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| **WORLD METEOROLOGICAL ORGANIZATION**  **COMMISSION FOR BASIC SYSTEMS OPAG on DPFS**  **FUTURE SEAMLESS GLOBAL DATA-PROCESSING AND FORECASTING SYSTEMS (GDPFS) MEETING**  Geneva, Switzerland, 1-4 Nov 2016 |  | CBS-DPFS/Seamless-DPFS/Doc. 4.4  (12.X.2016)  \_\_\_\_\_\_\_  Agenda item : 2  ENGLISH ONLY |

**Annex to draft Decision 8.1/1 (EC-68)**

**Outline of the Seamless data-processing and forecasting System implemetation plan –Including vision and scope**

1. **Vision**

(Excerpt from the draft White Paper on Seamless GDPFS)

* The GDPFS will be an effective and adaptable monitoring and prediction system to enable Members and partners to make better-informed decisions.
* The GDPFS will facilitate the provision of impact-based FORECASTS and risk-based warnings through partnership and collaboration.
* The GDPFS will do so through the sharing of weather, water, climate and related environmental data, products and services in a cost effective, timely and agile way, with the effect of benefitting all WMO members, while also reducing the gaps between developed and developing Members.

One may imagine the GDPFS in 2031, 16 years later:

* The overall accuracy of state of the art global prediction models have improved enough to add1.5 days of overall predictability, if the historical rate of progress of one day per decade is sustained: The goal set by Julius Charney and others when they launched GARP in the 1970's was achieved. Global models have resolutions below 5km, and mesoscale models significantly below 1km, down to a few tens of meters in urban areas for example.
* The sub seasonal time scales are achieved, ensembles have routinely hundreds of members, shared between many global centers, and forecast products provide accurate and detailed information on such things as closed water budgets over most watersheds, wind, temperature and air quality information in urban street canyons and outwards to the surrounding country side, finely detailed agromet information from hourly cycles to seasonal, precise storm surges and wind damage estimates for cyclone landfall, sea state, including rogue waves, and dangerous shore currents, telecommunications and electricity blackouts from solar eruptions form the surface to satellites orbital heights, toxic algae blooms , pest migrations, etc.
* Most or even all this information are accessible as a public good product to all WMO members, and their partners, and most of this information is available either in raw format, or directly as impact information. It is disseminated and presented in accordance with users formats, and using point to point or, increasingly, cloud to point communication broadband technologies. It is quality controlled, validated and have metadata information associated, and in the case of forecast information, it is verified. Imbedded in the design of the system is a two-way feedback real time communication capacity between the provider and the receiver of the data.
* The system has evolved through partnership agreements that allow it to absorb or carry information produced either by the private sector, or by other closely related organizations to the traditional NMHS's.

1. **Scope**

The WMO Strategic Plan 2016-2019 will largely determine the scope of the evolution of the GDPFS. It will be driven by the need to support the role of NMHSs in their response to global societal needs facing the world population at large. It will not only focus those sectors for which they traditionally have had a leading role to play, mainly in reducing the socio-economic impacts of weather and climate related disasters in their respective countries, but more broadly on contributing to an expanding number of sustainable development issues related to weather, climate, water and related environmental factors. This expansion or broadening of the role of the GDPFS will be made possible by a number of factors, a key one being the seamless and integrated modelling approach, which allows the delivery of new environmental services in support of sustainable development across all timescales.

1. **Current state of the GDPFS, what is it, what works, success stories**
   * Success Stories:
     1. SWFDP and cascading forecasting process
     2. Manual on GDPFS
     3. ERA Centres
     4. Designation of GDPFS Centres
     5. LCs for verification
     6. LRFMME (link with CCL)
     7. ….
2. **Role of Members**
3. **Role of stakeholders and partners (existing and potential)** 
   * Constituent bodies (TCs, RAs, EC )
   * GFCS/CSIS
   * Humanitarian Agencies
   * IAEA/CTBTO
   * ICAO
   * GEO
   * European Commission
4. **Areas for improvements** 
   * Interoperability between legacy GDPFS and users/partners
   * Services to Humanitarian Agencies
   * Limited recognition of capability of GDPFS among some users (eg. Hydrology)
     1. Hydrology cascade
     2. EFAS/GLOFAS (internal WMO structure)
   * Medium and long range (Sub-seasonal gap in the Manual)
   * Global centre for climate monitoring (ocean & atmosphere)
   * Lack of global coverage from the cascading process (cascading applied to limited areas)
   * Lack of designation criteria for some specialized centres (e.g. Agriculture, Hydrology)
   * Sustaining linkage of GDPFS goals to other relevant research bodies like WWRP TIGGE (including TIGGE-LAM) and international HEPEX, and other water and environmental research groups (e.g. European JRC).
5. **Communication & outreach strategy**

* Aligned with i.e. WIS, WIGOS GFCS, etc.

1. **Capacity development & Training**

* Aligned with i.e. WIS, WIGOS GFCS, and the WMO strategy for Capacity development etc.

1. **Current and foreseeable trends (external drivers of change) –** (users driven and technology driven)
   * Science
   * Earth system modelling
   * Internet bandwidth in developing countries
   * Technologies (big data, cloud storage and data mining tools, cloud computing, next generation satellite systems, crowdsourcing of everything, the Internet of things)
   * Emerging service needs – Downscaling
   * Socio-economic trends
   * Climate change and global security considerations
   * Urbanization (Mega cities), transports, energy, etc.
2. **Success indicators**

* Harmonization of regulatory materials
* Centre designation criteria & responsibilities established
* Inclusion of all WMO domains (Ag, Hydrology, marine, etc.)
* QMS including recurrent review of requirements in place
* procedures for continuing evolution in place
* Cascading process implemented across all regions
* Key external stakeholders are engaged
* Members have access to sufficient information to support the issue of multi-hazards early warnings
* Engagement with all TCs and RAs

1. **Methodology/Principles**

* Engagement of TCs, RAs and Programmes
* Clarity of responsibility between WIS, WIGOS and GDPFS
* Evolution of existing system
* Cost neutral
* Don’t break anything
* Non duplication
* Leverage existing system
* Synergy between research and operation
* Clear linkages to strategic plan
* Focus on operational arrangement and coordination
* Consolidation where appropriate
* Simplification and integration
* Regional engagement and empowerment
* Strengthening application activities
* Service oriented
* Customers (NMHSs & International Organizations)

1. **Policy considerations required to facilitate, enable the achievement of the vision** 
   * Clarity of the role between WIS/WIGOS and GDPFS
   * Open data
   * Open source
   * Cascading processing and predictive strategy
   * Evolving WMO governance to enable our vision
   * Role of the private sector?
2. **How do we get there? Required partnerships, role of the private sector in supporting-enabling the vision**
   * Harmonization of regulatory materials
3. **Roadmap, timelines, resources (high level implementation plan)**
   * EC-68, 69, and 70
   * CBS (and other sessions of TCs and RAs)
   * Cg-18, in 2019
   * CBS-17, in 2020