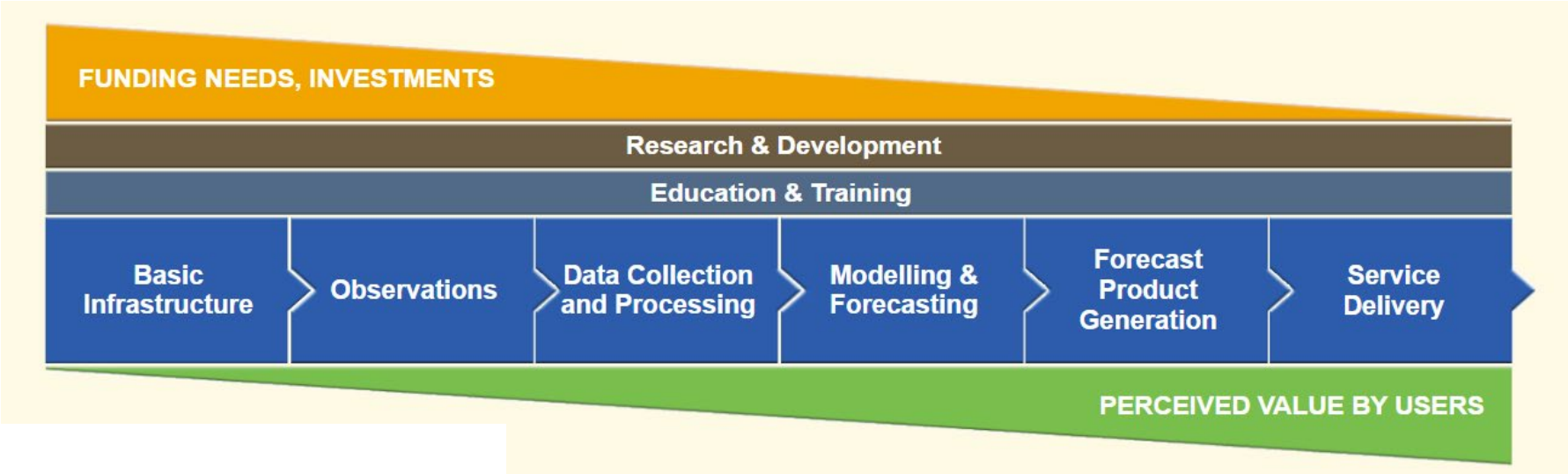
Diversity of modalities and clear interdependence between stakeholders

→ **Advocacy on public roles by stakeholders is important!**

A Value Chain with R&D and Education & Training



From Module 4 of a self-directed training course on ***Public-Private Engagement (PPE) in Weather, Climate and Water Services***.
Please refer to WMO Open Consultative Platform White Paper #2 (WMO-No. 1294), p. 18 & 69 for more information on the origins of this value chain model.

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Innovative Practices in Different Modalities
Evidence is better than debate…

Examples related to Public-Private Engagement Opportunities

- **Data sharing** (exchange of standardized data)
- **Crowdsourcing** (use of non-standard data)
- **Innovative approach** (in supercomputing, cloud computing or weather radar, incl. model* development)
- **Concession** (revenue sharing with the private sector)
- **Dialogue**
- **Open Data** (business model change)
- **Awareness Raising**
- **Procurement of services** from the private sector (IaaS and OaaS)
- **Licensing** the private sector
- Some **Win-win approach**

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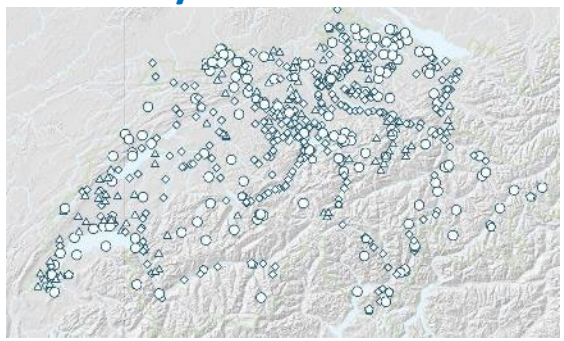
* Numerical Weather Prediction (NWP) model

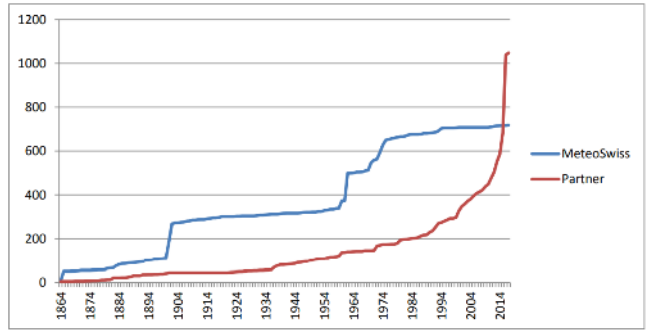
Innovative Scientific Approach
Use of public- and private-sector data for monitoring

Since 2011, **MeteoSwiss** has collaborated with **MeteoGroup (now DTN) and public partners to fill the measurement gaps** by integrating partner stations to provide warnings to 140 regions.

- In 2009, a warning concept, which divided Switzerland into around 140 warning regions, was operationally put in place with the goal to ensure at least one automatic weather station in each warning region measuring on a near-real-time basis.
- Based on an analysis it was shown that the existing gaps could be filled either by expanding the MeteoSwiss automatic weather stations network or by integrating existing partner stations. In addition to the already existing data exchange with **public partners**, in 2010, MeteoSwiss decided to also start cooperation with **private data providers**, while developing a procedure to evaluate a station's quality.
- Analyzing MeteoGroup's (now DTN) weather station network, 50 MeteoGroup stations, together with a number of stations operated by governmental agencies, have been integrated into the central data platform of MeteoSwiss since 2012, **adding great value to MeteoSwiss official duty tasks** such as forecasts, warnings or verification.

Current map of private and public partner stations integrated in the MeteoSwiss systems





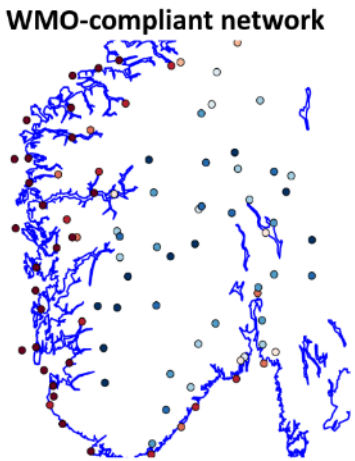
The amount of MeteoSwiss (blue) and partner (red) weather stations in the MeteoSwiss data warehouse.

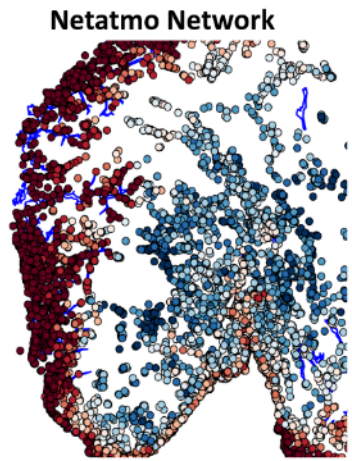
Details in PPE Resources in the WMO PPE website

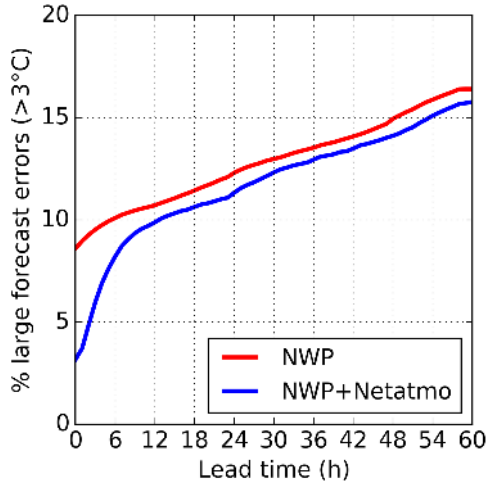
Innovative Scientific Approach
Crowdsourcing (use of non-standard data) for better temperature forecasting

MET Norway (Norwegian NMHS) **integrates private sector observations** from **Netatmo**'s Network in operational weather forecasting, while **MET Norway's QC enhanced the value** of Netatmo's freely accessible map.

- MET Norway integrates private-sector observations from Netatmo's network of Smart Weather Station to address the growing need for accurate and reliable weather predictions.
- Forecasting temperature is often a major challenge in Norway due to frequent inversion conditions and strong coastal gradients that are poorly represented even in the best state-of-the-art NWP models.
- The network has allowed MET Norway to **reduce the large forecast errors by a factor of three**, while the **quality-control** developed by MET Norway has been directly integrated into the Netatmo's freely accessible map and **enhanced the value of the map**.







Details in PPE Resources in the WMO PPE website

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Supercomputing & cloud computing

UK Met Office's partnership with Microsoft to harness next generation of **supercomputing** capability and **data technologies** to deliver innovation for weather and climate forecasting

1. In April 2021, the UK Met Office signed a multimillion-pound agreement with Microsoft for the provision of a world-leading **supercomputing** capability that will take weather and climate forecasting to the next level, and help the UK stay safe and thrive.

2. "Up until recently, the owning and operating of our supercomputing infrastructure have been set as another of those areas that we need to be experts ourselves. But our recent contract with Microsoft reflects the fact that we now see this as an area we can partner with industry to bring the best combination of expertise and capability together.... And moving our supercomputer to be close to a public **cloud** provides us with opportunities to leverage the elasticity and scalability of cloud and make our really huge data readily available to clients and partners."

Paragraph 1 and the slide (top right) from a WMO Open Consultative Platform (OCP) Innovation Webinar (Oct 2021); paragragh 2 and the photo from WMO's third high-level session of OCP (June 2022))

Supercomputing leap in weather and climate forecasting - Met Office

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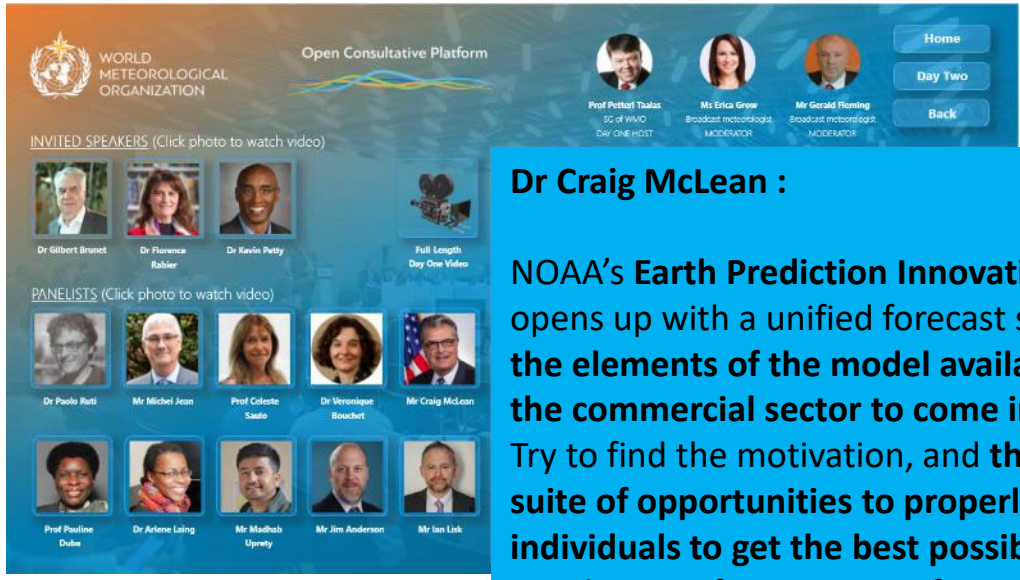
Collaboration in model development

NOAA's **Earth Prediction Innovation Center (EPIC) opens up** with a unified forecast system with all of the model's elements available **for academics or the commercial sector to come in and work through**.

Second High-Level Session of the Open Consultative Platform (OCP-HL-2) in May 2021; Day 1: Launch of the first OCP White Paper on Future of Weather and Climate Forecasting (vision 2030+)



Dr Craig McLean :

NOAA's **Earth Prediction Innovation Center (EPIC)** opens up with a unified forecast system that has **all of the elements of the model available for academics or the commercial sector to come in and work through**. Try to find the motivation, and **then harvest from that suite of opportunities to properly motivated individuals to get the best possible product**. There may be a profit motivation for a commercial company but that does not dissuade us. This is a very compatible methodology for us.

Video ¦ Summary ¦ Discussion

Improvement in **Data Quality**

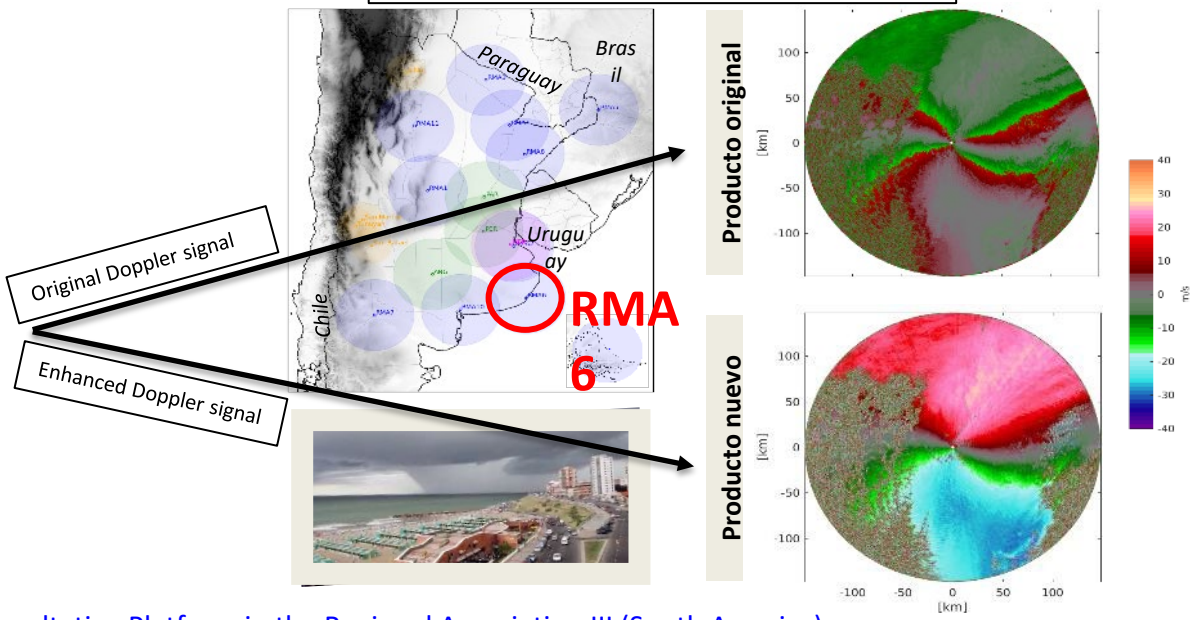
Creation of a public-private-academic consortium, including the National Meteorological Service of Argentina (SMN), private companies and universities **for the continuous improvement of data quality in weather radars**.

Members' profile: Specialized in the areas of electronic engineering, signal processing, and meteorology

Actions

Enhancement of the Doppler signal quality (radial velocity field) of the INVAP company's radar.

The consortium suggested improvements to the radar, implemented them and after observing the positive results, INVAP upgraded the radars.



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From High-Level Regional Forum of the Open Consultative Platform in the Regional Association III (South America)

Concession supported by legislation (1/4)

The ICRC (Infrastructure Concession Regulatory Commission) Act

Nigeria's Infrastructure Concession Regulatory Commission (ICRC) Act guides partnerships for **funding and revenue sharing for good meteorological services delivery**.

NiMet PPP EXPERIENCE: (C) WEATHER BASED INSURANCE SCHEME

WEATHER BASED INSURANCE SCHEME

- **NiMet & NIRSAL** entered into partnership with insurance firms (Weather Based Insurance Scheme)
- Currently collaborating with NIRSAL to provide weather info to 4 million farmers to de-risk their activities
- NiMet service cost to be deducted from source from loan facilities to farmers by the Central Bank of Nigeria

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Presentation ¦ Video ¦ Summary ¦ Details from the Second High-level Session of the Open Consultative Platform (OCP-HL-2)

PR of Nigeria with WMO

Prof. Mansur Bako Matazu:

The private sector engagement in public service delivery is well considered in Nigeria, and there is a governing law to guide partnership. Therefore, **we are leveraging the use of the ICRC (Infrastructure Concession Regulatory Commission) modules regarding funding and revenue sharing and benefits realization.** This quickly leads to technical partnership for good service delivery in Nigeria. We have learned some lessons from this experience. **Partnership is a two-way venture,** requesting us as meteorological services to do a lot in terms of technical, financial and procedural as well as administrative frameworks.

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Concession supported by legislation (2/4)

NiMet's collaboration with mobile service providers

Nigerian Meteorological Agency (NiMet)'s Partnership **with the four major GSM service providers** in the country, based on which they've developed an App that could easily **relay information of real-time** including short range and long range forecast to farmers and other users in Nigeria.

NiMeT's Weather App

NiMet PPP EXPERIENCE : (D) MOBILEMET PROJECT WITH GSM OPERATORS

- **Nigeria has huge population (about 206m)**
- **Very high usage of cell phones (170M officially registered lines)**
- **Huge market with populace in love with mobile products and services**
- **Development of weather products and services for specific and general usages**

PROJECT:
- *Deployment of ICT and Telecommunications facilities*
- *Development of products for marketing by MobileMet operators (MTN, Airtel, Glo, 9Mobile)*

TARGET: *170m Mobile Phone Users nationwide*

COVERED SO FAR: *Select 1m phone users under the pilot phase*

REVENUE STREAM:
Sales of SMS, USSD and other Mobileservices. Revenue to be shared between NiMet, Mobile Services Providers and Strategic Investors of the Agency

NiMet Nigerian Meteorological Agency 2021©

Concession supported by legislation (3/4)

Lightning and Thunder data provision service

Partnership btw the **Nigerian Meteorological Agency (NiMet) and UBIMET** in 2017 for installation of lightning and thunderstorm detectors in 22 federal airports and 14 state airports

NiMet PPP EXPERIENCE: (A) UBIMET

UBIMET

WEATHER MATTERS

PROJECT: ***Installation of Lightning and Thunder Detectors in Airports***

TARGET: ***22 Federal Airports, 14 State Airports***

COVERED SO FAR: ***8 Federal Airports***

REVENUE STREAM: ***Data sales for Aeromet Operations***

NiMet Nigerian Meteorological Agency 2021©

The **Institute for Ubiquitous Meteorology (UBIMET)** is a worldwide private provider of weather forecasts and severe weather warnings headquartered in Austria.

Concession supported by legislation (4/4)

Weather-based Insurance Scheme

Nigerian Meteorological Agency (NiMet)'s Partnership **with a financial institution NIRSAL** to provide weather insurance schemes to de-risk the activities of about 4 million farmers

NiMet PPP EXPERIENCE: (C) WEATHER BASED INSURANCE SCHEME

WEATHER BASED INSURANCE SCHEME

- **NiMet & NIRSAL** entered into partnership with insurance firms (Weather Based Insurance Scheme)
- Currently collaborating with NIRSAL to provide weather info to 4 million farmers to de-risk their activities
- NiMet service cost to be deducted from source from loan facilities to farmers by the Central Bank of Nigeria

PROJECT:
- *Installation of AWS in farming improvement centers and synoptic stations*
- *Generation of agromet services to support farmers products*

TARGET: *150m farmers nationwide*

COVERED SO FAR: *540,000 farmers under the pilot phase*

REVENUE STREAM:
Deductions of costs of AgroMet products and services from loan facilities to farmers and sharing among NiMet, Insurance Companies and NIRSAL)

NiMet Nigerian Meteorological Agency 2021©

NIRSAL: The Nigeria Incentive-Based Risk Sharing System for Agricultural Lending (NIRSAL Plc.) is a US$500million Non-Bank Financial Institution wholly-owned by the Central Bank of Nigeria (CBN) created to Redefine, Dimension, Measure, Re-Price and Share agribusiness-related credit risks in Nigeria.

Presentation ¦ Video ¦ Summary ¦ Details
from the Second High-level Session of the Open Consultative Platform (OCP-HL-2)

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Dialogue among sectors – National communication platform btw the government and the private sector

The **China Meteorological Service Association (CMSA)** aims to build a **communication platform** between the government and enterprises.

- China Meteorological Service Association (CMSA), established in May 2015, is the first nationwide industrial and non-profit civil society representing meteorological service providers in China.
- The CMSA was founded in a context where the government in China developed policies and took **measures to create a favorable environment for business growth, fair competition and quality service**.
- The CMSA **aims to build a communication platform between the government and enterprises**, boost the weather service industry's prosperity, and enhance the benefits of weather and climate services to all economic and social sectors.
- The CMSA represents the views and concerns of its members and the weather service industry at large, safeguards the legitimate rights and interests of the enterprises, and promotes industry self-discipline and compliance with standards and regulations.

Annual Forum of CMSA

Award-winners at the 2nd Meteorological Service Technology Innovation Competition of China and Annual Forum of CMSA

Photos from a good practice: Boosting innovation and national dialogue: 2nd Meteorological Service Technology Innovation Competition and Annual Forum, Beijing, China (February 2020) in PPE Resources page

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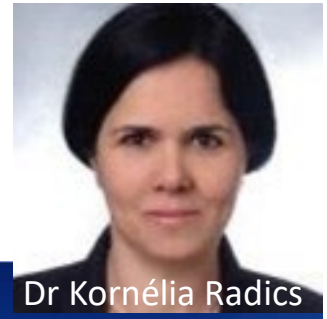
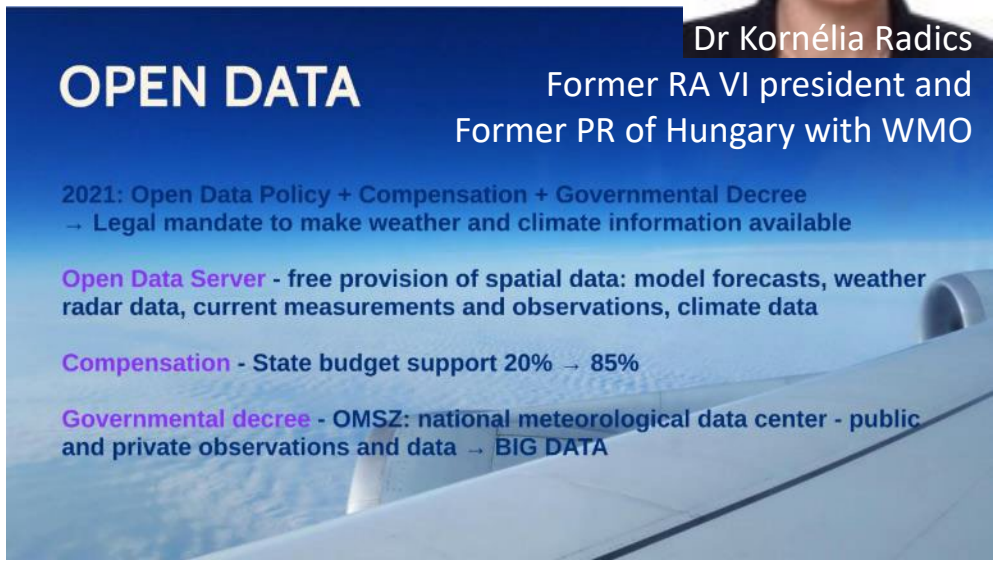
Evolving roles and responsibilities of NMHSs: **Open Data**

Hungarian Meteorological Service (OMSZ) successfully got significant budget compensation from government **by consolidating its legal mandate to make weather and climate information available through an open data server**.

- "Hungary was the country which has the highest prices for meteorological data and information in Europe. To get out of this tricky financial situation here in Hungary, a new business model has been settled."
- "**Recognizing the advantages and importance of free and unrestricted exchange of meteorological data**, a consultation has been initiated in 2015 to advocate **open data policy** in the government. As a result of our efforts, the Hungarian Metrological Service could introduce open data policy from 1 January 2020. We have got the **legal mandate** to make weather and climate information available through an open data server."
- "As a result of this budget compensation, we received from the government our state budget with a super increase from 20% to 85%."



Dr Kornélia Radics
Former RA VI president and
Former PR of Hungary with WMO



From (1) the Second High-level Session of the Open Consultative Platform (OCP-HL-2) and (2) the WMO Data Conference Preparatory Workshop on Theme 2: "Business models and data policy issues" (Oct 2020)

Evolving roles and responsibilities of NMHSs: **Open Data**

Danish Meteorological Institute (DMI) transformed from a product-oriented institute **to a more society-oriented one by making data open and free** for everyone to use and improving the societal values of DMI.

- "What we have also decided is that providing data to society should be a core part of our authority as well, which means that **we want to make our data open and free for everybody to use**. But it is not something that you make a decision and then it works. There is a financial issue. We had to work very hard towards our ministry and the parliament in order to persuade them to see that the societal value of having a meteorological institute in Denmark would grow enormously if we were allowed to open our data and if the parliament were to give us the budget not only to enable us to establish and run the relevant IT structure, databases, and APIs, but also to reimburse what we lost in our commercial business as well."
- "And what **we did was to have our stakeholders, private users, interest organizations, local municipalities, and everyone around us to be the voice** and put pressure on government by explaining that **they want this meteorological institute to have a new role as a pusher of climate and weather data**."

From OCP-HL-2 (link 1, 2, & 3)

Awareness Raising

Weather-Ready Nation Ambassadors initiative

The **WRN Ambassador initiative helps unify the efforts across government, non-profits, academia, and private industry** toward making the nation more ready, responsive, and resilient.

- The **Weather-Ready Nation Ambassador™** initiative is the National Oceanic and Atmospheric Administration's (NOAA) effort to formally recognize NOAA partners who are improving the nation's readiness, responsiveness, and overall resilience against extreme weather, water, and climate events.
- As a WRN Ambassador, partners commit to working with NOAA and other Ambassadors to strengthen national resilience against extreme weather.
- In effect, the WRN Ambassador initiative helps unify the efforts across government, non-profits, academia, and private industry toward making the nation more ready, responsive, and resilient against extreme environmental hazards.
- Reached more than 12,000 WRN ambassadors

Taken from About Weather-Ready Nation Ambassadors™

Infrastructure as a Service and Operation as a Service (IaaS and OaaS) for Satellite Observation

A special-purpose private company monitors and controls the Himawari 8/9 meteorological **satellites**, receives and processes observation data, and transmits it to the **Japanese Meteorological Agency (JMA)** for its imagery processing and analysis.

One of the former antennas that had been owned and operated by JMA

More efficiency and resilience

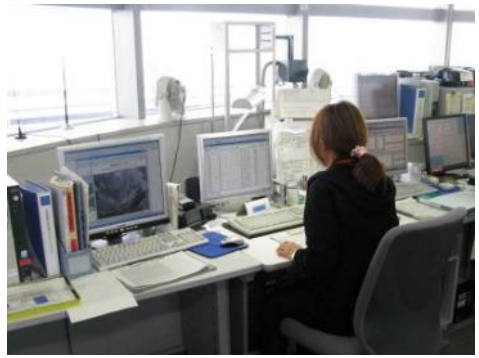
A group of antennas of the private company (at the main station and the sub-station)

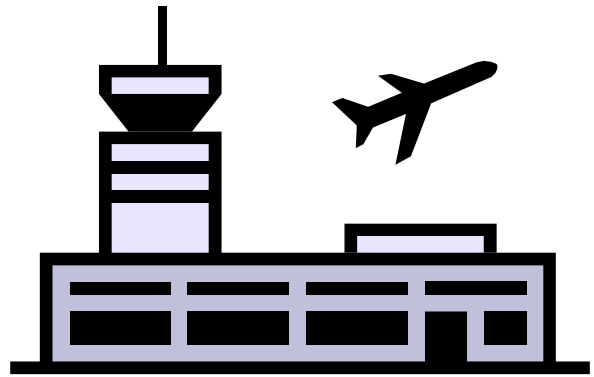
Pictures taken from http://hope-pfi.jp/

Observation as a Service or Operation as a Service (OaaS) for Aeronautical Meteorology

The Meteorological Service Act of Japan stipulates that the Japanese Meteorological Agency (JMA) **may entrust groups or individuals with (i) observations of phenomena and (ii) provision of the results**. This stipulation is necessary for JMA to efficiently and effectively ensure observations at necessary locations, not all by itself but in collaboration with other bodies, and within limited financial and human resources.

✓ Example:
JMA has entrusted municipalities or the private sector with aeronautical meteorological observations and reporting at many airports (N.B., not all), constantly providing necessary education and training to meet ICAO and WMO requirements and ensure observation quality.





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Pictures taken from https://www.jma.go.jp/ (Japanese pages)

Framework for licensing private-sector forecasting

Licensing, staffing and supports to ensure quality

By law, companies licensed to provide weather forecasts in Japan must employ Certified Weather Forecasters with the level of expertise required to perform the core part of the forecast (i.e., prediction of phenomenon).

Most of the broadcast meteorologists in Japan are qualified as Certified Weather Forecaster.

- The Meteorological Service Act of Japan aims to ensure the sound development of meteorological services. While **stipulating that only the Japanese Meteorological Agency (JMA) shall issue warnings, providing a single authoritative voice** in Disaster Risk Reduction activities, the Act also intends to promote private sector activity, including public utilization of meteorological data.
- Many provisions of the Act describe **licensing of forecasting services by the private sector, licensing of certified weather forecaster(s), staffing of certified weather forecasters by the licensed forecasting-service providers, and supports to the private sector** for the sake of sound development of meteorological services by the private sector, such as the **provision of data, products and information, consultation and training**.

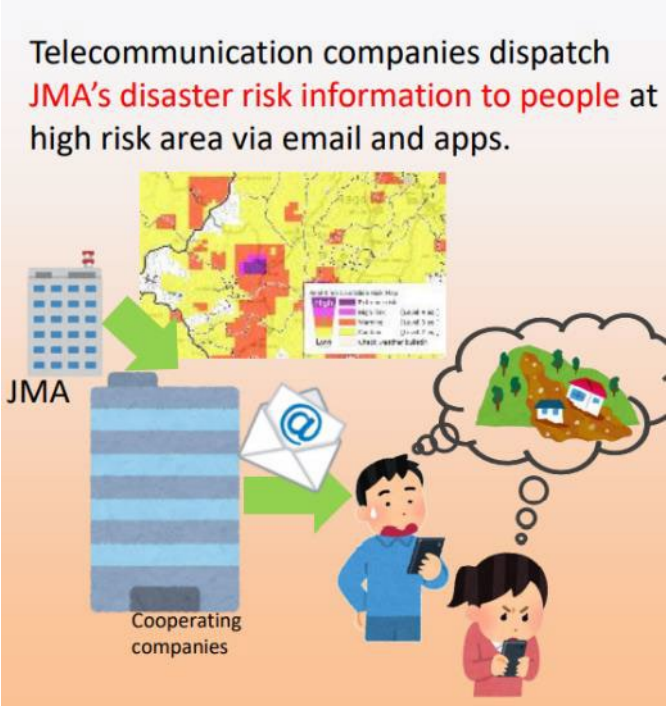
WMO OMM

From (1) the Second High-level Session of the Open Consultative Platform (OCP-HL-2) (Presentation ¦ Video ¦ Summary ¦ Details) and a good practice; See the Meteorological Service Act of Japan

Prompt and Clear Dissemination

Risk notification via Push-type communication

Five companies that responded to a public call for proposals cooperate in the **push-type communication of** the Japanese Meteorological Agency's **state-of-the-art real-time risk maps**.



- In May 2019, the Japanese Meteorological Agency (JMA) invited applications from those (i.e., the private sector) who would like to participate in a **new push notification** service of the state-of-the-art Real-time Inundation Risk Map and Real-time Flood Risk Map.
- The new push notification service **by five accepted collaborators** has started from 2019 summer onwards.
- Those collaborators are companies who have been proactive in weather-for-business activities in Japan.

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From a good practice submitted by the Japan Meteorological Agency (JMA); See Article 13 of the Meteorological Service Act of Japan, which prescribes that JMA shall endeavor to make forecasts and warnings publicly known by seeking cooperation from the mass media.

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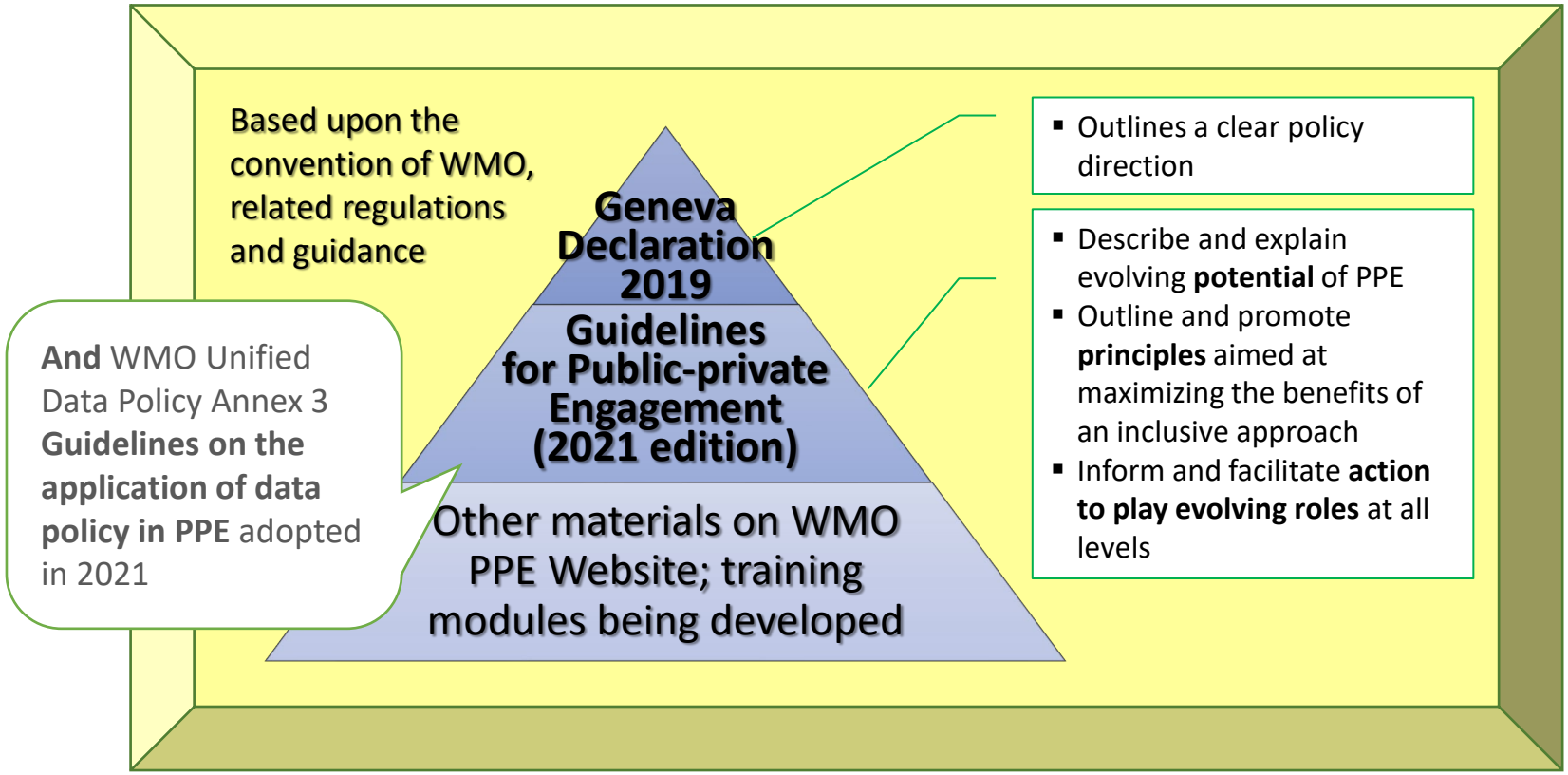
More Resources?

WMO PPE Policy, Guidelines and other materials



WMO PPE policy

Geneva Declaration 2019:

Building Community for Weather, Climate and Water Actions

A policy act that reflects the **new paradigm of cooperation and partnership** between stakeholders from all sectors of the weather enterprise **needed as a collective response to global societal risks** related to extreme weather, climate change, water scarcity and other environmental hazards.

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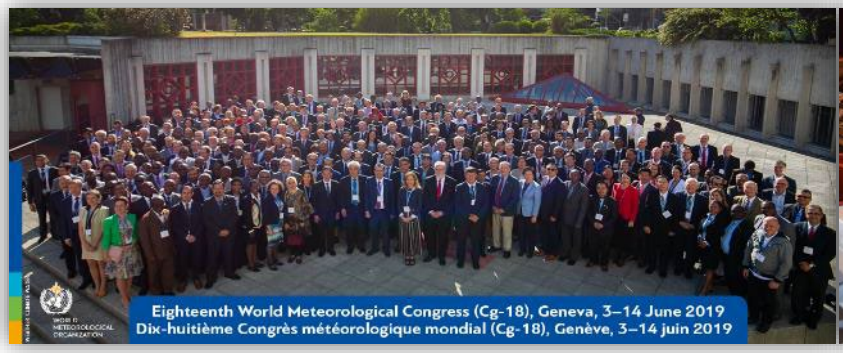
Geneva Declaration 2019:

Building Community for Weather, Climate and Water Actions



We, the delegates from 160 Member States and Territories of the WMO, meeting in Geneva from 3 to 14 June 2019 at the Eighteenth World Meteorological Congress, having considered:

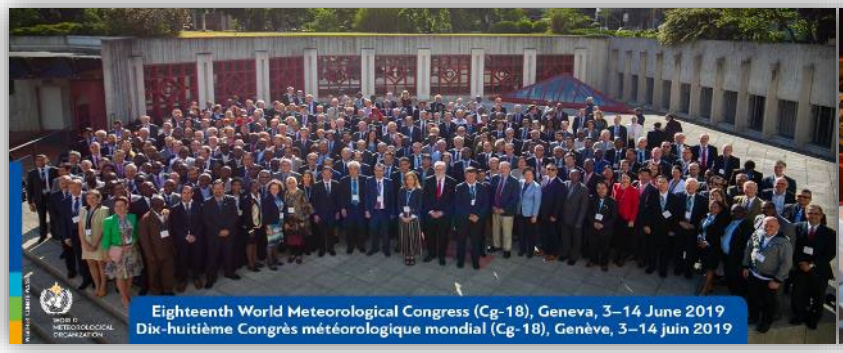
- that the global societal risks related to extreme weather, climate, water and other environmental events should be addressed through interdisciplinary and multi-sectoral partnerships, and
- that the expanding opportunities to use meteorological, climatological, hydrological and related environmental information and services to inform critical decisions can foster increased societal and structural resilience, and **sustainable economic development**;

declare as follows: …

WORLD METEOROLOGICAL ORGANIZATION

Geneva Declaration 2019:

Building Community for Weather, Climate and Water Actions



"**We NOTE**

- **The strong focus of the global agenda** on both immediate and long-term challenges related to weather, climate and water, as reflected in the 2030 Agenda for Sustainable Development, the Paris Agreement, and the Sendai Framework for Disaster Risk Reduction;
- **That achieving the sustainable development goals will benefit from inclusive partnerships** amongst public, private and academic sectors, as well as civil society, at global, regional, national and local levels; …

We WELCOME

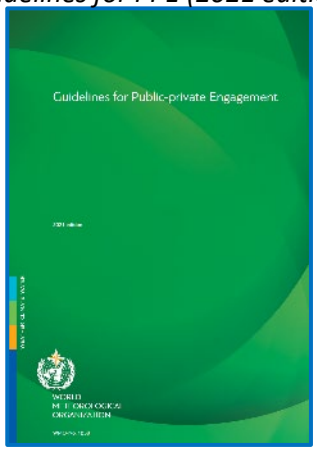
- **The opportunities for all stakeholders and the broader user community** that will result from a closer collaboration among public, private and academic sectors;
- **The engagement of all sectors** in addressing the societal needs through weather, climate, water and other environmental information and services; …"

Guidelines and supplementary materials (1/3)

WMO's Public-Private Engagement Publication

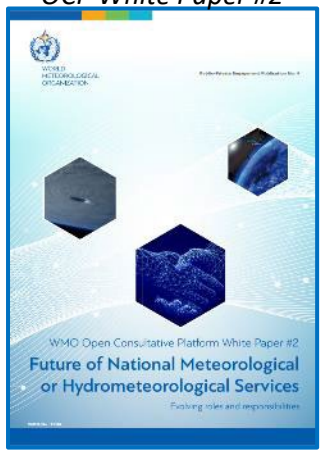
Geneva Declaration – 2019

Guidelines for PPE (2021 edition)



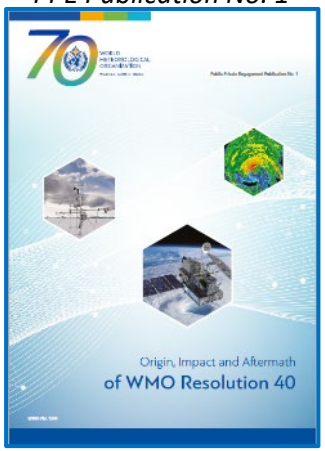
OCP White Paper #1

OCP White Paper #2



All resource materials are available at: https://public.wmo.int/ppe

PPE Publication No. 1



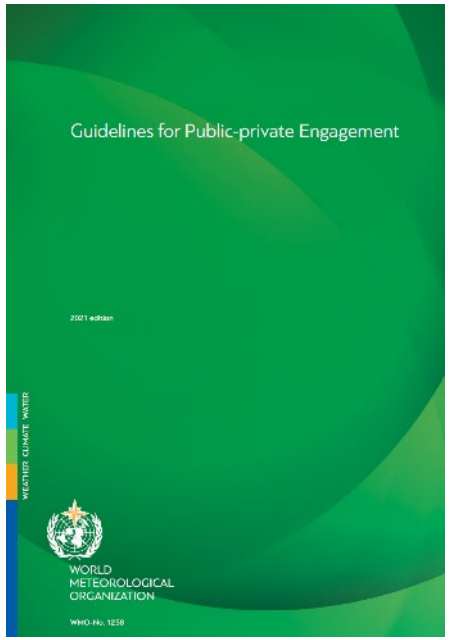
OCP-HL-1 Report

OCP-HL-2 Report

OCP-HL-3 Report

Guidelines and supplementary materials (2/3)
Guidelines for Public-Private Engagement (2021 ed.)

- Following the adoption of the Geneva Declaration – 2019, there was **an apparent need for guidance to Members on enabling and establishing successful PPE**.
- **The Guidelines were published as a response to this need** and are aimed **to inform and facilitate** global, regional and national **actions towards proactive engagement** between the stakeholders from public, private and academic sectors, which would result in better service to Members' governments, economy and citizens.
- The Guidelines **outline and promote principles** aimed at maximizing the benefits of an inclusive weather and climate enterprise approach.



Available in all WMO official languages: English, Arabic, Chinese, French, Russian and Spanish

Guidelines and supplementary materials (3/3)
Where Are PPE-related Resources Available?

We have **various resources** – good practices, newsletters, innovation seminars.

Web site

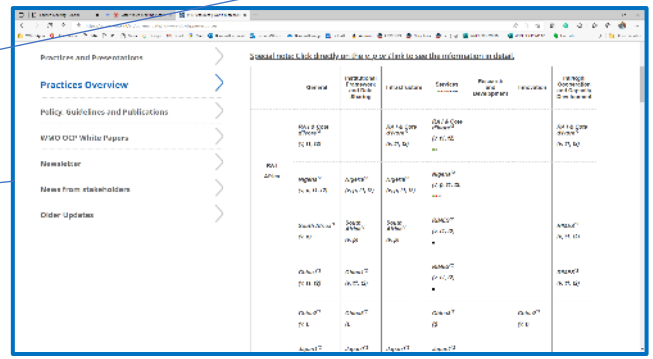
- PPE main page (public.wmo.int/ppe)

  This is the PPE main site. This site is a collection of past decisions, meeting recordings and reports, and good practices from Members and the private sector, (being) organized in various ways to make it easier to use.

  This site includes e.g., under PPE Resources page,

Presentations and Practices

Practices Overview



WMO OCP White Paper #1:
Future of weather and climate forecasting

Published in June 2021.

- The first OCP White Paper entitled “Future of weather and climate forecasting” was published as WMO-No. 1263 on 1 April 2021.
- It is a collective endeavor of more than 30 lead scientists and experts to analyze trends, challenges and opportunities in a very dynamic environment.
- The main purpose of the paper is **to set directions and recommendations for scheduled progress, avoiding potential disruptions and leveraging opportunities in the coming decade** through public–private engagement over the coming decade.
- Original written contributions is disclosed (published) as Part II – Compilation of Inputs to the WP.

WMO OCP WP#1 and its Annex

WMO OCP White Paper #2
Future of National Meteorological or Hydrometeorological Services: Evolving roles and responsibilities

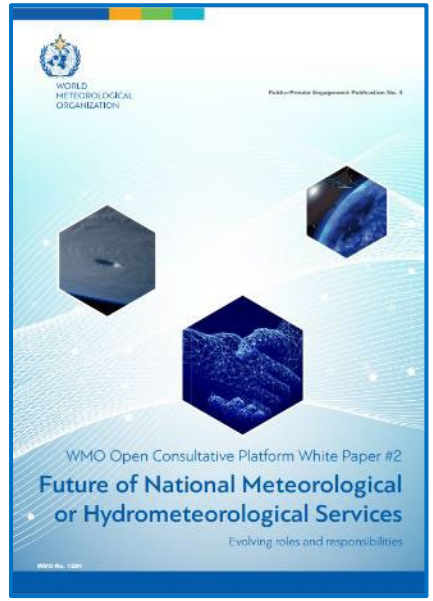
Published in June 2022.

WP#2 addresses identified issues and challenges under the overarching question "How do you see the NMSs in 2030?" and is **a collective endeavor of more than 30 lead experts**.

The conclusions **present key messages and recommendations derived from the comprehensive analysis of the evolving societal needs and observed trends** in the technological and operational ecosystems in which NMS operate, such as

> "In the coming decade … **progress will require inclusive multisectoral partnerships, leveraging the strength of the public and private sectors, supported by the research community and civil society**, operating in tandem and effectively working through challenges to meet the increasing weather, climate and water needs".

Original inputs from contributing authors are also available as Annex (Part II).



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WMO OCP WP#2 and its Annex

Activities in Support of Members

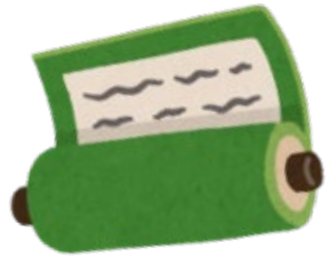
Ctrl+Click here!

A self-directed training course on ***Public-Private Engagement (PPE) in Weather, Climate and Water Services***
was launched on 27 February 2023
and is now freely **available** to all **at the learning platform of WMO Education and Training Programme.**
(WMO ETRP Moodle site, https://etrp.wmo.int/)
Translation to French and Spanish will be completed in Fall, 2023.

WORLD METEOROLOGICAL ORGANIZATION

Ongoing activities to further promote public-private engagement

- **Analysis of institutional frameworks** to assist Members in better defining the mandate & functions of National Meteorological and Hydrological Services and to unlock the potential of all sectors.
- **Assistance to Members** in reviewing and revising the legal framework or institutional arrangement concerning PPE, utilizing a repository of Members' laws and other legal instruments, generally gathered from publicly available sources.
- **Code of Ethics** (with the Association of Hydo-Meteorological Industry)



There is no one-size-fits-all because the situation depends upon Members

Role of the private sector in the Early Warnings for All

46 Cross cutting enablers

Role of the private sector

Ensuring that every person on Earth is protected by early warnings within five years is a global challenge that will require the combined efforts of the public and private sectors and will not be possible without the vast and varied capabilities of businesses. Throughout the Multi-Hazard Early Warning System (MHEWS) value cycle – whether it be in relation to community engagement, communications and outreach, data, or technical infrastructure - the global supply chains providing the enabling and underpinning technology and systems largely consist of private entities.

Weather information and early warnings can help businesses to manage their logistics, plan for climate risks and reduce the impact of hazardous weather or climate events on their own operations, supply chains and employees. Investment in the weather and climate value chain can therefore provide direct benefits and further, can be aligned be businesses' public good or corporate social responsibility priorities, especially in relation to climate adaptation efforts.

WMO has taken a proactive approach to greater engagement between the public, private and academic sectors operating across the early warnings value cycle, and particularly within what is often referred to as the 'global weather enterprise' - which primarily aligns with the first three MHEWS pillars. This includes a policy framework which provides a set of principles for successful public-private partnerships between government entities and private businesses. Initiatives such as the UN Global Compact offer further mechanisms through which businesses can adopt sustainability principles and take steps to support UN goals.

WMO recognises that the role of the private sector could go beyond a supporting role and that the private technology sector could be a leading contributor to the five-year goal through private-public-partnerships. In October 2022, WMO hosted a Technical Conference on Early Warnings with key 'Big Tech' companies to consider new models of collaboration and partnerships. The conference aimed to facilitate a dialogue between WMO, National Meteorological and Hydrological Services, other UN entities and the private sector on the potential contributions of technological advancements, big data, and the continued rise of social media and related digital platforms.

The conference identified a number of potentials for collaboration including

1. Advanced analysis of forecast and vulnerability data, using AI and other technology, to support warning decision making,
2. Utilizing private sector digital platforms to enable data analysis and delivery, enhance warning dissemination, drive better awareness and reach those most vulnerable, and
3. More generally tapping into the wealth of innovative technical expertise held by the private technology sector to enhance the effectiveness throughout the value cycle.

The complexity and urgency of climate challenges require coordinated efforts and an agile approach, which businesses – large and small, from many sectors – can have an important role in. The rationale for strong engagement with the private sector is clear, and so private-public-engagement will continue to be prioritized through the upcoming implementation stage.

"The complexity and urgency of climate challenges require coordinated efforts and an agile approach, which businesses – large and small, from many sectors – can have an important role in. The rationale for strong engagement with the private sector is clear, and so **private-public-engagement will continue to be prioritized through the upcoming implementation stage**."

WMO OMM

Science, research and innovation in the Early Warnings for All

Early Warnings for All Executive Action Plan 46

Science, research and innovation

Despite advances in science related to weather, water and climate, there are still scientific and technological challenges that must be addressed in order to improve the provision of accurate and effective early warnings. For example, advancements are needed to improve impact-based, people-centered forecasting as well as to enhance our understanding of how our climate will continue to change in order to ensure that MHEWS are effective not only in today's climate, but tomorrow's. Further research is also needed to better understand how to best communicate warnings and scientific uncertainty to ensure that warnings are understood and acted upon. It is also important to enhance the research to operations process to ensure the latest scientific and technological advances are being applied in operational settings and, ultimately, inform decision-makers.

There is already work taking place to address these scientific challenges, such as improving forecasting abilities in lower-income countries using new technologies, enhancing collaboration between scientists, and improving climate projections at regional and local scales. The science and research communities, including both the physical and social sciences, will be key partners for addressing these challenges through scientific and technological innovations, enabling this action plan and providing early warnings for all.

Recommendations:

1. Integrate scientific and technological advancements with local, traditional, Indigenous and generational knowledge.
2. Ensure activities to implement MHEWS are grounded in best available scientific and technological information.
3. Embrace cross-discipline research and innovation, recognizing that a challenge this big can't be tackled by one discipline alone.
4. Encourage further research and innovation related to MHEWS across diverse research communities in order to foster scientific and technological advancements.

"There is already work taking place to address these scientific challenges, such as improving forecasting abilities in lower-income countries using new technologies…. **The science and research communities**, including both the physical and social sciences, **will be key partners for addressing these challenges** through scientific and technological innovations, enabling this action plan and providing early warnings for all."

WMO OMM

WMO Technical Conference on the UN Global Early Warning Initiative for the Implementation of Climate Adaptation: Early Warnings for All (22nd Oct 2022)


Microsoft representative, Mr Matt Corey


Google representative, Mr Sella Nevo


Association of Hydro-Meteorological Industry (HMEI) representative, Ms Jay Wilson

Aimed to facilitate a dialogue between WMO, National Meteorological and Hydrological Services, other UN entities and the private sector **on the potential contributions of technological advancements, big data, and the continued rise of social media and related digital platforms**.

Representatives of private sector organizations including Alibaba, F24, Google, IBM, Microsoft and Smart Communications all voiced commitments to the Early Warnings for All Initiative.

Link to the web page is **here**

WORLD METEOROLOGICAL ORGANIZATION

OCP-HL-4 on Early Warnings for All held on 26 May 2023, in Geneva, Switzerland

Summary report will be available in October

THANK YOU

https://public.wmo.int/ppe

Your feedback and contribution are welcome to **ppe@wmo.int**