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Agenda Item 3: Strategic Plan and Budget 2020-2023

WMO OPERATING PLAN 2020-2023

Editorial note: The Operating Plan has been reformatted to demonstrate better the linkages along the results chain (activities, outputs, outcomes, impacts). It has also been aligned with the biennial budget for 2020-2021. Whereas some content changes have been made in terms of defining the outputs and milestones more concretely, no significant modifications have been made to the rest of the document (originally posted on 4 January 2019).

1. The WMO Operating Plan (OP) 2020-2023 presented herewith is based on the recommendations of the Executive Council and the EC Working Group on Strategic and Operational Planning. It is consistent with the main elements of the WMO Strategic Plan.

2. The OP is structured along the sixteen Strategic Objectives (SOs) defined in the WMO Strategic Plan. It shows the cascading flow of elements from (a) Long-Term Goals and SOs to (b) outcomes/benefits to Members to (c) outputs and milestones to (d) activities. For each SO, a set of performance indicators is presented at the outcome level as well as information on the allocation of regular budget resources and, when available, voluntary contributions. Selected regional aspects and priorities are highlighted based on the WMO Monitoring and Evaluation system, data collected through the Country Profile Database, and information provided by regions so far. The WMO programmes, constituent bodies and key partners involved in the implementation of each SO are also listed.

3. The current OP consists of two parts:

- Part I presents the core outcomes, outputs and activities of WMO policy-making organs (Cg and EC), constituent bodies (RAs, TCs) and Secretariat in implementation of the Organization's mandate (ZNG);

- Part II lists Additional Initiatives (AIs) designed to accelerate, scale up and broaden SO implementation in key focus areas as well as leverage investments in hydrometeorological technology and development. AIs that receive funding will be incorporated into Part I.

4. The OP will be adjusted, as necessary, following Cg-18.

Part I: Core Outcomes, Outputs and Activities (ZNG)

Long-Term Goal 1: Better serve societal needs: Delivering, authoritative, accessible, user-oriented and fit-for-purpose information and services						
Strategic Objective 1.1: Strengthen national multi-hazard early warning systems and extend reach to better enable effective response to the associated risks						
Budget (in thousands of Swiss francs): *Note: Regular Budget (RB) and Voluntary Contributions (VC) resources (staff & non-staff)*	**RB (CHF)**	**% of total RB**	**VC (CHF)**	**Comments (VC):** USAID Trust Funds, Tropical Cyclone Trust Fund, ESCAP/WMO Typhoon Committee Trust Fund,		
	16,116.2	6.1%	3,840.0			
Performance Indicators:				**Baseline 2019**	**Target 2021**	**Target 2023**
1.1.1 Number of Members participating in a global alert system						
1.1.2 Number of Members using the Common Alerting Protocol (CAP) in communication of warnings/alerts						
1.1.3 Number of Members with a MHEWS integrated in a national DRR management system						
1.1.4 Number of Members cataloguing high impact weather, weather and climate events using WMO standard unique identifiers						
Focus Area / Outcome A: Enhanced impact- and risk-based extended forecast and warning products and services to enable better preparedness and response to hydrological and meteorological events						
Outputs and Milestones:			**2020**	**2021**	**2022**	**2023**
New operational techniques to improve warning services developed			Major technological advancements for hazards monitoring identified	Specific technological advancements implemented	Expanded application; additional advancements identified and implemented	Expanded application; additional advancements identified and implemented
Guidelines and Recommended Practices on MHEWS (including hydromet derived hazards such as wild fire)			Checklist updated; Guidelines drafted	Guidelines finalized	Guidelines translated and published	Monitoring
Severe Weather Forecasting Project (SWFP), CIFI, Flash Flood Guidance System (FFGS) expanded globally and integrated into MHEWS			User requirements completed	Integrated approaches implemented gradually	Integrated approaches implemented gradually	Integrated approaches implemented gradually

Early warning and advisory services provided to UN and humanitarian agencies	Implementation Plan in place; WMO coordination mechanism approved; Pre-operationnal mode active	WMO coordination mechanism operational	Implementation plan updated; Additional tools and processes developed as needed	Implemented: with 60% of Members contributing through their MHEWS
WMO operational approach to Cataloguing Hazardous Weather, Climate, Water and Space Weather Events applied globally; Global catalogue of events associated with impacts	Implementation in 2 regions; Global catalogue of events developed	Implementation in 2 additional regions; Global catalogue of events implemented	Implementation in 2 additional regions; Global catalogue of events implemented & improved	Global catalogue of events universally applied
Hydromet related multi-hazard risk identification and assessment of Mortality and Economic Losses from Weather and Climate Extremes updated	1 workshop; Action plan developed and agreed	1 workshop; 1 update to Atlas; 1 or 2 RSMCs specialized in hazard assessment proposed	1 workshop; 1 or 2 RSMCs specialized in hazard assessment proposed	1 workshop; 1 update to Atlas; 1 or 2 RSMCs specialized in hazard assessment proposed
Focus Area / Outcome B: Strengthened national capacity in multi-hazard early warnings				
Outputs and Milestones:	**2020**	**2021**	**2022**	**2023**
Strengthened Members' engagement to ensure globally, regionally and nationally coordinated early warning mechanisms	Consultation with 20 Members to identify where early warning mechanisms need to be strengthened	Coordination mechanisms for strengthening early warning systems proposed	Tested and implemented in at least 1-2 regions	Tested and implemented in at least 1-2 more regions
Members engaged in regional and global platforms on disaster risk reduction	20 Members supported	20-30 additional Members supported	20-30 additional Members supported	20-30 additional Members supported

Common Alerting Protocol (CAP) standard installed and operational	25 additional Members w/ alerts aggregated to WMO Alert Hub; CAP alerts included in SWIC and WWIS	25 additional Members w/ alerts aggregated to WMO Alert Hub; CAP alerts included in SWIC and WWIS	35 additional Members w/ alerts aggregated to WMO Alert Hub; CAP alerts included in SWIC and WWIS	35 additional Members w/ alerts aggregated to WMO Alert Hub; CAP alerts included in SWIC and WWIS
Focus Area / Outcome C: Enhanced access to official national meteorological and hydrological forecasts and warnings globally in support of regional and global requirements				
Outputs and Milestones:	**2020**	**2021**	**2022**	**2023**
Development and implementation of operational MHEWS for hydromet hazards vulnerable areas facilitated (e.g. coastal, urban, hydro catchment etc.)	User requirements identified and where possible completed	MHEWS operationalization initiated	Expanded	Completed
Global Multi-Hazard Alert System (GMAS)	GMAS Implementation Plan approved; 3 pilots started	3 pilots implemented	Regional/sub-regional multi-hazard alert systems operational in all six regions	GMAS Operational
Operational warnings integrated in GMAS (e.g. Marine, Tropical cyclone, drought, flood, air borne hazards, etc)	Standards, SOP developed	A unified approach to coordinating the dissemination of warnings	Integrate into the GMAS framework	Integrate into the GMAS framework
Information related to multi hazard emergency response (e.g. nuclear and non-nuclear accidents/events, related to land, atmosphere and marine environment) available for WMO Emergency Response Services	Additional requrements for multi-hazard emergency response identified	Key elements for multi-hazard emergency response synergized & intregrated in RSMC		

Governance:

Outputs and Milestones:	**2020**	**2021**	**2022**	**2023**
Effective and efficient session of the Commission for Weather, Climate, Water and Related Environmental Services and Applications (Applications Commission)	1 session		1 session	

Activities:

A. New operational techniques shared through international workshops on effective monitoring of hazards (e.g. tropical cyclone, marine), dissemination of warnings and products;
Update the Checklist on MHEWS, collect recommended practice, develop and publish guidelines on MHEWS;
◦ Develop relevant requirements and procedures to ensure the integration of SWFP, CIFI, FFGS into operational MHEWS through organizing expert meetings and engagement of consultants;
◦ Develop an Implementation Plan on early warning and advisory services to UN and humanitarian agencies; draft Standard Operating Procedures; arrange MOUs and other working agreements through expert meetings and consultative workshops;
◦ Apply good practice from pilots on cataloguing hazardous weather in RA V and VI and expand application globally, including organization of meetings, development of guidance material, engagement of other regions; further demonstration and customization of global operational cataloguing of events through user interaction;
◦ Data collection from Members and relevant partners on mortality and economic losses from weather and climate extremes, including data archiving by relevant centres; ◦ Organize consultative workshops; update and publish revised editions of the Atlas.
B. Provide technical assistance to Members on CAP implementation; organize meeting of the World Weather Information Service (WWIS) Language Hosts; Provide assistance to Members in uploading warnings and alerts on WWIS, SWIC websites and the WMO Alert Hub; Assist Members to routinely update of the WMO Register of Alerting Authorities.
◦ Organize coordination and consultation with Members on the development of procedures and protocols including to address transboundary issues;
◦ Support Members' participation in regional DRR frameworks and the Global Platform on DRR.

C. Address and develop operational MHEWS for urban, coastal and tropical cyclone prone areas and hydro catchment through organizing expert meetings and consultants engaged to ensure development of MHEWS;
◦ Develop GMAS Implementation Plan; Develop and launch pilot initiatives in RA I and RA III; Expand and apply in the rest of the regions;
◦ Develop the standard and the mechanism for integration of operational warnings into GMAS;
◦ Identify additional requirements for multi hazard emergency response and key elements are synergized through consultation with Members and organization of expert meetings on nuclear/non-nuclear, marine, environmental emergency response and other emerging areas.

D. Organize and support the sessions of the Applications Commission

Risks:	**Mitigation measures:**

◦ Insufficient outreach activities on benefits and functions of global alert system ◦ Failure to secure services of volunteer experts ◦ Ineffective uptake of related programme activities due to lack of capability of NMHSs in LDCs and some developing countries. ° Insufficient resources to implement enough capacity building projects	◦ Develop outreach plan and implement it ◦ Optimize meetings and/or run in synergy with other events to reduce time away from home base. ◦ Seek XB resources for training workshops and other capacity building initiatives. ° Prioritize capacity building resources and projects, criteria to be defined (covered population, disaster prone areas, number of Members) ° Further implementation of subsidiarity principle in support of least developped NMHSs

Regional Aspects

61% of responding Members in RA I do not have a MHEWS, followed by RA III (57%), RA II (29%). *Source: CPDB, based on 109 responding Members.* All Regions have identified EWS and MHEWS as a key priority during RA sessions and WG / TT meetings and activities. CREWS is a key mechanism to help address this.

Current Programmes	Working Bodies	Partners
Lead: DRR Contributing: ERA, TCP, MMOP, CLW programmes, GAW, WWRP	RAs, TCs, Research Board, Secretariat	ISDR, UN organizations, WB (CREWS) and development partners, insurance

Long-Term Goal 1: Better serve societal needs: Delivering, authoritative, accessible, user-oriented and fit-for-purpose information and services						
Strategic Objective 1.2: Broaden the provision of policy- and decision-supporting climate information and services						
Budget (in thousands of Swiss francs): *Note: Regular Budget (RB) and Voluntary Contributions (VC) resources (staff & non-staff)*	**RB (CHF)**	**% of total RB**	**VC (CHF)**	**Comments (VC):** GFCS Trust Fund, KMA-GFCS Trust Fund, Hydrology and Water Resources Trust Fund & Climate Risk, Early Warning Systems (CREWS) Papua New Guinea Trust Fund.		
	19,790.0	7.4%	2,400.0			
Performance Indicators:				**Baseline 2019**	**Target 2021**	**Target 2023**
1.2.1 Number of Members with basic, essential, full and advanced climate services provision capacity						
1.2.2 Number of Members with NMHSs contributing to climate-relevant outputs (NAPs, NDCs, mitigation/adaptation projects) through national, multi-stakeholder mechanisms (e.g. National Frameworks for Climate Services)						
1.2.3 Demonstrated impact of WMO climate-related flagship products						
Focus Area/Outcome A: A climate service information system advanced, enabling all Members to access, and add value to, the best available global and regional climate information products and methodologies through improved processing, exchange and enhancement of information on past, present and future climate						
Outputs and Milestones:			**2020**	**2021**	**2022**	**2023**
Global-regional-national-regional-global exchange of GFCS-relevant data and products operationalized through WIS and GDPFS			3 sub-regions	9 sub-regions	12 sub-regions	All sub-regions
Climate Services Toolkit and guidance on access to data and products installed			Pilot country in 3 sub-regions	Pilot country in 9 sub-regions	Pilot country in 12 sub-regions; upscaling mechanism established	Pilot country in all sub-regions; upscaling mechanism implemented
RCCs performing revised required functions as defined in 2018 RCC functions review			3 RCCs	9 RCCs	12 RCCs	All RCCs
Regional Climate Forums implementing recommendations of 2017 global RCOF review			3 sub-regions	9 sub-regions	12 sub-regions	All sub-regions

Peer-to-Peer twinning between NMHSs for climate services provision	Pilot country in 3 sub-regions	Pilot country in 9 sub-regions	Pilot country in 12 sub-regions; upscaling mechanism established	Pilot country in all sub-regions; upscaling mechanism implemented
National climate services focal points designated				
Focus Area / Outcome B: Production and delivery of authoritative national climate information products and services supported in GFCS priority areas to adapt and respond to climate variability and change, including through participation in National Adaptation Plans, and to avert loss or damage as well as to optimize benefits from climate-related opportunities				
Outputs and Milestones:	**2020**	**2021**	**2022**	**2023**
NMHS Basic systems operational, with data rescued and incorporated in a climate data management system (CDMS) with ongoing integration of new observations; access to and provision of basic monitoring products and seasonal forecasts; deployment of Climate Services Toolkit (CST)	Climate Data Maturity Model/ Catalogue of Trusted Datasets/WIS Compliance/ Customization of CST	International Data Rescue operational/ CST Portal enhancement	Global inter-operability of country data sources/ Upscaling CST deployment	Full-scale exchange of CSIS data and products
Open-source CDMS developed and deployed	Concept developed into DMS for all relevant data needed for GFCS	Implementation	Implementation	1st beta version available
Objective regional sub-seasonal and seasonal forecasting systems operational; regional coordination of downscaling of annual to decadal prediction and climate change projection products	3 sub-regions	9 sub-regions	12 sub-regions	All sub-regions
National plans and frameworks for, or requiring, climate services accompanied by financing	NAP/NFCS support rollout in 5 countries	NAP/NFCS support rollout in 10 additional countries	NFCS/NAP linkages and mainstreaming implementation plan in 15 countries	NAP preparation support in place on global scale

Tailored decision-support products on multiple timescales, ongoing monitoring of user outcomes and feedback	Scoping/ National Climate Forum (NCF) concept development	Implementation /Promotion of NCFs	Upscaling and sustained operations of NCFs	Incorporation in CST
GFCS established as a mechanism for aligning the adaptation-related aspects of UNFCCC policy process with adaptation plan and other global agendas	UNFCCC MoU work plan for positioning GFCS through UNFCCC policy process	GFCS positioned as mechanism for alignment of partner climate services projects	Ongoing documentation and reporting of status and results achieved	GFCS input into global stocktake (adaptation)
NMHSs applying Quality Management Standards on climate and water	Pilot country in 3 sub-regions	Pilot country in 9 sub-regions	Pilot country in 12 sub-regions; incorporation in NMHS training curriculum	Documentation of NMHS QMS compliance
Focus Area/Outcome C: Refined WMO products containing key climate indicators, seasonal outlooks, and improved characterization of extremes and associated impact information recognized as key inputs for international climate-related policy implementation and UN system action				
Outputs and Milestones:	**2020**	**2021**	**2022**	**2023**
Annual reports on the state of the climate and selected associated impacts	1 report; UNFCCC MoU work plan on how to input into global stocktake	1 report	1 report	1 report as input to global stocktake
WMO climate indicators	Scientific paper published and introduced via UNFCCC Research Dialogue	Incorporation into WMO Climate Statement and alignment w/ IPCC climate indicators		Inform global stocktake/ IPCC Assessment Report
Progress report on the GCOS Implementation Plan, Status Report, work on the global climate indicators and outcomes of the Regional Workshops	Submission of progress reports to UNFCCC SBSTA	Submission of progress reports to UNFCCC SBSTA	Submission of progress reports to UNFCCC SBSTA	Submission of progress reports to UNFCCC SBSTA

ENSO bulletins, global seasonal climate updates, Information System Portal	4 Bulletins; 4 Updates	4 Bulletins; 4 Updates; Portal implemented	4 Bulletins; 4 Updates; Portal usage statistics	4 Bulletins; 4 Updates; Portal enhanced
WMO global sources of climate monitoring and forecast information available in real-time for UN system and humanitarian planning	GSCU/ENSO Info System aligned to UN System Standard Operating Procedures	Monitoring included		

Activities:

◦ Assist Members, through guidelines, training, technical support and pilot activities, to establish full-value chain service delivery systems addressing national climate-related priorities as defined in national development plans, Nationally Determined Contributions (NDCs) to the Paris Agreement and National Adaptation Plans (NAPs) including through establishment of National Frameworks for Climate Services or similar mechanisms.

◦ Enable peer-to-peer support by countries having advanced climate services, facilitating bilateral arrangements with countries in need.

◦ Establish or strengthen the exchange of data and products between national, regional and global CSIS centres.

◦ Upscale/harmonize products and practices across countries sharing similar climate characteristics and development needs through regional centres, forums, systems and mechanisms, creating an environment for networking, regional collaboration, co-production and establishment of community of practices.

◦ Support implementation of GCOS Implementation Plan and NAP.

◦ Maintain and enhance CSIS operations needed to generate policy and international system-level products and services (e.g. tracking and reporting on climate system "headline" indicators, documenting the impacts associated to climate events).

◦ Complement existing products on El Niño and the Southern Oscillation and regional seasonal climate outlooks with consolidated global seasonal climate outlooks.

◦ Integrate global and regional seasonal climate outlooks into a WMO El Niño information and climate monitoring portal as well as in UN standard operating procedures.

◦ Facilitate development of global annual to decadal climate updates.

◦ Revise the Implementation Plan for GCOS responding to the needs of WMO members and Parties to UNFCCC and its global stocktake, taking into account the IPCC assessment reports and the changing Earth observation landscape.

Risks:	**Mitigation measures:**
◦ Oversight and coordination: Some focus areas may be inadequately addressed due to inadequate mechanisms to systematically oversee their implementation by WMO constituent bodies, extensively coordinate, and to engage the relevant structures and departments. ◦ Authoritative official source: Other entities engaging in WMO central mandate, without coordination and compliance to WMO standards, may reduce the quality of climate and related environmental services, compromising WMO's core mandate in the UN System.	◦ Coordinate WMO support through a mechanism for contributions to the GFCS, implemented through regular joint meetings of PRAs and PTCs, chaired by the WMO President. ◦ Map country capacities to implement climate services, and engage RA Climate Services WGs to examine the status of climate services implementation in each region and the support needed from TCs. ◦ Address current and emerging climate services needs and opportunities through the joint PRA-PTC planning process.

◦ NMHS budget cuts: Reduction in public spending by the governments of some Members may lead to reduction in resources allocated to NMHSs to implement and operate basic systems for providing services, reducing their ability to provide high quality services to the detriment of the reputation of the Organization. ◦ Not full implementation of the actions due to Members/partners not responding to GCOS-IP.	◦ Communicate WMO competence in climate processes to ensure the integration of its mandate and to achieve a higher profile in the SDG, UNFCCC and Sendai DRR processes. ◦ More advocacy among decision-makers on the value of weather, climate, water and related environmental services to national development, health, water, agriculture, energy, aviation, marine and sustainable use of natural resources, as well as the value and benefits of international collaboration and WMO data policy. ◦ Improve communication about the benefits, including socio-economic, of addressing the actions of GCOS-IP.

Regional Aspects

◦ *Climate services provision:* lowest in RA III (58% of Members responding), RA IV (59%) and RA I (70%). Highest in RA II (91%) and RA V (90%). RA VI: 78%. *Source: CPDB, based on 146 responding Members.*

◦ *Capacity to deliver climate services in support of GFCS priority sectors* : assessed as poor by 36% of RA I Members and only as partly satisfactory by 26% of RA VI Members responding. *Source: CPDB, based on 169 responding Members.*

◦ *Formalized user interface mechanisms:* RA III and RA I most actively participate in NCOFs (42% and 38% of responding Members, respectively). Lowest participation in RA IV (14%). *Source: CPDB, based on 56 responding Members.*

◦ *Climate Watch Systems implementation:* highest in RA VI, lowest in RA I.

Current Programmes	**Working Bodies**	**Partners**
Lead: WCP, GFCS Contributing: GCOS, WCRP, WWRP, WIS, WIGOS, GDPFS, HWR, DRR, GAW	RAs, TCs, Research Board, GCOS SC, Secretariat	UNFCCC, GFCS PAC partners, UN agencies contributing to State of Climate report, WB & ISDR (CREWS)…

Long-Term Goal 1: Better serve societal needs: Delivering, authoritative, accessible, user-oriented and fit-for-purpose information and services						
Strategic Objective 1.3: Further develop services in support of sustainable water management						
Budget (in thousands of Swiss francs): *Note: Regular Budget (RB) and Voluntary Contributions (VC) resources (staff & non-staff)*	**RB (CHF)**	**% of total RB**	**VC (CHF)**	**Comments (VC):** Associtated Programme on Flood Management Trust Fund (Phase II)		
	10,264.5	3.9%	600.0			
Performance Indicators:				**Baseline 2019**	**Target 2021**	**Target 2023**
1.3.1 Number of Members participating in WMO Global Hydrological Status and Outlook System						
1.3.2 Number of Members with operational flood forecasting and warning services						
1.3.3 Number of Members with operational drought warning system						
1.3.4 Number of Members with improved integrated hydro/met/climate operational capabilities						
Focus Area/Outcome A: Better access enabled to improved hydrological services, forecasts and warnings for water resources, drought and flood risk management and planning						
Outputs and Milestones:			**2020**	**2021**	**2022**	**2023**
Flood forecasting systems			Regional process for implementing forecasts in Centers/ GDPFS	Roll out regional implementation	Roll out regional implementation	Roll out regional implementation
Seasonal hydrological outlooks in all regions			Additional 2 regions operational	Additional 2 regions operational	Additional 2 regions operational	Member sustained operation
Drought warning systems			Regional process for implementing forecasts in Centers/ GDPFS	Roll out regional implementation	Roll out regional implementation	Roll out regional implementation
Joint WMO/FAO/UNESCO expert groups set up			Finalized	Work ongoing	Work ongoing	Work ongoing

WMO action plan "weather, water, food" supports members to improve food security	Plan formulated	Regional Analysis	Regional Analysis	Regional implementation
HydroHub (APFM and IDMP aspects): full HelpDesk capabilities developed for End-to-End Early Warning Systems (E2E EWS) in floods and droughts (from data acquisition through modelling to decision support)		Finalized		
Water rationale for development projects provided and Members supported in applying to projects/programmes	Rationale formulated	Roll out	Regional implementation	Regional implementation
Focus Area/Outcome B: Exchange of transboundary data and products facilitated through the Global Hydrological Status and Outlook System to enhance understanding of current and future water resources				
Outputs and Milestones:	**2020**	**2021**	**2022**	**2023**
WMO Hydrological Observing System (WHOS) developed, standards and ontologies created, and Members supported in using it		All standards and ontologies needed are established	All guidelines published	Members support this aspect of WIS
HydroHub (Global Hydrometry Support Facility aspects) set up and operational, especially for innovation aspects, and a sustainable business model built for the long term	Regular innovation calls every year till WMO hydro community decides otherwise	3 donors support team in WMO Sec	Continued donor support for calls	Continued donor support for calls
World Hydrological Cycle Observing System: next generation systems including new business models (quantity, quality, groundwater, certification) designed, implemented and coordinated with long-term national planning	Next generation systems designed	Next generation systems designed & from 2021 onwards one new HYCOS project every year until the needs for a global water assessment are fully met	Implemented	Coordinated with national planning

Hydrological Status and Outlook System (HYDROSOS)	Guidelines and procedures published	Standards / ontologies finalised		
A unified data management system for hydro/climate and water data developed	Bring together developers	Requiremets are set	Community of programmers established	First sytsem fully functional
Focus Area / Outcome C: Regular reporting on the state of global water resources				
Outputs and Milestones:	**2020**	**2021**	**2022**	**2023**
Water Resources Assessment: dynamic assessment of basin, national and regional availability of water resources is available for planning and management purposes		First regional Assessments presented by RA		All AR have workflow in place to report
Institutional links developed and maintained	Hydro focal points operational	One data management system promoted	Joint development plans for NMHSs supported	Joint development plans for NMHSs supported
Complete HYDROSOS global water report covering all major river basins	Report in COP	Report in COP	Report in COP	Report in COP

Activities:

◦ Generate data through the Hydrological Status and Outlook System and publish a State of Hydrology Report.
◦ Install World Hydrological Observing System applications to contribute to WIS 2.0 through country and river basin scale interventions.
◦ Link seasonal weather forecasts/climate outlook fora to hydrological models on impact scale through twinning advanced services with regional centres and national hydromet services.
◦ Develop agrometeorological services into hydrological and meteorological support for agriculture with a focus on irrigation and water shortage.
◦ Link WMO/FAO and UNESCO water data undertakings (WMO is the connector through service provision).
◦ Provide targeted support to Members on NAPs and adaptation related NDCs related to water.
◦ Initiate and support regional ownership, management and implementation of flood and drought activities.

Risks:	**Mitigation measures:**
◦ Hydrology expertise not represented/underrepresented in WMO governing bodies ◦ Data sharing not successful due to lack of political leverage ◦ Members do not take ownership for WHOS/HydroSOS/Forecasting and warning systems	◦ Decide on hydrological representation and role in WMO governance ◦ Link NMHSs and higher level political decision makers more ◦ Create long-term country/regional support task forces that reside in technical departments and are deployed to regional offices. Create funding mechanism for mid- to long-term operational support for Members.

Regional Aspects

◦ *National Drought Policies:* 28 out of 43 responding Members (65%) in RA I do not have such policies in place. In RA II: 5 out of 14 responding Members; RA III: 2 out of 8 responding Members. RA VI: 17 out of 35 responding Members (many not impacted by droughts traditionally). Insufficient data on the rest of the regions. *Source: CPDB, based on 121 Members responding.*

◦ *Operational Flash Flood Guidance System:* used by only 23% of responding Members in RA I and 29% in RA III; RA II and VI: 41-43% (slightly above the global average of 35%). Scarce data on RA IV and V. *Source: CPDB, based on 104 Members responding.*

◦ *Flood Management Plans:* lacking in 27% of Members in RA I and 21% of RA IV. *Source: CPDB, based on 114 Members responding.*

Current Programmes	**Working Bodies**	**Partners**
Lead: HWR Contributing: WIGOS, WIS, RES (WWRP and WCRP), GCOS	EC, RAs, TCs, Research Board, Secretariat	UNESCO, FAO, NGOs, reinsurance companies

Long-Term Goal 1: Better serve societal needs: Delivering authoritative, accessible, user-oriented and fit-for-purpose information and services						
Strategic Objective 1.4: Enhance the value and innovate the provision of decision-supporting weather information and services						
Budget (in thousands of Swiss francs): *Note: Regular Budget (RB) and Voluntary Contributions (VC) resources (staff & non-staff)*	**RB (CHF)**	**% of total RB**	**VC (CHF)**	**Comments (VC):** IGAD-HYCOS Project Trust Funds (2012), WMO Global Hydrometry Support Facility Trust Fund (HydroHub)		
	12,114.6	4.6%	2,000.0			
Performance Indicators:				**Baseline 2019**	**Target 2021**	**Target 2023**
1.4.1 Number of Members with QMS for selected services (aviation, marine, EWS)						
1.4.2 Number of Members with socioeconomic benefit analysis conducted in the past 5 years						
1.4.3 Number of Members with established public/private/academia engagement on: (a) service delivery and (b) maintenance of networks						
1.4.4 Number of Members using (a) web applications and (b) social media in service delivery						
Focus Area/Outcome A: Enhanced and increased weather services by uptake of modern technology in service delivery and quality management principles						
Outputs and Milestones:			**2020**	**2021**	**2022**	**2023**
Standard Interfaces for Service Delivery (e.g. protocols or APIs) developed			Concept adopted; implementation roadmap developed	Pilot project implemented and guidelines developed	Pilot replicated	At least 5 countries per region have developed Standard Interfaces
Artificial Intelligence (AI) and big data applications for Service Delivery developed			WMO AI Forum; Funding mobilized	WMO AI Forum priorities and recommendations endorsed by EC	Disseminated widely and implemented	Implemented
Service driven Quality Management Framework (QMF)			Consultation process with Members completed	Service driven QMF endorsed	Relevant activities conducted in at least 2 regions	Relevant activities conducted in at least 2 more regions

Impact-based Forecast and Warning Services (WMO-No 1150) updated to include methods for assessing the likelihood of impacts using NWP/EPS	WMO No. 1150 Updated		WMO No. 1150 Updated	
WMO-No. 49, Technical Regulations, Volume II and/or associated WMO manuals, guides and other publications aligned with ICAO Annex 3 – Meteorological Service for International Air Navigation	WMO-No. 49, Vol. II, AMD 79 updated; WMO-731/732 consolidated	WMO-904 updated	WMO-No. 49, Vol. II, AMD 80 updated; WMO-No. 732 updated	WMO-904 updated
Scientific and technological development and innovation, coordinated with partners, to improve the monitoring and forecasting of aviation hazards enabling impact-based decision-support aeronautical meteorological services	Tools/techniques identified and demonstrated	Tools/techniques identified and demonstrated	Tools/techniques identified and demonstrated	Tools/techniques identified and demonstrated
Common platforms, products and decision support tools developed for access to necessary data for better decision making in marine meteorological and coastal services	Advance priority activities for delivery in the 21 METAREA regions	Advance priority activities for delivery in the 21 METAREA regions	Advance priority activities for delivery in the 21 METAREA regions	Advance priority activities for delivery in the 21 METAREA regions
Strengthened capacity of Members with responsibility to provide marine meteorological services (especially coastal LDCs and SIDS)	A maximum of 2 regional events	A maximum of 2 regional events	A maximum of 2 regional events	A maximum of 2 regional events
Strengthened capacity of NMHSs in developing countries, LDCs and SIDS for effective dissemination and communication of services	10 Members assisted	10 Members assisted	10 Members assisted	10 Members assisted
Global wildfire watch/warning services	Good practices collected, requirements identified and guidance outline developed	Guidelines endorsed and demonstrated in at least 10 Members	Demonstrated in at least 15-20 Members	Good practices collected, expanded use and demonstration of guidelines
Service delivery to polar and high mountain regions by NMHSs enhanced	Polar and High mountains users and their needs determined	Development of services to users initiated/ improved	Implementation of marine services initiated in line w/ Polar Code and WWMIWS	Strategy for Service Delivery implemented by all Members in relevant regions

Long-term plans for major application and service areas aligned with WMO Strategic and Operating Plans	Current long term plans reviewed and further requirements, gaps and emerging areas identified	Drafts for new long term plans developed, endorsed and implemention initiated	Implemented and progress regularly reviewed	Implemented and progress regularly reviewed
Focus Area / Outcome B: New weather and water prediction services designed and implemented for the specific needs of megacities and other urban areas				
Outputs and Milestones:	**2020**	**2021**	**2022**	**2023**
Guidelines on integrated operational platforms for urban service delivery developed and applied in regions	Guidelines developed	Applied in at least 5 Members	Applied in at least 5-10 more Members	Applied in at least 10-15 more Members
Enhanced provision of decision support services to multimodal transportation, including land transportation	Forum plan developed	Forum held	Recommendations applied	10% extra countries per RA initiate services
Focus Area / Outcome C: NMHSs provided with further guidance and assistance in the assessment and enhancement of socioeconomic benefits of their services				
Outputs and Milestones:	**2020**	**2021**	**2022**	**2023**
Strengthened capacity of Members to conduct socio-economic benefit assessment	At least 3 Members assisted in conducting SEB as a pilot	At least 3 Members assisted in conducting SEB as a pilot	At least 3 Members assisted in conducting SEB as a pilot	At least 3 Members assisted in conducting SEB as a pilot
Focus Area / Outcome D: Principles and guidance for successful public-private engagement established as well as a continuous dialogue between players and stakeholders facilitated based on collaboration and mutual reinforcement				
Outputs and Milestones:	**2020**	**2021**	**2022**	**2023**
PPP and weather enterprise guidance material containing sectoral and national good practice examples developed	Guidelines published; Good practices collected	Update	Update	Update or new edition

Analytical studies on sustainable business models for service delivery with public-private-academia engagement conducted	Study conducted	Analysis and recommended business models published	Pilot projects on business models	Pilot projects on business models
National initiatives for PPP established	Practices collected; framework prepared	20 Members	30 Members	Publish best practices summary
Regular events and outreach to Members; Annual meetings of the Open Cnsultative Platform (OCP) on PPE	GWE event	Regional events; OCP events	GWE event	Regional event
Focus Area/Outcome E: International standards, quality control mechanisms and recommended practices developed and adopted in a holistic manner for all service areas based on best national practices				
Outputs and Milestones:	**2020**	**2021**	**2022**	**2023**
Increased compliance with technical regulations (e.g. aviation, marine and public services) and monitoring against the WMO Strategy for Service Delivery	Assessment conducted; Audit mechanism developed	2-3 audits, incl. recommendations for endorsement	2-3 audits, incl. recommendations for endorsement	2-3 audits, incl. recommendations for endorsement
Information/data exchange policies, coordinated with partners, supporting the integration of aeronautical meteorological information into air traffic management systems and decision support	First draft of policy and community consultation	Draft of policy taking into account community feedback	Draft of policy taking into account community feedback	
Climate change and variability impact assessment on aviation operations (ground and air, downscaled to local level where required)	Climatological variation analyses and impact assessment	Development and publication of first report/ guidelines and associated outreach	Translation and dissemination	

Relevent marine meteorological manuals and guides updated	WMO-No 1071 reviewed; Coastal Inundation National Assessment Guide drafted; WMO-No.9 Volume D and WMO-No 574 published	WMO-No 1071 published; Coastal Inundation National Assessment Guide finalized	WMO-No 558 and WMO-No 471	WMO-No 574
Maintenance of standards in meteorological service for marine navigations as defined under the UN Convention for Safety of Life at Sea (SOLAS) and Polar Code	Input to Maritime Safety Committee (IMO) and NCSR, WWNWS, relevant Arctic Council Working Groups, IALA	Input to Maritime Safety Committee (IMO) and NCSR, WWNWS, relevant Arctic Council Working Groups, IALA	Input to Maritime Safety Committee (IMO) and NCSR, WWNWS, relevant Arctic Council Working Groups, IALA	Input to Maritime Safety Committee (IMO) and NCSR, WWNWS, relevant Arctic Council Working Groups, IALA
Establishment and maintenance of standards in meteorological service for marine environment emergency response as defined under MARPOL and other relevant international conventions and emergency response to marine oil spills	Best practices collected, requirements identified and guidelines outline developed	Advance priority activities for delivery to Members implemented through collaboration with AEA, IMO and other relevant emergency response stakeholders such as oil and gas industry	Advance priority activities for delivery to Members implemented through collaboration with AEA, IMO and other relevant emergency response stakeholders such as oil and gas industry	Advance priority activities for delivery to Members implemented through collaboration with AEA, IMO and other relevant emergency response stakeholders such as oil and gas industry

Activities:

A. Collect good practice; Develop and test QMF in the following areas: assessment of quality of product and data provided by GDPFS/WIS to Service; identification of emerging service needs to be addressed by GDPFS/WIS/Research; efficient procedures to transfer from research to operation/services; identification of requirements for capacity development and evaluate contribution of CD to improvement of quality of services; provision of advice on QMS/QMF implementation to WMO programme areas as requested; implementation of QMS/QMF amongst members through a train-the-trainer event (e.g. practitioners workshop or similar) on QMS/QMF, transition from ISO 9001:2008 to ISO 9001:2015 standards, and update to WMO-No. 1100; up-to-date WMO regulatory and guidance material covering QMS/QMF.

◦ Develop concept note and roadmap on stadard interfaces for service delivery; implement pilots on Commons Standard on Service Delivery; develop guidelines; document good practices.

◦ Update WMO-No 1150 based on the outcomes of the Symposium on Impact Based Forecasting;

◦ Gather good practices from Members and develop and demonstrate guidelines on wild fire services;

◦ Set up the polar and high mountain service delivery agenda and its implementation by the RSMCs and NMCs;

◦ Develop technical roadmaps for AI and big data application for service delivery; document good practices for development of Recommended Best Practices;

◦ Organize and support ICAO METP meeting, ICAO METP WG meetings, ICAO Regional METSG meetings, ICAO AEP-ANSEP meeting, ICAO AEP-ANSEP WG meeting(s), other ICAO symposium/conference, IATA FOSTF meetings, IATA ACTG meetings;

◦ Joint activities with ICAO through support WMO AeM ET/EN and organize WMO IWVA/8.

◦ Develop concept note and roadmap as well as implement pilots on Common Standard on Marine and Coastal Services; develop guidelines and document good practices; Develop training material; Provide limited financial support for personnel to attend regional marine training events.

◦ Facilitate Members in the improvement of the provision of data and products through technical assistance by the WWMIWS Committee, Expert Team on Sea Ice, Expert Team on Ocean Forecasting, and Coordinator for Satellite Data Application;

◦ Consult with Members for specific operational application and service areas such as WMO Strategy for Service Delivery, aeronautical, marine, urban meteorology, etc.

B. Facilitate Members to enhance their capacities on operational urban services with assistance by the special experts team; Develop guidelines; Conduct integrated operational urban/environment services workshops

◦ Consult with Members and partners through joint expert collaboration and a Forum on Multimodal Transportation.

C. Provide guidance on mechanism for the assessment of Social Economic Benefits

D. Survey and missions to selected Members for description of good practices on public-private partnerships;

◦ Work with economics experts on business models;

◦ Assist Members in the establishment of national initiatives on public private engagement;

◦ Establish Open Consultative Platform and maintain relations with members; Establish and maintain a website; annual meetings.

E. Develop an audit mechanism for compliance with technical regulations and monitoring of WMO Strategy for Service Delivery implementation; Conduct audits.

◦ Joint activities with ICAO through support of WMO CSA SC-AeM ET/EN.

◦ Consult with relevant Members on the development of Coastal Inundation National Assessment Guide; Review and update Storm Surge Forecasting Guide (WMO-No 1071), Volume D (WMO-No.9), Sea-Ice Information Services in the World (WMO-No 574); translate, edit and publish the manuals and guides.

◦ Strengthened effective interaction with IMO, IHO, Arctic Council etc. to organize the 2nd Extreme Maritime Weather Symposium;
◦ Conduct a cost recovery consultation, WWMIWS activity;
◦ Participate in IMO IMO/NCSR, IHO/WWNWS, Arctic Council Working Group (e.g. PAME, EPPR);
◦ Organize 2 WMO Members consultation activities in line with the efforts of the Expert Team on Marine Environmental Emergency Response (ETMEER) to provide technical assistance and advisory services to Members in need of emergency response products and services including marine oil spill emergency response.

Risks:	**Mitigation measures:**
◦ Failure to secure services of volunteer experts. ◦ Ineffective uptake of related programme activities due to lack of capability of NMHSs in LDCs and some developing countries. ◦ Risks associated with the delivery of services by the private sector.	◦ Optimize meetings and/or run in synergy with other events to reduce time away from home base. ◦ Seek XB resources for training workshops and other capacity building initiatives. ◦ Measures to address risks associated with public-private partnerships are being formulated.

Regional Aspects

◦ *QMS for aeronautical meteorological service provision* : lowest implementation in RA II (20% no, 3% partial), RA IV (9% no, 32% partial) and RA I (9% no, 23% partial). RA III: 33% partial. RA V (14% no, 10% partial). Highest implementation: RA VI (94% yes). *Source: Survey 2016-2017.*
◦ *Tropical Cyclone / Hurricane Services* strong in affected Regions with Committees and Panels extremely effective - efforts need to concentrate on IBF and last mile communications of IBF / Warnings.

Current Programmes	**Working Bodies**	**Partners**
Lead: PWS, MMOP, AeMP, TCP Contributing: GDPFS	EC, RAs, TCs, Research Board, Secretariat	ICAO, IATA, IMO, IOC/UNESCO, other UN agencies, HMEI

Long-Term Goal 2:
Enhance Earth system observations and predictions: Strengthening the technical foundation for the future

Strategic Objective 2.1:
Optimize the acquisition of observation data through the WMO Integrated Global Observing System

Budget (in thousands of Swiss francs): *Note: Regular Budget (RB) and Voluntary Contributions (VC) resources (staff & non-staff)*	**RB (CHF)**	**% of total RB**	**VC (CHF)**	**Comments (VC):**
	26,811.5	10.1%	8,370.0	GCOS Trust Fund, Prof. V. Vaisala Award Trust Funds, WMO Space Programme VLab Trust Fund, EC-PHORS Trust Fund, DBCP Trust Fund, WMO Space Programme Trust Fund, AMDAR Operating Fund, WIGOS Tust Fund, JCOMM Support Trust Fund

Performance Indicators:	**Baseline 2019**	**Target 2021**	**Target 2023**
2.1.1 Percentage of the Earth's surface covered by observations meeting Global Basic Observing Network (GBON) requirements			
2.1.2 Number of Members with observing network meeting GBON requirements			
2.1.3 Number of Members covered by operational Regional WIGOS Centres activities supporting OSCAR/Surface and WDQMS			
2.1.4 Percentage of space-borne instruments in orbit in relation to WIGOS Vision 2040			

Focus Area/Outcome A: WIGOS implementation rapidly advanced through coordinated global and regional plans, in particular further development and operational implementation of electronic metadata inventories for all observing platforms, along with quantitative tools to monitor their data delivery and data quality

Outputs and Milestones:	**2020**	**2021**	**2022**	**2023**
WIGOS Operational Plan 2020-2023 implemented: ◦ Enhanced WMO Integrated Global Observing System delivering observations to support all WMO Priorities, Programmes and application areas; ◦ Increased visibility and strengthened role of NMHSs at their national level; ◦ Increased integration and open sharing of observations from WMO and non-WMO sources across national and regional boundaries;	* Plan for WIGOS Initial Operational Phase (2020-2023) submitted to EC-72	* Composition of GBON approved by Cg-Ext * Existing WDQMS analysis and display tools evaluated; new ones specified	*20 countries with national implementaion of WIGOS;	*60 countries with national implementaion of WIGOS.

	* Process for nomination, review and approval of GBON composition; Regulatory and guidance material developed; * GBON provisions developed by INFCOM, submitted to and approved by EC-72; * Initial set of WDQMS tools; specification of additional tools * OSCAR Strategy and funding model of OSCAR Platform finalized; * 3 RAs with RWC deployed; * Hydrometry networks integrated in WIGOS; * 7th WMO Impact Workshop held	* Additional WIGOS components integrated in WDMQS; * Regional AMDAR implementation (RA VI, V, III) * Monitoring and evolving of global and regional networks; * Machine to Machine interfaces to OSCAR implemented by some Members * Monitoring and evolving of hydrometry networks. * Establish framework for OSCAR/Space evolution and integration with other OSCAR components	*First workshop RWCs; Assessment, risk management. GBON provisions met by 10 additional Members; Pre-operational WDQMS monitoring capability of RBON.	*Second workshop of RWCs; Gaps and improvement; GBON provision by 20 additional Members. Pre-operational WDQMS monitoring capability for GAW and/or GCW deployed.

◦ Enhanced capabilities to identify gaps in global, regional, subregional, and national observing systems in context of user needs, issues, etc.; ◦ Enhanced cooperation with partners at the national and regional levels; ◦ Enhanced compliance with WMO Technical Regulations; ◦ Improved human and technical capacity of all WMO Members for planning, implementation and operation of WIGOS; ◦ Improved availability and quality of WIGOS observational data and metadata.	* Assessments of observing systems performed; * Funding model of OSCAR Platform finalized; * Regulatory material developed; * Plan finalized for global and regional networks; * Hydrometry networks integrated in WIGOS; * Global AMDAR Implementation Plan developed; Regional implementation (RA VI) * 3 RAs with RWC deployed.	*Assessments of obs. systems performed; * Monitoring performance and evolution of OSCAR; * Regulatory material developed; * Monitoring and evolving of global and regional networks; * Monitoring and evolving of hydrometry networks; * Regional AMDAR implementation (RA V, III); *All RAs with RWC deployed.	* Compliance assessment mechanism approved * Regional AMDAR implementation (RA-II, RA-IV)	* Compliance assessment mechanism exercised with related recommendations * Regional AMDAR implementation (RA-I)

◦ Operational space mission implemented in line with the WIGOS Vision 2040 ◦ Strategy and plan for integration of in situ and remote sensing data developed, with focus on some variables (SST, Surface Vector wind, Sea Level, T Profiles, sea ice) and applications (drought, forest fires, coastal impacts) ◦ Climate services value chain fully addressed by satellite observation; roles and responsibilities of actors and coordination mechanisms understood. Physical Architecture for Climate Monitoring from Space implemented after identifying and addressing key gaps in the climate value chain from satellites to decision-making. Output will include: Gap Analysis, Statement of Guidance, Reporting to CEOS/CGMS, Actions by Space Agencies. ◦ Guidance on calibration and measurement techniques, including intercomparison results in order to ensure fit for purpose traceable measurements.	* Gap analysis between CGMS baseline and WIGOS Vision 2040 * Risk analysis between CGMS baseline and actual space-based obs system component * Key gaps in Earth Obs Systems from Space identified and addressed; * Users requirements from all 6 regions coordinated; * WMO 2020 Global Survey on the Use of Satellite Data; * 15th Session Consultative Meetings on High-Level Policy on Satellite Matters;	* Draft in situ/satellite integration strategy for consultation; * Check against CGMS baseline and WIGOS Vision 2040; * Risk analysis between CGMS baseline and actual space-based observing system component; * Users requirements from all 6 regions coordinated; * Draft of Climate services value chain by satellite observation for consultation: First assessment conducted;	*CGMS-50 hosted by WMO; *Support RRR process and follow-up on EGOS-IP/WOS-IP in all Application Areas by providing a link to user and user needs, incl. through the regional Satellite Data Requirements groups. *Gap Analysis between the WIGOS 2040 Vision Tier 1 and the CGMS Baseline to review implementatio n * 16th Session of Consultative Meetings on High-Level Policy on Satellite Matters.	*Issues of satellite utilization and products addressed in all 14 WMO Application Areas, in line with WMO's Earth System Approach; understanding of members' requirements for satellite information maintained.

	* Case studies on the architecture for climate monitoring from space; Implementation of the SWCEM in East Asia and Western Pacific regions from demo phase to operation; *Intercomparisons prepared (development of tools for monitoring, visualization analytic, and landing pages for the interface between GSICS and WDQMS);	*Implementation of SWCEM Demonstration Project in North Africa; *Intercomparisons conducted (establishment of interface between GSICS and WDQMS); * Space weather observation practices for forecasting, verification, metadata standards and data exchange included in relevant WMO documents (i.e. Manual on WIGOS, WIGOS Metadata, Manual on WIS, Manual on GDPFS);		

	* WMO Statement of Guidance on Space Weather updated; Space weather inroduced into OSCAR/Surface database and OSCAR/ Requirements; * Implement capacity development activities in line with VLab Strategy 2020-2023.	* Implement capacity development activities in line with VLab Strategy 2020-2023		

◦ WIGOS Component Observing Systems Implementation Plan (WOS-IP) responding to the WIGOS Vision 2040 developed, communicated and monitored per Rolling Review of Requirements, incl. consideration of Earth System Prediction reqiurements and urban services	* Redesign of RRR to take into account Earth System Prediction, incl. workshop on impact of obs. systems on NWP * Initial version of WOS-IP per first assessment of RRR (gap analysis) and of obs. needs for urban services * Annual Review of RRR (gap analysis) - focus on two Application Areas and Earth System Prediction * Consultation with Members on Strategy for observing systems design and outreach * Start next assessment cycle for GCOS	* Workshop on impact of obs. systems on Earth System Prediction * Next version of WOS-IP for Cg-Ext. * Approved Strategy for observing systems design and outreach * Annual Review of RRR (gap analysis) - focus on two Application Areas and Earth System Prediction * Methodology approved for impact per cost study * Last advances in situ observations and end-users requirements analysis for urban observations assessed * Revised GCOS Status Report available	*Implementation of Actions of EGOS-IP; Recommendations as needed to address most critical gaps; *Annual review of RRR; *Methodology for designing urban areas networks developed.	*Implementation of Actions of EGOS-IP monitored; Recommendations as needed to address most critical gaps; *Annual review of RRR; * WOS-IP approved by Cg

Focus Area/Outcome B: Compliance with regulations and standards increased and critical gaps in observational data coverage identified and addressed through the integrated design of observing networks				
Outputs and Milestones:	**2020**	**2021**	**2022**	**2023**
◦ Standards and guidance developed for observations, operational practices and system performance monitoring, calibration and instrument testing, and data related aspects for Earth System observations and fit for purpose traceable measurements, particularly from extreme and harsh environments and remote areas (incl. oceans and polar and high mountain regions). ◦ New and emerging measurement techniques and non-conventional, innovative measurement methods developed (e.g. cryospheric observations, radar technologies, ground-based remote sensing, autonomous vehicles, measurement devices, citizen observatories). Existing standards updated to reflect evolving technologies, with a focus on precipitation (different time scales and phases) and specific instruments (e.g. remote sensing, incl. radars). ◦ Guidance on calibration and measurement techniques, including intercomparison results in order to ensure fit for purpose traceable measurements.	* Standards and partners identified; discussion initiated; * Upper-air intercomparisons prepared, IPC and IPgC conducted; * Guidance on AWS procurement published.	* Partners consulted; standards and guidance reviewed and developed (CIMO Guide chapters updated); * Upper-air intercomparisons conducted	* Technical conference on emerging measurement techniques; *Intercomparison report published; * Inter-lab comparison conducted; * Best practices & publications streamlined (wrt uncertainties)	* Standards published (or planned according to partner milestones); * CIMO guide updated; * All RICs accredited/ audited.
GCW pre-operational phase implemented: ◦ Short-term demonstration projects and long-term plans for high mountain observations, prediction, research and services ◦ Global Cryosphere Watch (GCW) implemented as an end-to-end programme, including the development of an integrated cryosphere information system addressing cryosphere information needs at all latitudes and elevations (observations, data, normative work); ◦ Studies completed on impact of cryospheric observations on relevant Application Areas:Statement of Guidance Cryosphere Monitoring. ◦ Assessments and indicators of the state of the cryosphere, with relevant users, e.g. RCCs, WMO Statement on the State of the Global Climate, etc. progressively from 2021; ◦ Intercomparison of products for sea ice ◦ GCW Data Portal operating as a WIS DCPC by 2023	* RA VI High Mountain concept; *Normative material draft:glaciers,sea ice, metadata, compliance; * Contribution to WMO Statement on Climate; Methodology cryosphere climate indicators;	*RA III High Mountain concept; *Normative material: draft (permafrost); Published (sea ice, glacier, metadata, compliance, interoperab); *Consultation Cryosphere Monitoring Application Area;	* RA II High Mountain concept, follow up on RA VI; * Cryosphere Monitoring Application Area established; *Normative material published (permafrost, data exchange); drafted (lake/ river ice);	*Pilot project concept RA IV and follow up on RA III; *Statement of Guidance Cryosphere Monitoring; *Normative material published (complete volume, data exchange); *GCW Data Portal operating as WIS DCPC;

	*153 GCW stations in OSCAR; *25 new GCW stations and interoperable with data portal; Sea ice intercomp prepared	*Draft Plan Sea Ice Intercomparison; *Contribution to WMO Statement on Climate, *25 new GCW stations and interoperable with Data portal	*Contribution to WMO Statement on Climate; Bulletin on Cryosphere; *Sea Ice product intercomparison initiated *25 new GCW stations and interoperable with Data portal	*25 new GCW stations and interoperable with Data portal; *Contribution to WMO Statement on Climate; *Bulletin on Cryosphere; * Year 1 sea ice intercomparison
Focus Area / Outcome C: Additional regulatory and guidance material developed to facilitate integration of externally-sourced observations under the WIGOS umbrella				
Outputs and Milestones:	**2020**	**2021**	**2022**	**2023**
Global ocean observing system responding to Earth System prediction requirements - WMO Contribution to Global Ocean Observing System (GOOS), incl. Technical support to Members provided with regard to ocean observing systems monitoring, implementation and maintenance through JCOMMOPS	GOOS Project Office at WMO established; Ongoing management of JCOMMOPS	Ongoing management of JCOMMOPS Proposal from JCB regarding functional connections of GOOS with WIGOS & INFCOM	Ongoing management of JCOMMOPS; WMO fully engaged in GOOS, and related activities fully functional with WIGOS and INFCOM	Ongoing management of JCOMMOPS
Governance:				
Outputs and Milestones:	**2020**	**2021**	**2022**	**2023**
Effective and efficient session of the Commission for Observation, Infrastructure and Information Systems (Infrastructure Commission)	1 session		1 session	

Activities:

A. National WIGOS implementation, including necessary capacity development efforts, partnership agreements and integration of observing systems for all application areas; includes in particular monitor implementation by Members of global and regional surface-based observing networks; implementation and operations of operational weather radar data, incl. globally consistent networks (best practices, international data exchange, metadata to OSCAR); implement WMO-IATA Collaboration on AMDAR at the regional level; promoting enhancement of Hydrometry networks and Members' capacity regarding these networks; establish GCOS Surface Reference Network

- Implementation of the Global Basic Observing Network and the Regional Basic Observing Networks;
- Operational deployment of the WIGOS Data Quality Monitoring System;
- Operational implementation of Regional WIGOS Centres;
- Further development and evolution of OSCAR databases; operations and long term maintenance of OSCAR, incl. quality monitoring of OSCAR content, guidance and training material, implementation of machine to machine interfaces by Members
- Update WIGOS regulatory and guidance material and foster a culture of compliance with the WIGOS technical regulations.
- Develop strategy and plan for integration of in situ and remote sensing data;
- Work with experts in each Application Area to adjust OSCAR database and methodology (e.g. for consideration of multiple time scales) and update the observational user requirements recorded in OSCAR;
- Work with Members and other relevant partners (e.g. Space Agencies) and groups (e.g. CGMS, CEOS) to make sure that the capabilities of surface- and space-based observing systems as recorded in OSCAR/Surface and OSCAR/Space reflect the reality of the observing systems implemented and operated;
- Take steps to facilitate (i) better integration of in situ, remote sensing data and other products to be assimilated by models of various Application Areas;
- Conduct gap analysis between CGMS baseline and WIGOS Vision 2040;
- Lead the implementation of the architecture for climate monitoring from space in cooperation with GCOS and GFCS (requirments), CEOS-CGMS WGClimate (ECV climate data sets), and other mechanisms identified in the Architecture;
- Conduct intercomparison of radiation instruments (13th IPC and 3rd IPgC);
- Plan and conduct upper-air instrument intercomparison;
- Plan and conduct an inter-laboratory intercomparison (ILC) for RICs that have not yet participated in such an ILC;
- Conduct assessment of RICs (including on-site audit of selected RICs);
- Develop guidance material linking observing technologies to application area requirements;
- Address the needs for sustainable measuring technologies in extreme environments (polar, high mountains, remote locations).
- Develop Strategy and guidance on how to frame National WIGOS Implementation Plans and how to use new technology, engage with partner organizations and the private sector in order to enhance availability of observations from them, and undertake observing network design taking such availability into account;
- Review list of Application Areas and update it if needed;
- Update observational user requirements in OSCAR;
- Update Statements of Guidance of all Application Areas;
- Assess and compile observational user requirements for seamless and high impact events;
- Review results of impact studies and promote new ones;
- Assess the special needs of cities through a combination of dense observation networks, high-resolution forecasts, multi-hazard early warning systems, and climate services;
- Develop methodology for improving the observation networks in urban areas;

◦ Conduct study of impact per cost of observing systems;
◦ Develop WIGOS Component Observing Systems Implementation Plan (WOS-IP) including elements relevant to all WIGOS component observing systems;
◦ Communicate and advertise the WOS-IP;
◦ Monitor implementation of WOS-IP actions by the identified implementing agents◦
◦ Initiate the next assessment and review cycle of GCOS;
◦ Communicate and advertise the new GCOS-IP and its benefits to Members and other relevant observing agencies;
◦ Monitor implementation of the actions of the GCOS-IP and consider further recommendations accelerating implementation;
B. Develop and publish guidance material on measurement practices, including on non-conventional technologies;
◦ Update existing standard (including publication) to reflect evolving technologies;
◦ Streamline WMO guidance and regulatory material on measurements through collaboration with all WIGOS components
◦ Publish and make generic tender specifications easily useable through an interactive tool;
◦ Collaborate with ISO in the development and publication of joint WMO-ISO standards on measurement technologies and practices;
◦ Develop and publish guidance material on measurement practices, including on non-conventional technologies;
◦ Treacability and intercomparisons:
** Conduct intercomparison of radiation instruments (13th IPC and 3rd IPgC)
** Plan and conduct upper-air instrument intercomparison
** Plan and conduct an inter-laboratory intercomparison (ILC) for RICs that have not yet participated in such an ILC
** Conduct assessment of RICs (including on-site audit of selected RICs)
** Develop guidance material linking observing technologies to application area requirements
◦ Plan engagements and specific activities as an outcome from the WMO High Mountain Summit followed by implementation activities;
◦ Develop for publication in relevant WMO documents cryosphere specific regulatory and guidance material on observations and data;
◦ Consolidate Cryosphere Observing Requirements, facilitate sea ice products in-situ/space intercomparison and assess compliance of observing capacity, within the framework of GCW;
◦ GCW Data Portal to operate as a WIS DCPC in 2023;
◦ Publish recommended practices on the development of user-driven assessments of the state of the cryosphere, and for inclusion in the WMO Statement on the State of the Global Climate, progressively from 2021;
◦ Representatives of relevant applications, including emerging application requirements are engaged and advice on gaps in the current representation of cryosphere observing requirements.
C. Establish GOOS Project Office at WMO;
◦ Contribute to development of GOOS Implementation Plan;
◦ Contribute to joint WMO-IOC Strategy for Ocean Data Management, and extend strategy to full financial period;
◦ Further develop Marine Climate Data System with new Centres and high-quality ocean data management for climate;
◦ Coordinate implementation of ocean observing networks;
◦ Develop strategies and update/maintain Best Practices of each ocean observing network;
◦ Promote and facilitate ocean data exchange using WIS infrastructure

◦ Evaluate and designate new ocean centres in WIS ◦ Promote development of Operational Ocean Forecasting Systems to contribute to Earth System Prediction ◦ Technical assistance provided by JCOMMOPS to Members on implementation on ocean observing networks; ◦ Monitoring of ocean observing networks by JCOMMOPS according to agreed metrics; ◦ Collection of ocean observing platform metadata to OSCAR via JCOMMOPS. D. Organize and support the session of the Infrastructure Commission	
Risks: ◦ WIGOS Data Quality Monitoring System (WDQMS) not providing required information; ◦ OSCAR/Requirements not reflecting current reality of observational user requirements (different nature of the requirements e.g. for regional requirements and for hydrology or GAW, lack of resources for the required coordination, etc.); ◦ OSCAR/Surface not reflecting reality of surface-based observing system; ◦ OSCAR/Space not reflecting reality of space-based observing system; ◦ Ensuring sustainability of OSCAR/Space ◦ Lack of results from impact studies; ◦ Observations impact per cost not correctly assessed; ◦ Reduced funding of observing systems due to lack of political support and understanding; ◦ Reduced funding of observing systems due to perception that third party and crowdsourcing data could replace traditional observations; ◦ Members not responding or not adequately responding to WIGOS-IP; ◦ Adaptation planning not sufficiently based on good observational foundations: adaptation funding does not include funding for observations. ◦ Risk of losing voluntary contributions from WMO Members and IOC Member States in support of JCOMMOPS, due to the centre becoming unsustainable or weakly managed.	**Mitigation measures:** ◦ Speed up completion of WDQMS in compliance with RRR technical regulations; ◦ Appoint active Application Area Focal Points and Communicate with user communities; ◦ Improve (a) training of OSCAR/Surface national focal points and (b) monitoring of quality of OSCAR/Surface content; ◦ Promote implementation of Machine to Machine interfaces by Members with OSCAR/Surface; ◦ Dedicate sufficient resources to OSCAR/Space (financial, staff); ◦ Put in place resources for better managing, quality and content of OSCAR; ◦ Promote relevant impact studies; ◦ Dedicate more resources towards effective impact per cost study; ◦ Encourage Members and key actors to provide accurate and appropriate information about observing systems costs; ◦ Make further efforts to better assess impact of specific observing systems on WMO Application Areas; ◦ Communicate with Members about the need and benefits of WIGOS IP and on integrated observing systems, and value of high quality observing systems for planning, climate adaption, emergency response and disaster risk reduction; ◦ Develop communication strategy with Members about the need and benefits on integrated observing systems, and value of high quality observing systems for reference purposes. ◦ Perform assessment of quality of third party data and communicate results to decision makers (e.g. build on GAW's efforts in this regard); ◦ Develop a communication strategy about the benefits, including socio-economic, of addressing the actions of WIGOS-IP; ◦ Advocate for adaption to be based on observations; ◦ Work with funding agencies to ensure the importance of observations is well understood. ◦ Introduce manager position at JCOMMOPS.

Regional Aspects

- Need to evolve RBSN/RBCN into RBON and GBON, extend to networks with additional observing stations, and have them to report more frequently (at least hourly) in order to provide higher spatial and temporal resolution data to Global NWP and Climate monitoring applications, in line at least with their threshold requirements.
- Establishment of Regional WIGOS Centres in all regions with coverage extended to include all Members.
- Regional Implementation Plans for AMDAR, based on collaboration with IATA.
- Routine use of OSCAR/Surface by Members to record the WIGOS metadata of their observing stations, and implementation of machine to machine interfaces. Quality monitoring of information in OSCAR/Surface could be coordinated and undertook at the regional level.
- Regions to put in place regional coordination mechanisms in the framework of the WMO-IATA collaboration for aircraft-based observing systems.
- Regions to agree on common best practices and exchange weather radar data across borders.
- Need to assure proper transition from manual to automated observations, in line with the Observing Network Design principles.
- For some Members, high cost of the supply of observing systems, spare part and maintenance, and the lack of qualified staff for the maintenance, prevents them from operating and maintaining surface-based observing systems according to Regulations and requirements.

Current Programmes	Working Bodies	Partners
Lead: WIGOS Contributing: WHOS, WWW-IOC, SAT, GCOS, GFCS, DMA, GAW, GCW	RAs, TCs, Research Board, Secretariat	Space Agencies, UN and other partner organizations with observing programmes

Long-Term Goal 2:
Enhance Earth system observations and predictions: Strengthening the technical foundation for the future

Strategic Objective 2.2:
Improve and increase access to, exchange and management of current and past observation data and derived products through the WMO Information System

Budget (in thousands of Swiss francs): *Note: Regular Budget (RB) and Voluntary Contributions (VC) resources (staff & non-staff)*	**RB (CHF)**	**% of total RB**	**VC (CHF)**	**Comments (VC):** WIS Trust Fund
	13,616.3	5.1%	780.0	

Performance Indicators:	**Baseline 2019**	**Target 2021**	**Target 2023**
2.2.1 Progress in the implementation of WIS by NMHSs as measured by a weighted score			
2.2.2 Progress in the maintenance and evolution of WIS technical standards measured by a weighted score			
2.2.3 Percentage of data available in WIS registered as unrestricted or in line with Resolutions 40, 25 and 60			

Focus Area/Outcome A: A growing and evolving WIS which accommodates and exploits the different technical capabilities of Members and provide continued access to all observations acquired under WIGOS and all data generated under the Global Data Processing and Forecasting System for all Members

Outputs and Milestones:	**2020**	**2021**	**2022**	**2023**
Pilot projects that demonstrate viability of proposed technical standards for global integration of observations with products to meet the needs of weather, climate, hydrology, aviation, marine and other services, including ability to access data and products originating from NMHS and partner organizations sites internationally in rapid real time and with adequate WIS and OSCAR metadata	Technologies identified and prioritized for contribution to WIS 2.0	Prototype and pilot prioritized technologies	Guidance material on agreed technologies for WIS 2.0 documented and prepared	Draft updates to guides and technical regulations provided to Cg-19

Focus Area/Outcome B: Further regulatory and guidance material developed, governing international exchange of data, along with strengthened monitoring of compliance

Outputs and Milestones:	**2020**	**2021**	**2022**	**2023**
Guidance on Information Management for all WMO activities	Generalized information management practices identified across WMO activity areas, including key thematic requirements	Draft generalized guidelines prepared for consideration of EC-73	Information management guidelines extended to include specific thematic practices	Draft updates to guides and technical regulations provided to Cg-19
Focus Area / Outcome C: WMO data management systems and practices consolidated and further developed through WIS to help ensure that all observational data and key products are properly managed				
Outputs and Milestones:	**2020**	**2021**	**2022**	**2023**
Operational guidelines for data representation maintained and developed, improved information discovery and access services enabled by WIS 2.0	Data representation and metadata quality developed and extended to more programmes	Data models for interoperablity enhanced including discoverability in search engines	Updated practices processed through TC and EC-74 for consideration of Cg	Data and information discoverable and usable through popular search engines for all programmes
WMO position prepared and represented at the World Radiocommunications Conference (WRC-23) to ensure that the radio frequencies required for WMO activities are protected	Develop WMO position on WRC23 Agenda. Support studies on Space Wx services and frequency requirements	ITU processes, national to global, informed on WMO requirements and progress studies on space wx	WMO positions on WRC23 updated; EC-74 and Cg-19 prepared on current and future WRCs Agendas	WMO requirements represented to final WRC23 processes and prepared for next WRCs

Activities:

A. Develop and start implementation of WIS 2.0 Strategic Plan - define technical specifications, provide guidance in their application - prepare guidance on how to use the facilities of WIS 2.0 and WIGOS tailored to the needs of users of the Seamless Global Data Processing and Forecasting System, Integrated Global Greenhouse Gas Information System and the Climate Services Information System. - Conduct workshops drawing on experts from all contributing areas to identify the requirements and sources of observations and products to contribute to pilot projects for all items.

B. Develop the information management standards and guidance. - Develop information management guidance and maturity matrix framework for all WMO programmes and communities - Provide a facility for sharing WIS, WIGOS and Information Management good practice and training materials, especially targeted to assist members with low levels of maturity or capability.

C. Maintain and develop data representations and metadata and extend to all WMO activities - extend data models to support the needs of weather, climate, hydrology, aviation, marine and other services - engage with community driven data representations to provide guidance for their use in all WMO activities within a communities wide information management framework - develop metadata to improve data discovery and data access.

D. Maintain awareness of radio frequency issues at global, regional and national level; Support the work of Steering Group on Radio Frequency Coordination.

Risks:	**Mitigation measures:**
◦ Gaps between developed and developing countries; ◦ Staff retirements; ◦ Inability of NMHSs to adapt; ◦ Inability to process decisions for technical standards during transition to new TC; ◦ Shortage of experts with time and skill to support development and implementation.	◦ Continue using volunteer services to provide expertise; ◦ Optimize the number of meeting days; ◦ Use video conferencing and webinars to optimize or reduce the need of face-to-face meetings and workshops; ◦ Integrate already available standards and practices from partners or at national level; ◦ Development of e-learning material.

Regional Aspects

Facilitate RAs in leading national implementation of WIS, in particular coordinating training through GISCs and RTCs. Identify problem areas in WIS implementation and ensure all Members have achieved a basic level of WIS in preparation for WIS 2.0.

Current Programmes	**Working Bodies**	**Partners**
Lead: WIS Contributing: WIGOS, DMA, GCOS, GFCS, MMO, HWR	EC, RAs, TCs, Research Board, Secretariat	ITU

Long-Term Goal 2: Enhance Earth system observations and predictions: Strengthening the technical foundation for the future						
Strategic Objective 2.3: Enable access and use of numerical analysis and prediction products at all temporal and spatial scales from the WMO seamless Global Data Processing and Forecast System						
Budget (in thousands of Swiss francs): *Note: Regular Budget (RB) and Voluntary Contributions (VC) resources (staff & non-staff)*	**RB (CHF)**	**% of total RB**	**VC (CHF)**	**Comments (VC):**		
	7,497.2	2.8%	-			
Performance Indicators:				**Baseline 2019**	**Target 2021**	**Target 2023**
2.3.1 Number of Members (a) accessing and (b) using quantitative numerical model fields in support of national product generation and service delivery						
2.3.2 Number of Global Producing Centres providing verification data to Lead Centres						
Focus Area / Outcome A: Enhanced GDPFS to enable all Members to develop and/or improve their own national predictive capabilities benefiting from advances in quantitative model- and impact-based forecasting products						
Outputs and Milestones:			**2020**	**2021**	**2022**	**2023**
Impact-based operational data-processing and forecasting implemented in WMCs, RSMCs, NMCs			29 Members implement impact-based forecasting	57 Members implement impact-based forecasting	96 Members implement impact-based forecasting	115 Members implement impact-based forecasting
Operational data-processing and forecasting for emergency response for nuclear, non-nuclear and marine environment expanded			2 additional centers	2 additional centers	2 additional centers	2 additional centers
Enhanced marine data processing and forecasting systems implemented by marine RMSCs and/or National Marine Meteorological Centres			New data processing & forecasting technique for marine developed	Test at 2 centers	Awareness and education campaign for implementation	5 centers implement

GDPFS designated centres audited for compliance	Audit process developed	4-5 per year	4-5 per year	4-5 per year
Focus Area/Outcome B: GDPFS advanced to accommodate increased emphasis on probabilistic forecasting and coupled Earth system modelling to improve predictions over time scales ranging from long-term climate variability to seasonal/sub-seasonal to short-term weather event				
Outputs and Milestones:	**2020**	**2021**	**2022**	**2023**
Pilot projects on seamless GDPFS to demonstrate capabilities	At least 2 pilots	2-4 more pilots and ongoing assessment	Final assessment of pilots and integration of results	Gaps addressed; implementation initiated in at least 2 centers
Toolbox for accessing seamless GDPFS data and products	Concept and design developed	Tested	Tested	Implemented
Operational aspects of CSIS integrated into GDPFS process	Mechanism for integration discussed	Mechanism developed and tested	Continued testing	Integration of CSIS with GDPFS completed
Hydrology data-processing and forecasting integrated into seamless GDPFS	Designation criteria developed for RSMC for hydrology; hydrological aspects integrated in pilot projects	Designation criteria integrated into GDPFS manual and continuing hydrological aspects in pilot projects	RSMC Hydrology designated	RSMC Hydrology designated
Seamless GDPFS pilot project outputs implemented in all sub-regions of the Severe Weather Forecasting Demonstration Project (SWFDP)	2-3 workshops	2-3 workshops	2-3 workshops	2-3 workshops
Advanced Operational Environment Prediction for air-borne hazards	Operational processes standardized and implemented	Up to 20 Members provide environmental prediction	20 additional Members	30 additional Members

Focus Area / Outcome C: Regulatory and guidance material governing the functioning of the GDPFS further developed				
Outputs and Milestones:	**2020**	**2021**	**2022**	**2023**
Updated/new technical and regulatory materials, including: (1) a new Guide on Global Data-Processing and Forecasting System (WMO-No 305); (2) new Guidelines on High Resolution Numerical Weather Prediction (NWP); (3) Guidelines on the use and interpretation of non-nuclear ERA products and services provided by RSMC; (4) Guidelines on Humanitarian Services; (5) GDPFS Manual (WMO-No 485); (6) Guidelines on Ensemble Prediction System and Post Processing (EPSPP)	(1) draft available for comments; (2) and (6) draft developed; (4) criteria for RSMC humanitarian developed (5) updated	(1) (2) and (6) published; (3) draft available; (5) amended	(3) published	
Established procedures applied by Members engaged in the implementation of NWP	1-2 Members	1-2 Members	10% more Members	20% more Members

Activities:

A. - Conduct expert meetings on the development of a procedure for integration of non-conventional data (exposure and vulnerability) into GDPFS to facilitate impact-based forecasting and risk-based warning;

- Organize meetings and support the work of the Standing Committee on Operational Data Processing;

Convene meetings of weather, climate and emergency response experts;

- Convene expert team meetings on integration of marine data processing into GDPFS;
- Develop a new technique for data processing and forecasting to be used by marine RSMCs and/or National Marine Meteorological Centres;
- Organize expert meetings on the development of an audit process; Conduct audits of GDPFS designated centres.

B. - Convene meetings of the Steering Group; Develop criteria for selection of pilot projects;

- Select and implement pilot projects; Conduct WMCs/RSMCs Annual Workshop;
- Develop a mechanism for weekly severe weather advisory services;
- Develop a WMO roadmap to Earth System modelling
- Establish a task team and organize meetings;
- Develop a toolbox for accessing seamless GDPFS data and products in coordination with WIS 2.0;
- Establish a joint task team and hold meetings to develop and implement the integration mechanism of CSIS into GDPFS;
- Develop hydrological centres designation criteria; Integrate into the Manual of GDPFS;
- Hold one training workshop on the use of improved products of seamless GDPFS in all 8 SWFDP sub-regions;
- Task Team meeting for the development of operational standards for environmental prediction;
- Technical assistance to Members to implement environmental prediction.

C. - Develop guidelines and update existing regulatory material;
- Publicize the revised Manual on GDPFS;
- Assess applications for designation of new GDPFS centres, including for marine and nuclear and non-nuclear emergencies;
- Conduct assessment missions to countries;
- Provide technical assistance as needed.

Risks:	**Mitigation measures:**
◦ Failure to secure services of volunteer experts ◦ Ineffective uptake of GDPFS/ERA programme activities due to lack of capability of NMHSs in LDCs and some developing countries.	◦ Optimize meetings and/or run in synergy with other events to reduce time away from home base. ◦ Seek XB resources for training workshops and other capacity building initiatives.

Regional Aspects

Operationalizing SWFDP in all regions is an imperative including strengthening the RSMCs. Increased focus on impact-based forecasting integrating with FFGS and CIFDP where possible. Continue emphasis on the implementation of SWFDP West Africa and Caribbean and operationalizing the Pacific initiate ASAP in South America, Central Africa and Oceania.

Current Programmes	**Working Bodies**	**Partners**
Lead: GDPFS, RES (WWRP, WCRP, GAW) Contributing: HWR, WCP, MMOP	EC, RAs, TCs, Research Board, Secretariat	GPCs, Lead modelling centers

Long-Term Goal 3: Advance targeted research: Leveraging leadership in science to improve understanding of the Earth system for enhanced services						
Strategic Objective 3.1: Advance scientific knowledge of the Earth system						
Budget (in thousands of Swiss francs): *Note: Regular Budget (RB) and Voluntary Contributions (VC) resources (staff & non-staff)*	**RB (CHF)**	**% of total RB**	**VC (CHF)**	**Comments (VC):** (A) WCRP typically mobilizes around 400 K CHF annually from non-WMO contributions, which are used to coordinate the global climate research community (B) WCRP climate research agenda generates in-kind contributions from many research centers and agencies, with conservatives estimates well above 100 M CHF annually. JCRF Trust Fund		
	8,298.3	3.1%	8,400.0			
Performance Indicators:				**Baseline 2019**	**Target 2021**	**Target 2023**
3.1.1 Number of peer reviewed papers published in "top five" science journals that cite keywords of relevance to WCRP, WWRP and GAW						
Focus Area/Outcome A: Overarching challenges in Earth system scientific research, modelling, analysis and observations addressed, on topics such as atmospheric composition, the ocean/atmosphere/land coupling, cryosphere, clouds and circulation, water availability and flooding, regional sea level and coastal impacts, high-impact weather, and climate variability and change						
Outputs and Milestones:			**2020**	**2021**	**2022**	**2023**
Integrated research pilot projects established, fostering the value chain approach, responding to research needs of RAs and addressing regional priorities			Research needs of RAs identified	Pilots to address these needs developed and implemented	Pilots evaluated and follow-up activities developed; Further pilots developed and implemented	Pilots evaluated and follow-up activities developed
Integrated research pilot projects established, related to the understanding and assessment of the Earth system across weather, climate, water and environment programmes			Suitable pilots identified and developed	Pilots implemented and evaluated	Pilots implemented and evaluated; Follow-up activities planned	Evaluation; Follow-up activities planned/ operational implementation
Focus Area/Outcome B: Research implementation plans prioritized and broad scientific community mobilized to help leverage global research potential to generate enhanced knowledge and understanding of the Earth system and related weather, water and climate linkages						

Outputs and Milestones:	**2020**	**2021**	**2022**	**2023**
Research implementation plan developed and delivered to community and used by Members to drive their research programmes (including regional priorities identified in collaboration with RAs) considering cross-cutting research activities	Draft plan developed with experts under the supervision of Research Board	Plan shared with broader community and Members	Plan updated based on outcomes of open science conference, other key events, and feedback from Members and communities	Planfinalized and distributed to Members and communities
WMO open science conference 2021: underpinning research for all elements of the weather-climate-water-enterprise value chain	Conference planning commenced and experts from all fields engaged	Conference planning finalized; Conference takes place	Follow-up work on publications based on conference outcomes completed	
Focus Area / Outcome C: Advancement of WMO-coordinated priority scientific assessments and services supported				
Outputs and Milestones:	**2020**	**2021**	**2022**	**2023**
Early career scientists (ECS) engaged in WMO research activities	Plan developed on ECS contribution to WMO research activities/ events	Broad ECS community engaged in organization of workshop/ activities	Broad ECS community engaged in organization of workshop/ activities	Broad ECS community engaged in organization of workshop/ activities
Governance				
Research Board (RB) established in WMO to better guide the research priority and science-driven services development as well as link to the advice from SAP	RB established	Contributions to EC; SAP suggestions evaluated	Contributions to EC; SAP suggestions evaluated	Contributions to EC; SAP suggestions evaluated

Activities:

Coordination bodies and conferences

◦ Establish an international steering committee across WWRP, WCRP, GAW for the organization of the 2021 Open Science Conference;
◦ Organize the 2021 Open Science Conference.

Improved knowledge of the processes/drivers of the Earth system, including feedbacks

◦ Targeted research on high-impact weather and climate extremes;
◦ Joint research activities to improve the understanding of aerosol activation in the atmosphere; develop better understanding and modelling capabilities for cloud processes, including aerosol-cloud integration and radiative forcing;
◦ Joint projects/activities on improved understanding of radiative forcing of Short-Lived Climate Pollutants;
◦ Studies of the processes driving atmospheric chemical composition changes including deposition, exchange processes, atmospheric transport and transformation;
◦ Improve the understanding of the role of clouds and associated circulation in the present and future climate;
◦ Better understand how the cryosphere will respond to, and feedback on, a changing climate;
◦ Improve the skill of predictions of regional sea-level change and better understand the processes involved;
◦ Improve understanding of carbon feedback in the climate system, including how such feedbacks may amplify changes over time;
◦ Improve understanding of the dynamics, the interaction and the predictability of the coupled ocean-atmosphere system for a range of time scales, including modes of variability and abrupt changes to the system.

Attribution of changes

◦ Development of science underpinning attribution of weather extremes, regional sea level rise, and water availability over a range of time scales;
◦ Development of advanced methods for the atmospheric chemical composition variations to specific sources (e.g. tracer-tracer relations, multi-component inversion and isotopic studies).

Development of Science requirements for observations, data assimilation and analysis techniques

◦ Development of coupled data assimilation and reanalysis techniques;
◦ Improvement and implementation of efficient strategies for strongly and weakly coupled data assimilation;
◦ Improvements to model physics and related data assimilation to better utilize observations of aerosols, cloud, and water vapor in initializing models and predicting convective initiation, rainfall enhancement/ suppression, and other precipitation processes;
◦ Improved understanding and quantification of the impact of existing and new observation data streams on the accuracy of numerical prediction, especially at the km-scale;
◦ Improved diagnostics and verification tools from high-resolution ensembles;
◦ Assessment of the emerging measurement techniques and integration of observations from different platforms, including the use of innovative technologies towards cost-effective, scalable and sustained Earth System observing systems;
◦ Development of consistent multi-scale atmospheric inverse modeling techniques;
◦ Support further development of coupled Earth System Reanalysis.

Water and energy cycle research

◦ Increasing use of ensemble and probabilistic approaches to provide seamless precipitation and hydrological predictions across time and space scales;
◦ Increasing ability to observe, understand, and predict variability and changes of the coupled air-ocean-ice-land system from hourly to decadal time scales and beyond;

◦ Improvement of land surface models in coupled modelling systems to incorporate more hydrological processes, including temporal variability.
◦ Improvements to model physics and related data assimilation to better utilise observations of aerosols, cloud, and water vapour in initialising models and predicting convective initiation, rainfall enhancement/suppression, and other precipitation processes;
◦ Improved estimates of Quantitative Precipitation Estimation and Forecasting (QPE and QPF) and their associated uncertainty to drive ensemble hydrological predictions;
◦ Modelling and post-processing methodologies that improve hydrological prediction on a variety of space and time scales for different applications;
◦ Analysis of the water vapour variability in the atmosphere;
◦ Coordinate international partnerships to develop assessments of historical and future variability and predictability of water and energy cycles.

Research in the biogeochemical cycles
◦ Assess benefit of including bio-geochemistry in ESM

Coupled ESM and underpinning technology
◦ Integration of new process understanding in enhanced ESM to tackle systematic errors;
◦ Design of international joint initiatives around ESM development;
◦ Improving the coupling of numerical environmental prediction models with impact models and observations;
◦ Development of coupled high-resolution atmospheric and hydrological models, incorporating surface and sub-surface drainage, for prediction of flash flooding in urban areas;
◦ Development of models and coupling strategies that take advantage of advanced computer architectures.

Risks:	**Mitigation measures:**
◦ Engagement of lead experts (on voluntary basis) in the work of SAP, the Research Board and science oversign of research programmes; ◦ Lack of contributions to the organization of the Open Science Conference; ◦ General lack of interest in the WMO articulated research priorities.	◦ Members are made aware of the role of SAP and Research Board and invited to use their advice in driving national and regional research priorities; ◦ Broader scientific community is made aware of the planned conference well in advance, steering committee is established to include leading Earth System scientists; ◦ Outreach on WMO role in research and benefits for operations and services.

Regional Aspects

Regional research priorities and needs will be jointly identified with RAs for the development of integrated research pilots fostering the value chain approach.

Current Programmes	**Working Bodies**	**Partners**
Lead: WWRP, WCRP, GAW, Contributing: IPCC	SAP, Research Board, GAW, WWRP and WCRP scientific oversight bodies, TCs, Secretariat	ICSU, UNESCO, Science Foundations

Long-Term Goal 3: Advance targeted research: Leveraging leadership in science to improve understanding of the Earth system for enhanced services						
Strategic Objective 3.2: Enhance the science-for-service value chain ensuring scientific and technological advances improve predictive capabilities						
Budget (in thousands of Swiss francs): *Note: Regular Budget (RB) and Voluntary Contributions (VC) resources (staff & non-staff)*	**RB (CHF)**	**% of total RB**	**VC (CHF)**	**Comments (VC):** GESAMP Trust Fund, WMO Weather Modification Research Trust Fund, Sub-seasonal to Seasonal Prediction Project Trust Fund, UNEP, NextGEOSS Trust Fund, Polar Prediction Project Trust Fund, GAW Meteo Swiss Trust Fund, Integrated Global Greenhouse Gas Information System Trust Fund, High Impact Weather Trust Fund.		
	13,715.8	5.2%	5,850.0			
Performance Indicators:				**Baseline 2019**	**Target 2021**	**Target 2023**
3.2.1 Downloads of Sub-seasonal to Seasonal Prediction (S2S) database in Terabytes						
Focus Area/Outcome A: Improved predictive capabilities in high-impact weather forecasting, sub-seasonal, seasonal and decadal prediction, polar prediction, urban and environment prediction and water cycle prediction						
Outputs and Milestones:			**2020**	**2021**	**2022**	**2023**
A concept of federated data hubs developed and tested for sharing data and metadata across WMO research projects in line with agreed standards and ensuring compatibility with the implementation plan for the Seamless Data Processing and Forecasting System			Concept developed		Concept tested	
High-performance computing projects established to further develop Earth system modelling and related data management for improving the transition to an exascale world			Plan developed	Resourcing and partnership meeting	Reporting on early progress	
Coordinated modelling and forecast experiments across WWRP, WCRP and GAW to foster Earth System modeling development			Pilot projects & comparison experiments designed to test specific model processes	Pilot projects & comparison experiments executed to test specific model processes	Outcomes evaluated	Feedback provided to fundamental research
Focus Area/Outcome B: Enhanced relevance and utility of products and services through broader engagement of social science expertise and closer collaboration between physical and social scientific groups						

Outputs and Milestones:	**2020**	**2021**	**2022**	**2023**
Dialogue with stakeholders, including social scientists initiated and coordinated to develop a service delivery interface and increase the uptake by end users and links to coordinated international research meetings on model development, evaluation and performance metrics	User interface group composed and plan for research programmes developed	User survey conducted	User survey analyzed and synthesized	Lessons learned from selected case studies documented
Guide for Urban Integrated Hydro-Meteorological, Climate and Environmental Services developed to support Members in establishing respective services, contributing to SDG “sustainable cities and communities”	First draft available	Plan for additional pilot projects		Final Report
Concept developed and tested on the implementation of an end-to-end value chain approach to improve services	Value chain concept developed	Concept tested for specific projects	Guide refined and published	

Activities:

A. Improved high-impact weather forecasting:

◦ Improved numerical forecasts of catchment conditions through collaboration of meteorological and hydrological scientists;

◦ Identification, characterization and quantification of analysis and forecast uncertainty using advanced probabilistic methods;

◦ Development of (a) observation-based nowcasting techniques to enable frequent, rapid forecast updates of very short duration high-impact weather conditions, (b) new methods for verifying impact-based forecasts and application to hazard impact forecasts and warnings, (c) global systems for biomass-burning forecasting and related air quality forecasts, including connection with health impacts.

Development of polar prediction systems

◦ Increased abilities to observe, understand, and predict variability and changes of the coupled air-ocean-ice-land system, and specifically to advance polar region forecasts and services for high-impact variables such as sea ice on a range of time scale from hourly to seasonal and seamlessly from seasonal to decadal and longer;

◦ Better understanding of the potential global and regional benefit of additional observing systems deployed to remote regions (oceans, polar regions).

Improve seamless sub-seasonal to seasonal and decadal predictions

◦ Identification and exploitation of additional sources of predictability from atmosphere, land, ocean, cryosphere and bio-geosphere components;

◦ Development of objective multi-model combination methods to improve skill and capture uncertainties in ensemble predictions;"

◦ Coordination with TCs to (a) define the standards and protocols for operational implementation and exchange of S2S forecasts and (b) operationalize skillful decadal predictions;

◦ Support of TIGGE, S2S, and similar data collection efforts;

◦ Improved long-term biomass burning forecast, atmospheric chemical composition forecast (chemistry-climate modelling) for sustainable development planning.

Support/guidance of the development of modelling infrastructure, big data and data standards, protocols and sharing facilities

◦ Co-develop a WMO research-operation integrated computing and data sharing framework towards interoperability, open access and seamless infrastructures and best practices;
◦ Development of a strategy towards ultra-high resolution and scalability of weather forecast and climate prediction;
◦ Methodological research (numerical methods, coupling strategies, assimilation methods, observational and model data information exploitation, including post-processing);
◦ Sharing of specialist methods and tools enabling complex modelling systems to be run by a wider community;
◦ Development of capabilities to use information sourced from citizen observations and other unconventional data for verification and forecast quality improvement in different domains (energy, urban etc.).

B. Development of integrated urban forecasting systems

◦ Improved (a) climate prediction for megacities including regional sea level rise over a range of time scales, (b) urban weather forecasting targeting extreme events, (c) air quality urban forecasting, (d) source attribution of urban emissions using observations and inverse modelling techniques.
◦ Development, validation and demonstration of urban prediction capabilities, toward building urban environment integrated information systems to support decision-making for different applications in different parts of the world.
◦ Use of km-scale process understanding and impact modelling expertise in climate studies.

Development of the socio-economic relevant services

◦ Co-design of science and training activities to enhance the relevance of prediction products for appropriate exploitation in socio-economic sectors;
◦ Cooperation of research experts and practitioners to co-develop approaches to transfer and communicate uncertainties across the value chain;
◦ Increased knowledge of the physical and social factors limiting the capability to predict, communicate and mitigate the impacts of high-impact weather events, developing end-to-end approaches from meteorology to assess impacts, in key application areas, to the urban environment.

◦ Engagement of social scientists in i) co-design of methods for communicating uncertainty, ii) development of capabilities to use information sourced from citizen observations and other unconventional data, iii) development of assimilation systems for socio-economic models, iv) ensuring that social science methodologies are increasingly included in end-to-end project evaluation;
◦ Improved collaboration with (a) the health sector to develop impact relevant air quality forecasting, (b) the user community utilizing advances in volcanic ash forecasting, incl. estimates of deposition for ecosystem health and the agricultural sector.

Risks:	**Mitigation measures:**
◦ Slow improvement of the predictive capabilities due to lack of the collaboration between research/academic and operational weather, climate, hydrological community; ◦ Lack of the common model performance matrices; ◦ Slow improvement in the forecasting skills due to lack of the computing capabilities; ◦ Low uptake of the new products by the user community; ◦ Competition with private sector ◦ Other priorities of users.	◦ Regularly communicate and effectively collaborate between research and operational groups, programmes, departments; ◦ Involve social scientists (success story of WWRP) in the other programmes; ◦ Build Members' awareness of higher benefits due to relies on the advances in the Earth system modelling with distributed responsibilities; ◦ Ensure visibility of centres providing integrated forecasts for sustainability and investment; ◦ Better involvement of the user community will help to sustain development of the new services.

Regional Aspects Regional research priorities and needs will be jointly identified with RAs for the development of integrated research pilots fostering the value chain approach (to be elaborated in consultation with regions prior to Cg-18).		
Current Programmes	**Working Bodies**	**Partners**
Lead: WWRP, WCRP, GAW Contributing: application programmes, WIGOS	SAP, Research Board, GAW, WWRP and WCRP scientific oversight bodies, TCs, Secretariat	ICSU, UNESCO, Science Foundations

Long-Term Goal 3: Advance targeted research: Leveraging leadership in science to improve understanding of the Earth system for enhanced services						
Strategic Objective 3.3: Advance policy-relevant science						
Budget (in thousands of Swiss francs): *Note: Regular Budget (RB) and Voluntary Contributions (VC) resources (staff & non-staff)*	**RB (CHF)**	**% of total RB**	**VC (CHF)**	**Comments (VC):** WCRP climate research agenda generates in-kind contributions from many research centers and agencies, with conservatives estimates well above 100 M CHF annually. VC: IPCC Scholarship Programme, WMO/UNEP/IPCC (SFR) Trust Fund, B. Dobrilovic Trust Fund, Prof. Mariolopoulos Trust Fund.		
	4,124.4	1.5%	23,220.0			
Performance Indicators:				**Baseline 2019**	**Target 2021**	**Target 2023**
3.3.1 Number of Members with national greenhouse gas monitoring systems						
3.3.2 Number of Members routinely producing decadal forecasts						
Focus Area/Outcome A: An integrated global greenhouse gas information system implemented to enable Members to improve the quality and confidence in national greenhouse gas emission inventories						
Outputs and Milestones:			**2020**	**2021**	**2022**	**2023**
Good practices on the implementation of IG3IS documented, updated and implemented in an increasing number of countries			User community established and engaged	Good practices adjusted and tested	Quality control tools developed	Quality control tools implemented
GHG Bulletin and contribution to Climate Statement, Reactive Gases and Aerosol Bulletins, ongoing review of IG3IS implementation plan			Annually written and published	Annually written and published	Annually written and published	Annually written and published
Focus Area/Outcome B: Enhanced body of scientific knowledge assessed by IPCC and other global scientific reports						

Outputs and Milestones:	**2020**	**2021**	**2022**	**2023**
6th Assessment Report and special reports of the Intergovernmental Panel on Climate Change (IPCC)		Working Group contributions	6th Assessment Report	7th Assessment Cycle initiated
The next Coupled Model Intercomparison Project (CMIP) and regional climate downscaling initiatives designed and implemented in support of IPCC and the UNFCCC Global Stocktake	WMO climate statements & other policy & outreach documents addressing e.g. water, energy & carbon cycles and budget assessments developed /published	Estimates of climate sensitivity related to various forcings synthesized, taking stock of CMIP and GAW research outcomes		Decadal predictions contribution to Global Stocktake traced, supported by reanalyses
Scientific advice to Polar and High-Mountain institutional frameworks provided	Promotion of WMO polar research in policy fora		Side events at Arctic Council	
Support to disaster risk reduction and environmental policy provided, including normative documents and methodological support tools (guides, guidelines, implementation plan, demonstrated in a few countries)		Assessment published		
International datasets to determine climate statistics of extreme events based on ultra-high resolution modelling developed		Dataset specifications outlined	Dataset developed	
WMO/UNEP Scientific Assessment of Ozone Depletion finalized	Assessment published			
Climate information distilled for regions based on multi-model global and regional projections including associated uncertainties via objective methods toward Vulnerability, Impact and Adaptation (VIA) studies				Information extracted in preparation for VIA studies

Focus Area / Outcome C: Improved basis of understanding for water resource management decisions drawing upon improved capabilities, especially in sub-seasonal to seasonal range

Outputs and Milestones:	**2020**	**2021**	**2022**	**2023**
Additional assessments (ocean exchange via GESAMP) and tools (on total deposition) developed to guide environmental policy	Good practices on measurement-model-fusion techniques documented	GESAMP WG 38 assessment on the changing atmospheric acidity and the oceanic solubility of nutrients published	Increased number of countries involved in measurement-model-fusion; Global maps with high resolution produced	GESAMP WG38 assessment on the impact of ocean acidification on fluxes of non-CO2 climate-active species published

Activities:

◦ Scientific support to climate policy through implementation of global and regional reanalysis and modeling projects, development of climate indicators and estimates of climate sensitivity related to various forcings, and assessment of GHG flux attribution.
◦ Scientific support to polar policy within the context of Polar code, Arctic Council and Antarctic Treaty.
◦ Scientific support to environmental policy with a specific focus on urban aspects and environmental policy.
◦ Scientific support to disaster risk reduction actions.
◦ Scientific support to socio-economic policy.

Risks:	**Mitigation measures:**
◦ Slow improvement of the predictive capabilities due to lack of collaboration between weather, climate, hydrological community; ◦ Lack of institutional connection with policy relevant international initatives; ◦ Low engagement of private sector; ◦ Slow uptake of the science driven tools into international policy making.	◦ Regular communications are established within RES Department, and between RES Department and IPCC Secretariat; ◦ Better involvement of the scientific community in the UNFCCC and other policy contexts; ◦ Improved consultations with the private sector and co-design of the products and services that could be useful for policy making.

Regional Aspects

Regional research priorities and needs will be jointly identified with RAs for the development of integrated research pilots fostering the value chain approach (to be elaborated in consultation with regions prior to Cg-18).

Current Programmes	**Working Bodies**	**Partners**
WWRP, WCRP, GAW, IPCC	SAP, Research Board, IPCC, GAW, WWRP and WCRP scientific oversight bodies, TCs, Secretariat	UNFCCC, ICSU, UNESCO, IRDR, UNEP, Arctic Council, Antarctic Treaty, UN Oceans

Long-Term Goal 4: Close the capacity gap on weather, climate, hydrological and related environmental services: Enhancing service delivery capacity of developing countries to ensure availability of essential information and services needed by governments, economic sectors and citizens						
Strategic Objective 4.1: Address the needs of developing countries to enable them to provide and utilize essential weather, climate, hydrological and related environmental services						
Budget (in thousands of Swiss francs): *Note: Regular Budget (RB) and Voluntary Contributions (VC) resources (staff & non-staff)*	**RB (CHF)**	**% of total RB**	**VC (CHF)**	**Comments (VC):** Emergency Assistance Fund, AMCOMET Trust Funds, VCP Trust Funds, Korea Trust Fund SEE-MHEWS Phase II Trust Fund, Japan Trust Fund for Global Frameworks, WMO/PME/FIT, Modernization PME - Saudi Arabia , Brazil - National Institute of Meteorology, Agricultural Climate Resilience Enhancement Initiative (ACREI), Supplementary Funds for Regular Budget-Financed Activities, CREWS Trust Funds, JPO Programme, other new Expected Trust Fund pertaining to capacity building.		
	31,763.1	11.9%	56,480.0			
Performance Indicators:				**Baseline 2019**	**Target 2021**	**Target 2023**
4.1.1 Number of NMHSs with strategic plans and legal basis for their operation						
4.1.2 Number of NMHSs with enhanced capacity to provide a full range of services (based on CPDB self-assessment)						
Focus Area/Outcome A: Improved understanding of the specific capacity needs of developing country with respect to technical, institutional and human resources, to enable them to provide adequate weather, climate, hydrological and related environmental services, in particular for protection of life, property and economic productivity						
Outputs and Milestones:			**2020**	**2021**	**2022**	**2023**
Outputs and recommendations of technical commission work regionalized through regional technical conferences			3 regional technical workshops, capacity development workshops, climate/water fora	3 regional technical conferences	3 regional technical workshops, capacity development workshops, climate/water fora	3 regional technical conferences

Up-to-date data available on Members' capacity	80 Members	80 Members maintained; 48 more updated	128 Members maintained; 32 more updated	160 Members maintained; 32 more updated; 100% overall
Capacity development of NMHSs in LDCs and SIDS increased in critical economic sectors (agriculture, health, transport, marine, EWS)	3 new projects	3 new projects	3 new projects	3 new projects
Training conducted on basic WIS competencies neccessary for current systems and preparation for WIS 2.0 and a fully operational WIGOS	RA I French-speaking countries & RA V English and French-speaking countries	RA III and IV Spanish-speaking countries, RA IV English-speaking and RA II Russian-speaking countries	Continued training in the rest of the regions	Continued training in the rest of the regions
Technical cooperation and coordination of tropical cyclone regional bodies enhanced, including on transboundary issues	Operation Plans, incl. contingency plans and evacuation maps updated	Operation Plans, incl. contingency plans and evacuation maps updated	Operation Plans, incl. contingency plans and evacuation maps updated	Operation Plans, incl. contingency plans and evacuation maps updated
Pilot projects of Machine to Machine Interfaces with OSCAR/Surface implemented in developing countries				
Focus Area/Outcome B: Strategic resources mobilized, involving development partners and national governments and assisting NMHSs to develop long-term strategies and operational plans to address the identified capacity needs				
Outputs and Milestones:	**2020**	**2021**	**2022**	**2023**
NMHS with legislation and national strategic plans in place	10	20	30	40
Focus Area/Outcome C: Increased visibility and sustainability of NMHSs in LDCs and SIDS by demonstrating the value of their weather, climate, water and related environmental observations, research and services				
Outputs and Milestones:	**2020**	**2021**	**2022**	**2023**
Raised awareness of NMHS role and value at the national level	20	20	20	20

Increased advocacy and partnership with regional and sub-regional bodies engaged in WMO business	WMO priorities reflected in regional and sub-regional agenda	WMO priorities reflected in regional and sub-regional agenda	WMO priorities reflected in regional and sub-regional agenda	WMO priorities reflected in regional and sub-regional agenda
Governance:				
Outputs and Milestones:	**2020**	**2021**	**2022**	**2023**
Effective and efficient RA Sessions and Regional Business	3 RA sessions	3 RA sessions	3 RA sessions	3 RA sessions

Activities:

A. Support NMHS in contributing to global, regional, national development agenda (Agenda 2030, Paris Agreement, Sendai Agreement);
◦ Convene regional conferences on key technical topics;
◦ Ensure that strategic and operational planning is informed by regional priorities;
◦ Update regularly the Country Profile Database and liaise with Members; Assess data gaps and identify priority countries for engagement (by region); Provide CPDB helpdesk services at regional meetings;
◦ Organize and support the annual and biennial sessions of Typhoon Committee, Panel on Tropical Cyclones, RA I and RA V Tropical Cyclone Committees, RA IV Hurricane Committee; Organize integrated workshop for Typhoon Committee;
◦ Develop pilot project with selected developing country(ies) to implement Machine-to-Machine interface with OSCAR/Surface;
◦ Supplement the training provided by GISCs and WIGOS Regional Centres of staff involved in the support and operation of information systems, and maintain Discovery Metadata for WIS and station metadata in OSCAR.
B. Support the development of national legislation and national strategic plans;
◦ Advise NMHS and their national and international partners to increase development effectiveness of investments in infrastructure and capacity development;
◦ Manage development projects by region;
◦ Coordinate WMO technical support to NMHS and technical expertise for project design and implementation in line with WMO standards.
C. Conduct high level advocacy at the national level on the role and services of NMHS;
◦ Provide expert/advocacy assistance to NMHS in LDCs/SIDS;
◦ Build and sustain partnership with regional organizations, including regional economic groups and development agencies to the benefit of Members.

D. Organize and support the sessions of Regional Associations

Risks:	Mitigation measures:
◦ Support to NMHS to implement WMO strategic priorities may be inadequate due to inadequate mechanisms to systematically oversee their implementation by overall ROs and to engage the relevant WMO working structures and departments. ◦ Other entities engaging in WMO central mandate, without coordination and compliance to WMO Standards, may reduce the quality of weather, water, climate and related environmental services, compromising the core mandate of the Organization in the UN System. ◦ Inadequate national funding to NMHSs may impede NMHSs to implement and operate basic systems for providing services, reducing their ability to provide high quality services needed.	◦ Regular engagement of PRAs and joint meetings of PRAs and PTCs, chaired by the WMO President, to review the status of services delivery at national and regional level and accelerate RA implementation of WMO priorities. ◦ Map country capacities to implement essential services, and engage RA WGs to examine the status of services implementation in each region and the support needed from the technical commissions. ◦ Advocate WMO and NMHS competence in weather, water and climate services and MHEWS to ensure the recognition of WMO/ NMHS mandate and competencies, and to achieve a higher profile in the SDG, and Sendai DRR processes.

Regional Aspects

Regional Offices established in all Region. Regional Plans aligned with WMO SOP. Regional Priorities inputed in SOP process prior CG-18 on input provided by RAs. Regionap priorities transmitted to WMO Technical Programmes.

Current Programmes	Working Bodies	Partners
Lead: Regional Programme Contributing: CLW, WDS, OBS,CER	RAs, TCs and their WGs, Regional Climate Centres, Regional Specialized Meteorological Centres, Regional Training Centres, Global Producing Centres of Long Range Forecasts, Global Information Service Centres (and other WMO global centres), Secretariat	Major financing partners, in particular multilateral development banks, regional thematic and intergovernmental bodies, selected UN organizations, developed countries' NMHS as service providers.

Long-Term Goal 4: Close the capacity gap on weather, climate, hydrological and related environmental services: Enhancing service delivery capacity of developing countries to ensure availability of essential information and services needed by governments, economic sectors and citizens						
Strategic Objective 4.2: Develop and sustain core competencies and expertise						
Budget (in thousands of Swiss francs): *Note: Regular Budget (RB) and Voluntary Contributions (VC) resources (staff & non-staff)*	**RB (CHF)**	**% of total RB**	**VC (CHF)**	**Comments (VC):** WMO Fellowship & Training Fund, US VCP Trust Fund		
	15,550.1	5.8%	6,400.0			
Performance Indicators:				**Baseline 2019**	**Target 2021**	**Target 2023**
4.2.1 Number of experts trained in short courses at WMO Regional Training Centres (RTCs) or by Education and Training Partners						
4.2.2 Number of new fellowships provided under WMO's Fellowship Programme						
4.2.3 Number of Members that have implemented competency assessment programmes						
Focus Area/Outcome A: Members supported in acquiring the qualification and competencies required for effective service delivery through appropriate education and training programmes focused on standards and recommendations						
Outputs and Milestones:			**2020**	**2021**	**2022**	**2023**
Strengthened capacity of NMHS professionals and experts, particularly from developing countries, LDCs, SIDS, countries recovering from civil strife and/or natural disasters			100 trainees	110 trainees	110 trainees	120 trainees
Fellowships awarded (one month to 5 years)			80 fellows	80 fellows	80 fellows	80 fellows
Biennial survey on education and training needs, priorities and resources and statistics on human capacity development needs				Survey conducted		Survey conducted
Continuous improvement of institutional development and training			1 annual report	1 annual report	1 annual report	1 annual report
Guidelines on management of training institutions, competencies and compliance evaluation				3 guides/ guidelines	Guides promoted; Feedback	Review conducted for potential revisions

Demonstrated usage of WMO-standard training planning templates or equivalent	Assessment report	20%, Review of WMO-1114	20%, Revisions to WMO-1114 published	25%
WMO Symposium for improved development, coordination and delivery of education and training activities		1 symposium		1 symposium
Strengthened capacity of tropical cyclone forecasters in terms of specialized skills and competencies	34 operational forecasters trained	60 operational forecasters trained	60 operational forecasters trained	60 operational forecasters trained
Additional trainers capacitated on integrated data management systems	15-20 experts in 5 countries trained	15-20 experts in 10 countries trained	15-20 experts in 10 countries trained	15-20 experts in 12 countries trained
WMO E-Learning modules for CAP standard updated		Updated		Updated
Institutions offering climate services-related training catalogued	NMHS Climate Services Capacity guideline distributed globally	Relevant training resources inventoried, documented and accessible	Mechanism established for systematic training of NMHS personnel	Systematic training programme for NMHS in place
Basic Instructional Package for Climate Services (BIP-CS)	Gaps and needs assessment	Design	Piloting	Roll-out through mechanism & programme for systematic NMHS training
Enhanced capacity in the interpretation and use of NWP outputs	2-3 SWDP sub-regions	2-3 SWDP sub-regions	2-3 SWDP sub-regions	2-3 SWDP sub-regions
Strengthened capacity of Members in the provision of public weather services, including in respect of competency, qualification, etc.	1 workshop providing assistance to at least 10 Members	1 workshop providing assistance to at least 10 Members	1 workshop providing assistance to at least 10 Members	1 workshop providing assistance to at least 10 Members

Strengthened capacity of Members in the provision of aeronautical meteorological service, including in respect of competency, qualification, cost recovery	1 workshop providing assistance to at least 10 Members	1 workshop providing assistance to at least 10 Members	1 workshop providing assistance to at least 10 Members	1 workshop providing assistance to at least 10 Members
Strengthened capacity of Members in the provision of marine meteorological service, including in respect of competency, qualification, cost recovery	2 workshops providing assistance to at least 20 Members	2 workshops providing assistance to at least 20 Members	2 workshops providing assistance to at least 20 Members	2 workshops providing assistance to at least 20 Members
Training modules on impact-based forecast (IBF) and warning services included in the curricula of WMO RTCs as part of implementing the WMO PWS Competencies	Strategy for developing IBF training curricula in RTCs completed	Curricula developed and tested	IBF training in at least 2 RTCs	IBF training in at least 3 more RTCs
Training curriculum and related material made available for training experts on measurement practices	Concept developed	Training units developed	Curricular used in 3 regions	Curricular used in 3 more regions
Focus Area / Outcome B: Cooperation between developing and developed Members and full utilization of the WMO Regional Training Centres				
Outputs and Milestones:	**2020**	**2021**	**2022**	**2023**
Improved capacity of Regional Centres to serve Members and act as trainers for Members' experts	One training for regional centres in RA I, II and III	One training for regional centres in RA IV, V and VI	One training for regional centres in RA I, II and III	One training for regional centres in RA IV, V and VI
Global Campus operational and strengthened partnerships among RTCs and other WMO Centres, universities and research institutes	10 new agreements and/or twinning arrangements	Operational, 50% of Members participate in 1 or more activities; 10 new agreements or twinning arrangements; Guidelines developed	Operational, 65% Members participation in one or more activities; 10 new agreements or twinning arrangements	Ongoing, 75% participation; 10 new agreements or twinning arrangements

External reviews of RTCs for reconfirmation and individual consultations	4 external reviews conducted, 2 consultations	4 external reviews conducted, 2 consultations	4 external reviews conducted, 2 consultations	4 external reviews conducted, 2 consultations
Increased development and use of distance learning opportunities for international training (as reported by WMO RTCs and Secretariat Technical Departments)	150 courses serving 900 participants	160 courses serving 950 participants	165 courses serving 975 participants	170 courses serving 1000 participants
Increased use of WMOLearn Resources Catalogue and WMOLearn Events Calendar as integrated platforms for sharing of reusable training resources and events	500 resources shared, 12 institutions, 100 events	525 resources shared, 18 instutions, 120 events	550 resources shared, 19 instutions, 125 events	575 resources shared, 20 instutions, 130 events
Volunteers Initiative mechanism for exchange of experts between NMHSs	10 successful exchanges	15 successful exchanges	20 successful exchange	30 successful exchange

Activities:

A. ◦ Organize WMO co-sponsored short-term trainings, including planning, identification of training institutions, curricula development, sponsoring of participants;
◦ Award short- and long-term fellowships, group fellowship training and continuing professional development courses on specialized WMO-targeted priority areas;
◦ Promote networking among WMO fellows (Fellows-in-Touch) and the success of postgraduate fellows in research, career development and publications;
◦ Develop methods for impact evaluation intended to capture long-term success of training programmes and postgraduate fellows in research, career development as well as monitor annual results (quantitative and qualitative);
◦ Revise Guide on Management of Training Institutions and Guide to Competencies;
◦ Conduct use assessment of WMO-1114;
◦ Develop guidelines on distance learning delivery;
◦ Review existing Basic Educational Packages for potential updates (BIP-M and BIP-MT), contribute to the development of new and revised ones (BIP-H, BIP-HT, BIP-Climate Services), and provide guidance on evaluating compliance with qualification frameworks);
◦ Organize Symposia, including planning, programme, participants travel;
◦ Conduct training for integrated data management experts;

B. ◦ Conduct annual regional meetings of RTCs to increase their capacity and encourage co-development and sharing of training activities and resources;
◦ Organize training for Regional Centre experts;
◦ Organize twinning programmes among RTCs;
◦ Increase the reach, breadth of impact and speed of training dissemination through distance learning and reusable resources;
◦ Enhance cooperation and promotion of training events and resource sharing through WMO Global Campus tools (e.g. WMOLearn Events Calendar, WMOLearn Resources Catalogue);
◦ Identify NMHS need for experts and link to matching volunteers, including sponsorship of short-term exchange visits;
◦ Promote cross-fertilization between universities and vocational training centres;
◦ Develop guidelines on developing sharable resources;
◦ Conduct external reviews of RTCs.

Risks:	**Mitigation measures:**
◦ Budget reductions preventing meeting goals for number of support awards granted, and/or meeting of other indicators; ◦ Limited ongoing support for WMO Global Campus/WMOLearn activities and tools; ◦ Insufficient funding to meet the huge demand for fellowships and short term training; ◦ Delay in delivery of materials to be published; ◦ Limited availability of resources from RTCs; ◦ Leverage of extra-budgetary funding ◦ Some of the destinations where there are opportunities may not be suitable for some Members to send their fellows on a long-term basis; ◦ Failure of fellows to meet academic standards on host institution; ◦ Non-return of fellows to their home country.	◦ Increate resource mobilization drive; ° Seek more predictable collaboration with partners through agreements and increased consultation; ° Increase surveillance of current fellows through closer interaction with host institutions; ° Increase screening of entry qualifications of fellows; ° Work more closely with extra-budgetary projects within the Secretariat ° Socialize Global Campus mechanisms; ° Be vigilant on strategies for delivering training innovations to mitigate poor uptake; ° Seek additional partnerships for in-kind translations; ° Engage RTC parent institutions with a view of increasing resource allocation to RTCs.

Regional Aspects

Regional needs assessments with RAs. Regional Training centres supported. Regional allocation of training and fellowship opportunities based on priorities and needs.

Current Programmes	**Working Bodies**	**Partners**
Lead: ETR Contributing: All technical programmes	EC, RAs, TCs, Secretariat	UNDESA, UNESCO, UNITAR, UNEP, UN HABITAT, ICSU, UNDP, UN Economic Commissions, World Bank, National Partners (e.g., UCAR, CMA, Meteo-France, Met Office, EUMETSAT, ROSHYDROMET, etc.)

Long-Term Goal 4: Close the capacity gap on weather, climate, hydrological and related environmental services: Enhancing service delivery capacity of developing countries to ensure availability of essential information and services needed by governments, economic sectors and citizens						
Strategic Objective 4.3: Scale-up effective partnerships for investment in sustainable and cost-efficient infrastructure and service delivery						
Budget (in thousands of Swiss francs): *Note: Regular Budget (RB) and Voluntary Contributions (VC) resources (staff & non-staff)*	**RB (CHF)**	**% of total RB**	**VC (CHF)**	**Comments (VC):**		
	5,578.4	2.1%	-			
Performance Indicators:				**Baseline 2019**	**Target 2021**	**Target 2023**
4.3.1 Number of developing country NMHSs (particularly LDCs and SIDS) receiving international capacity development assistance through WMO advisory services						
4.3.2 Number of developing country Members (particularly LDCs and SIDS) benefiting from WMO-catalyzed development projects						
4.3.3 Volume of development projects catalyzed through WMO (in CHF)						
4.3.4 Type of legal basis for public-private partnerships globally (prohibitive, constrained, permissive)						
Focus Area/Outcome A: Strengthened partnerships and alliances among all Members to share knowledge, technology and expertise with particular emphasis on the use of twinning arrangements						
Outputs and Milestones:			**2020**	**2021**	**2022**	**2023**
Alliance for Hydromet Development launched and operational			Launched & operational			
Country Support Initiative launched and operational			Launched & operational			
Focus Area/Outcome B: Strategic, functional and mutually beneficial development partnerships and alliances with key relevant UN, intergovernmental and non-governmental organizations, the private sector, and academia						
Outputs and Milestones:			**2020**	**2021**	**2022**	**2023**
Green Climate Fund (GCF) supported in developing and implementing climate rationale concept and methodology						
Innovative partnerships catalyzed in support of developing countries' NHMSs						

Focus Area / Outcome C: Leadership in promoting the principles on which global meteorology is built, emphasizing authoritative voice, common standards, data and product sharing

Outputs and Milestones:	**2020**	**2021**	**2022**	**2023**
Climate finance institutions (GCF and Adaptation Fund) project proponents supported with WMO technical expertise for designing or implementing hydromet services projects				
Selected multilateral and regional development banks provided with WMO expertise for project design or implementation				

Activities:

◦ Spearhead establishment of a global alliance to increase resources flow and effectiveness in supporting developing countries hydromet services.
◦ Develop a WMO country support programme providing targeted and just in time "gap filling assistance" to developing countries NHMSs and seek funding from bilateral partners.
◦ Develop and implement a partnership with GCF to provide WMO advisory services for the climate rationale for all GCF-funded projects and activities.
◦ Provide WMO advisory services, in collaboration with NMHS, to entities accredited by GCF and Adaptation Fund in the preparation and implementation of projects funded by major climate finance institutions.
◦ Provide WMO advisory services, in collaboration with NMHS, to major development banks for the preparation and implementation of projects.

Risks:	**Mitigation measures:**
◦ Partners/members not ready to commit with the principles and commitments of the alliance; ◦ Bilateral partners not willing to co-finance WMO country support Programme; ◦ Green Climate Fund not ready to partner with WMO as technical expert to develop their climate rationale; ◦ Project proponents not ready to engage with WMO on technical service provision; ◦ Multilateral development banks not ready to partner with WMO as technical expert; ◦ WMO Secretariat not ready to put together WMO expert service drawing on the expertise of WMO network, including NHMSs.	◦ Co-spearhead the establishment of the alliance with key relevant partners such us the World Bank; ◦ Co-design and deliver the country support programme jointly with selected developed countries' NHMSs and jointly with them approach their respective bilateral agencies for funding; ◦ Demonstrate WMO value proposition beyond its current role as an accredited entity for project delivery; ◦ Strengthen WMO positioning within the Green Climate Fund and Adaptation Fund; ◦ Initial focus on the World Bank as prime multilateral development partner and through developing the WMO expert service with the World Bank use this experience to secure additional expert service partnerships; ◦ Developing WMO expert service approach in collaboration with main delivery partners from the WMO institutional network.

Regional Aspects
Regional partners identified and brought on board the Hydromet Alliance.

Current Programmes	Working Bodies	Partners
Partnerships are in support of all WMO programmes	EC, RAs, TCs, Secretariat	Major climate and development financing partners (multilateral development banks, Green Climate Fund, Adaptation Fund, bilateral partners)

Long-Term Goal 5: Strategic realignment of WMO structure and programmes for effective policy- and decision-making and implementation						
Strategic Objective 5.1: Optimize WMO constituent body structure for more effective decision-making						
Budget (in thousands of Swiss francs): *Note: Regular Budget (RB) and Voluntary Contributions (VC) resources (staff & non-staff)*	**RB (CHF)**	**% of total RB**	**VC (CHF)**	**Comments (VC):**		
	1,495.1	0.6%	-			
Performance Indicators:				**Baseline 2016**	**Target 2021**	**Target 2023**
5.1.1 Members perceptions based on Stakeholder Survey (e.g. on structure, effectiveness and mode of operation of WMO Constituent Bodies) *Source: Stakeholder Survey 2016*				Usefulness: Cg: 7.9 RAs: 7.7 TCs: 7.6 EC: 7.7 (fulfilling purpose)		
Focus Area/Outcome A: Decisions of Congress on optimized constructs, processes and duties of WMO constituent bodies and organs implemented to enhance the efficiency and effectiveness of the Organization and good governance						
Outputs and Milestones			**2020**	**2021**	**2022**	**2023**
Sessions of the new EC structures (PAC, TCC) conducted during spring 2020 to elaborate decisions of the EC-72			PAC and TCC first sessions held ahead of EC-72	PAC and TCC sessions held ahead of Cg-Ext. (2021)	PAC and TCC first sessions held ahead of EC-74	PAC and TCC sessions held ahead of Cg-19
The new technical commissions fully established; sessions scheduled and work programmes with EC reporting milestones prepared			Joint meeting of TCs (substructures established; work programmes defined; outcomes provided to PAC and TCC)	Meeting of TCs and other bodies held (outcomes provided to PAC and TCC)	First regular session of TCs held; work programme being implemented; outcomes provided to PAC and TCC	Outcomes of TC sessions and work programme submitted to Cg-19

Activities:

◦ Organize meetings of PAC, TCC and JCB with the objective to provide advice to EC respectively on policy, technical coordination and collaboration matters;
◦ Rationalize and streamline agenda setting with identification of expected meeting outcomes;
◦ Optimize working methods with a view to reducing expenditure.

Risks:	**Mitigation measures:**
◦ Poor adaptation to new working structures and methods leading to less focused outcomes.	◦ Adequate consultation process with Bureau, Officers of constituent bodies and Members on agenda setting, expected outcomes and working methods of meetings; ◦ Adequate support by the Secretariat to intersessional work.

Regional Aspects

Stakeholder Survey Results (2016) on RAs:
Usefulness: 7.7 (mean); length of sessions: 7.1; quality of documentation: 7.4; language services: 8.1; success in implementing Cg decisions: 7.4; RA and Cg reflecting needs of Members: 7.2.

Current Programmes	**Working Bodies**	**Partners**
	EC, RAs, TCs, Secretariat	IOC/UNESCO, ICAO, other UN specialized agencies

Long-Term Goal 5: Strategic realignment of WMO structure and programmes for effective policy- and decision-making and implementation						
Strategic Objective 5.2: Streamline WMO programmes						
Budget (in thousands of Swiss francs): *Note: Regular Budget (RB) and Voluntary Contributions (VC) resources (staff & non-staff)*	**RB (CHF)**	**% of total RB**	**VC (CHF)**	**Comments (VC):**		
	352.6	0.1%	-			
Performance Indicators:				**Baseline 2016**	**Target 2021**	**Target 2023**
5.2.1 Members perceptions based on Stakeholder Survey (e.g. value of WMO programmes to operational services provided by Members) *Source: Stakeholder Survey 2016*				WMO value to foundation activities: Weather Services: 7.8 Climate Services: 7.7 Hydro Services: 7.2 Other: 7.0		
Focus Area / Outcome A: WMO scientific, technical and service programmes streamlined to enable Organization to better achieve the goals and objectives set in the Strategic Plan, ensuring coherence and consistency between the strategic, programmatic and financial frameworks of the Organization						
Outputs and Milestones			**2020**	**2021**	**2022**	**2023**
WMO Programmes redefined and implementing units of the Secretariat reorganized, based on the decisions taken by Cg-18 concerning the reform of constituent bodies			Programme redefinition proposal endorsed by EC-72, incl. redefinition of implementing units of Secretariat	Programmes redefinition adopted by Cg-Ext. incl. redefinition of implementing units of Secretariat	Reorganized programmes & Secretariat units show evidence of higher efficiency & effectiveness as considered by EC-74	Reorganized programmes & Secretariat units support more effectively & efficiently implementation of the Strategic Plan goals & objectives

Governance of co-sponsored programmes streamlined, based on the decisions taken by Cg-18 concerning the reform of constituent bodies	Revised governance arrangements for co-sponsored programmes agreed with partners by EC-72	Adjustments to governance of co-sponsored programmes, if any, adopted by Cg-Ext.	Streamlined governance of co-sponsored programmes and coordination of collaborative initiatives show higher efficiency and effectiveness	Streamlined governance of co-sponsored programmes and coordination of collaborative initiatives delivered outcomes of greater benefit to Members

Activities:

◦ Following decision by Cg-18, proposal for the redefinition of programmes and reorganization of the implementing units of the Secretariat;
◦ Following decision by Cg-18, operate co-sponsored programmes with streamlined governance, including through coordination mechanisms such as Joint WMO-IOC Collaborative Board (JCB).

Risks:	**Mitigation measures:**
◦ Poor adaptation to new working structures and methods leading to less focused outcomes.	◦ Phased approach to change and testing

Regional Aspects

Stakeholder Survey Results (2016):
RA V recorded particularly high ratings of 8.8 and 8.9 for the value of WMO to Foundation Activities of Weather Services and Climate Services respectively. While the ratings for the value to Hydrological Services were lower across all regions, RA II showed the lowest mean (6.5). The low ratings from RA II were also reflected in the low mean of 6.4 for the value to products developed to meet needs of hydrological end-users. Comments from RA V and RA VI also mentioned hydrology as requiring more support.

Current Programmes	**Working Bodies**	**Partners**
	EC, RAs, TCs, Secretariat	

Long-Term Goal 5: Strategic realignment of WMO structure and programmes for effective policy- and decision-making and implementation						
Strategic Objective 5.3: Equal, effective and inclusive participation in governance, scientific cooperation and decision-making						
Budget (in thousands of Swiss francs): *Note: Regular Budget (RB) and Voluntary Contributions (VC) resources (staff & non-staff)*	**RB (CHF)**	**% of total RB**	**VC (CHF)**	**Comments (VC):**		
	1,135.1	0.4%				
Performance Indicators:				**Baseline 2019**	**Target 2021**	**Target 2023**
5.3.1 Proportion of female and male delegates to WMO constituent body meetings						
5.3.2 Composition of constituent body working structures (by gender and region)						
Focus Area/Outcome A: Gender equality across the Organization advanced, especially in governance and decision-making, in implementation of SDG5 and the WMO Gender Equality Policy						
Outputs and Milestones			**2020**	**2021**	**2022**	**2023**
The leadership capacity of female experts/professionals from WMO community strengthened, with a focus on those participating or interested in contributing to the work of constituent bodies and their working structures			1 technical community or region	1 technical community or region	1 technical community or region	1 technical community or region
Strengthened capacity of Members (PRs, Gender Focal Points and NMHS staff) to implement WMO Gender Equality Policy and Gender Action Plan			-	1 side event or training in conjunction w/ meetings	1 side event or training in conjunction w/ meetings	1 side event or training in conjunction w/ meetings
WMO visible in the UN system and strengthened partnerships			Participation in UN-SWAP, IGC, IANGWE and other networks	Participation in UN-SWAP, IGC, IANGWE and other networks	Participation in UN-SWAP, IGC, IANGWE and other networks	Participation in UN-SWAP, IGC, IANGWE and other networks
Focus Area/Outcome B: Equitable access to, interpretation of and use of information and services provided to both women and men						
Outputs and Milestones			**2020**	**2021**	**2022**	**2023**
Knowledge generated on the gendered impacts of weather, water and climate as well as approaches to gender-sensitive service provision developed (e.g. guidelines, good practice, training modules)			Regional/ thematic info collected	Regional/ thematic info collected	Tools and materials drafted	Tools and materials finalized

Strengthened capacity of Secretariat staff to mainstream gender in programmes, services, policies and organizational processes	1 training	1 training	1 training	1 training

Focus Area / Outcome C: Role models showcased and investment in human capital realized to attract more women and girls to science and employment

Outputs and Milestones	**2020**	**2021**	**2022**	**2023**
Awareness raised on female scientists and role models from WMO community	Communication materials produced & disseminated	Communication materials produced & disseminated	Communication materials produced & disseminated	Communication materials produced & disseminated

Activities:

◦ Conduct women's leadership workshops and other training events intended to strengthen the leadership capacity of female delegates, technical commission experts and professionals from NMHS and other national institutions;
◦ Organize forums/workshops on gender-sensitive services (e.g. Regional Climate Outlook Forums, Regional Hydrological Forums dedicated on gender);
◦ Build knowledge on the gendered impacts of weather, water and climate and collect good practices on gender-responsive weather, hydrological and climate services;
◦ Build the capacity of PRs, Gender Focal Points and NMHS staff through side events at meetings and/or dedicated training;
◦ Organize trainings for Secretariat staff (e.g. inclusive leadership, unconscious bias, gender and WMO mandate, mainstreaming gender in programmes);
◦ Actively participate in UN inter-agency cooperation and international initiatives on gender equality and empowerment of women.

Risks:	**Mitigation measures:**
◦ Inability to sustain the increased level of female representation achieved in TC sessions and structures. ◦ The shorter format of regional and technical meetings may not allow the incorporation of side events and trainings on gender; ◦ Inability to meet the growing interest in and demand for WMO involvement in gender-related initiatives due to limited human resources.	◦ Continue organizing workshops and events targeted at female delegates and resulting in their increased participation. ◦ Collaborate closely with PRAs and regional gender focal points; ◦ Build and strengthen the capacity of Secretariat staff.

Regional Aspects

Whereas considerable progress was registered in 2016-2019 in increasing female participation in TCs, women are still underrepresented at RA sessions and in regional working groups, with the exception of RA III. It was the lowest at the latest meetings of RA II and RA IV at 13% and 19%, respectively. Among technical commissions, the share of women delegates was lowest at CIMO-17 and only increased minimally (1%-2%) at CAS-17 and CBS-16. The lowest female participation in working groups has been registered in RA I (16%), RA IV (17%) and RA V (22%). *Source: WMO Gender Database.* RA III particularly identified the promotion of inclusive work and gender policies as a regional priority

Current Programmes	**Working Bodies**	**Partners**
Cross-cutting	EC, RAs, TCs, Secretariat	UN Women, International Gender Champions

Part II: Additional Initiatives

Name of Additional Initiative:
GLOBAL METEOALARM SYSTEM (GMAS) IMPLEMENTATION

Strategic Objective 1.1:
Strengthen national multi-hazard early warning systems and extend reach to better enable effective response to the associated risks

Estimated Cost (in thousands of Swiss francs):	**1600.00**	Comments:

Rationale: *Why is this additional to ZNG investment needed? What is the cost of doing nothing or postponing? What opportunities exist at this moment?*
- Extension of the existing European Meteoalarm is underway.
- In Europe the EUMETNET Meteoalarm programme has proven its value for the general public and several customer/user sectors of the NMHSs. It has strengthened the safety authority role of especially small and medium sized NMHSs in their home countries.
- In USA the Weather Ready Nation concept has proven its strength. In WMO context the approach could be called Weather and Climate Ready World.
- The lack of recognition of the NMHSs importance in a large amount of WMO Members countries is an obstacle for their further development.

Benefit to Members: *What is the end-benefit being offered?*
The development of GMAS will underline and demonstrate the value of NMHSs as critical safety authorities and would be useful in public private sector role evolution.

Cost Overview: *What is the intended use of the funds?*
◦ Additional staff members for 2020-23 (one P4 level IT expert and one P4 level project manager)

Name of Additional Initiative: **EARLY WARNING SERVICES FOR INTERNATIONAL ORGANIZATIONS**		
Strategic Objective 1.1: Strengthen national multi-hazard early warning systems and extend reach to better enable effective response to the associated risks		
Estimated Cost (in thousands of Swiss francs):	**1700.00**	Comments:
Brief Description: *What is this initiative about?* The ZNG budget will assist LDCs and developing countries to adopt the Common Alerting Protocol (CAP) standard and to have alerts aggregated on the WMO Alert Hub, the Severe Weather Information Centre and the World Weather Information Service contributing to GMAS. These additional funds are necessary to support wider utilization of CAP at the national level across NMHSs, humanitarian agencies and warning authorities (e.g. cell phones get the alerts through cell phone broadcast technology, drivers see CAP alerts on digital billboards along highways, smart phones get alerts through apps, the fire department uses CAP for rapid warning etc.). The funds will be used for such CAP pilot application projects.		
2030 Vision Statement: *Where do we want to stand in 2030?* WMO, through its Members, provides timely, tailored impact-based actionable weather, water and climate information to humanitarian agencies at all levels, thereby strengthening in-country preparedness, response and recovery operations so that vulnerable communities, especially in developing countries, access alerts and warnings in a more timely manner, thus saving more lives and livelihoods.		
Rationale: *Why is this additional to ZNG investment needed? What is the cost of doing nothing or postponing? What opportunities exist at this moment?* The opportunity to enhance a wider ulitization of CAP at the national level across NMHSs, humanitarian agencies at local levels and warning authorities will be missed and communities will continue to be vulnerable.		
Value Proposition: *How would this initiative…*		
… help close the capacity gap and address the needs of developing countries?	The initiative will support pilot projects, especially in developing countries, for wider ulitization of CAP at the national level across NMHSs, humanitarian agencies and warning authorities.	
… leverage additional resources?		
… complement existing work funded under ZNG budget?	It will build on the CAP systems developed using ZNG budget. Capacity building under ZNG activities is focused on producing CAP formatted messages. This is a further step in the co-design of the different types of uses of the messages from a user perspective.	
… accelerate action / scale down implementation?		
… encourage innovation?	Innovation will be necessary in linking CAP warnings to smart phones, billboards, tv, radio etc. The activities will contribute to innovative mechanisms for humanitarian preparedness, response and recovery as well as new ways of collaboration and possibly financing.	

Benefit to Members: *What is the end-benefit being offered?*

◦ Improved capability of Members to provide high quality services to humanitarian agencies;

◦ Improved understanding and capability of Members to serve the needs and requirements of humanitarian agencies for response and recovery operations;

◦ Improved understanding on behalf of humanitarian agencies of NMHS products and services.

Outputs and Milestones: *What will specifically be produced as a result? When and/or in what phases?*	**2020**	**2021**	**2022**	**2023**
Cross-compilation of Members requirements and humanitarian agencies' needs for weather, climate and water information services and products for their in-country preparedness, response and recovery operations and strategic planning	Expert team meetings	Expert team meetings		
Guidelines on how NMHSs can support overall preparedness, response and recovery operations, as part of the WMO Coordination Mechanism (WCM) to support UN and humanitarian agencies		Guidelines drafted	Guidelines published	
Lessons learned: Better understanding of the performance of national early warning systems and regional support mechanisms as well as overall preparedness, response and recovery following major events for global improvement	Expert reviews	Expert reviews	Expert reviews	Expert reviews
Wider usage of the CAP standard and strengthened capacity of NMHS staff on provision of services to humanitarian agencies, with a focus on developing countries			Regional workshops	Regional workshops

Activities: *What specific activities will be implemented?*

◦ Convene expert meetings on humanitarian agencies' needs for weather, water and climate information services and producs, participate (NMHSs and Secretariat) in relevant meetings of the humanitarian community and maintain an active expert network;

◦ Leverage the Country Profile Database (CPDB) as a tool to obtain and maintain an up-to-date list of humanitarian agencies' needs for weather, water and climate information services and products within the context of the WMO Coordination Mechanism;

◦ Develop guidelines (to be used as a training tool) and collect feedback on their use and usefulness for future improvements, publish reports and contribute to other publications by the humanitarian community;

◦ Conduct regional workshops for NMHS staff on the provision of services to humanitarian agencies (within the framework of pilot projects);

◦ Conduct post-disaster reviews of the performance of the respective warning mechanisms and of the additionnal services provided by the NMHS(s) within the framework of pilot projects, bringing together NMHSs and their stakeholders and beneficiaries.

Cost Overview: *What is the intended use of the funds?*

◦ Additional staff members for 2020-23 (in-kind contributions by WMO Members and one P4 level project manager)

◦ 2 expert team meetings (100K)

◦ Short-term contractor to develop draft guidelines (20K)

◦ Publishing of guidelines in 6 languages (30K)

◦ 6 regional training workshops (300K)

◦ Pilot projects (250K)

◦ Performance reviews (200K)

Name of Additional Initiative: **REGIONAL CLIMATE FORUMS**		
Strategic Objective 1.2: Broaden the provision of policy- and decision-supporting climate information and services		
Estimated Cost (in thousands of Swiss francs):	**3400.00**	Comments:
Brief Description: *What is this initiative about?* The proposed regional climate forums (RCFs) will take place biennially and will build on the existing regional climate outlook forums (RCOFs) by expanding the RCOF product portfolio to include all other WMO climate related aspects (GFCS implementation, national adaptation planning and implementation, GCOS development, regional coordination of the climate services information system, data rescue, capacity development and other relevant topics/matters as defined by regions). The RCFs will replace meetings of the regional working groups on climate related matters and will define work plans that will drive regional implementation between the sessions. A forum session can include technical segments on specific topics to which technical experts of other organizations/private sector can also be invited. Regional Association presidents will play substantial roles in the Forums, along with Directors of Regional Climate Centres and other stakeholders, and report on implementation progress to EC.		
2030 Vision Statement: *Where do we want to stand in 2030?* RCFs around the world provide sustainable platforms for regional collaboration and networking to organize and optimize the operationalization of full value-chain climate services at country level across countries with common regional climate challenges with regional and global support.		
Rationale: *Why is this additional to ZNG investment needed? What is the cost of doing nothing or postponing? What opportunities exist at this moment?* There are many countries around the world which are strongly and commonly influenced by distinct regional climate features, and it is critically important for them to access and apply climate information in a mutually consistent and complementary manner for the policy and decision making to be effective, particularly in the context of trans-boundary impacts. There is an increased use of global and regional climate information from multiple sources in the adaptation policy and decision making at the national level, and there are potential risks of inappropriate or inconsistent use in the absence of a sustainable and co-owned mechanism for regional coordination. Two decades of RCOF operations and a decade of RCC operations covering all WMO regions, and the longstanding regional working groups and regional conferences offer unique opportunities to consolidate the existing strengths and mainstream optimized regional inputs to support climate services at the national as well as regional levels.		
Value Proposition: *How would this initiative…*		
… help close the capacity gap and address the needs of developing countries?	RCFs give excellent opportunities to identify and address capacity gaps, sharing of data, knowledge and experience, and will facilitate engagement of international experts and better application of global and regional inputs to meet the national needs for climate information in developing countries.	
… leverage additional resources?	Coordination and sharing of information on a wide range of investments related to climate services, for which the RCFs can provide a regular and Member-driven platform, can help leverage additional resources in a complementary manner.	
… complement existing work funded under ZNG budget?	RCFs serve as a mechanism for regional coordination of the CSIS, already covered under SO 1.2 and related SO streams, encompassing data, monitoring, prediction and projection, as well as capacity development.	

… accelerate action / scale down implementation?	The use of global and regional sources of information for national applications, though already available in large volumes and accessible to most Members, is considered to be sub-optimal. RCFs can help build awareness and capacities in countries to accelerate mainstreaming of climate services in the priority areas.
… encourage innovation?	RCFs can promote innovative approaches to optimize regional climate products from multi-model ensembles, and also to tailor the tools and products, including components of the CST, to meet the specific Member needs in the region.

Benefit to Members: *What is the end-benefit being offered?*

- Better coordinated regional implementation mechanism for climate;
- Regional discussion and action on climate-related aspects not covered by RCOFs;
- More reliable and optimized global and regional input for national CSIS;
- Operational systems supporting the delivery of an increased number of higher quality high-priority climate products and services at country level.

Outputs and Milestones: *What will specifically be produced as a result? When and/or in what phases? Note: Numbers refer to numbers of additional regional domains achieving each output/milestone*	**2020**	**2021**	**2022**	**2023**
RCFs including work plan development and monitoring of implementation	3	3	3	3
Joint capacity and assessment capabilities developed and joint activities implemented	3	3	3	3
Joint statements and agreements on regional cooperation and collaboration on climate aspects, particularly on regional approach to the CSIS, including prioritization of tailored products for operationalization and generation of products common to countries in the region such as the state of regional climate and outlooks/projections	3	3	3	3
Operational exchange of data and products needed to generate high-priority outputs, such as historical analyses, monitoring products, subseasonal and seasonal forecasts and specific tailored products for decision-making in the sectors	3	3	3	3

Activities: *What specific activities will be implemented?*

- RCF concept development including mapping of stakeholders, governance, agenda and expected outcomes covering the full range of CSIS functions for each region;
- Identification of venues and logistics including communication and outreach;
- Engagement of consultants and other experts including those from WMO Technical Commissions;
- RCF sessions including the associated training events;
- Publication of RCF outcomes and guidance for national follow-up;
- Strengthening of national-regional-global operational Climate Services Information Systems in each region through WIGOS, WIS and GDPFS.

Cost Overview: *What is the intended use of the funds?*

- 2 biennial forum meetings in 6 regions, including work plan development and monitoring of implementation (1.2M);
- Joint implementation activities in 6 regions (1.8M);
- Support staff in WMO Secretariat for 4 years (350K) (same staff to manage both the climate and hydrological fora).

Name of Additional Initiative: **CHIEF HYDROLOGIST: better engagement of hydrological community**		
Strategic Objective 1.3: Further develop services in support of sustainable water management		
Estimated Cost (in thousands of Swiss francs):	**1440.00**	Comments:
Rationale: *Why is this additional to ZNG investment needed? What is the cost of doing nothing or postponing? What opportunities exist at this moment?* - Hydrology and water resource management will be a more visible and integral part of WMO activities as recommended by CHy and expected to be endorsed by Cg-18. - Only a small part of the hydrology community has been engaged with WMO, which is an obstacle for MHEWS, where flooding and drought are one of the dominant disasters. - Also the global hydrological observing system is very limited and is restricting the Earth System understanding. - There is an opportunity to gain more by better engaging the hydrology actors in mainstream WMO activities. - Only a part of the atmospheric and hydrological science communities are represented in WMO, and there is a great opportunity to get additional workforce and intellectual contribution to WMO and its Members.		
Cost Overview: *What is the intended use of the funds?* ◦ One D1 level WMO Chief Hydrologist		

Name of Additional Initiative:
REGIONAL HYDROLOGICAL FORUMS

Strategic Objective 1.3:
Further develop services in support of sustainable water management

Estimated Cost (in thousands of Swiss francs):	**3400.00**	Comments:

Brief Description: *What is this initiative about?*
The proposed hydrological forums will take place biennially and will bring together water administrations on a regional scale with the aim to develop alliances for effective implementation of the Hydrological Status and Outlook System (HydroSOS), the WMO Hydrological Observing System (WHOS), regional flood early warning and drought mitigation alliances and to develop joint capacity and assessment capabilities.

The forums will replace meetings of the regional working groups and will define work plans that will guarantee regional implementation between the sessions. A forum session can include technical days on specific topics to which technical experts of other organizations/private sector can be invited. The forums will be chaired by the regional presidents and report to EC.

2030 Vision Statement: *Where do we want to stand in 2030?*
By 2030 the Regional associations design their own hydrological programmes and own the implementation of hydrological projects and activities. They use regional fora to coordinate regional hydrological workplans, assign responsibilities and follow up on implementation.

Rationale: *Why is this additional to ZNG investment needed? What is the cost of doing nothing or postponing? What opportunities exist at this moment?*
Hydrology is, above all, a national and river basin focused topic. This activity is aimed at bridging gaps between technical commissions, the scientific community, regional operational and political needs as well as between meteorologocal and hydrological services. The regional forums are aimed at devising and implementing their own work plans, budgets on the basis of needs assessment and advise the WMO technical commissions on the support they need in terms of guidelines, etc. This will help taking WMO Regions ownership of the hydrological issues at stake these days, especially climate change adaptation related activities but also gereral services for the public in support of water management and sustainable development. The regional forums are the catalyzers of systemic change in how the WMO community plans, implements, owns, and develops content.

Value Proposition: *How would this initiative…*

… help close the capacity gap and address the needs of developing countries?	The hydrological forums will bring together more and less developed services in WMO Regions with the focus to resolve practical issues. This will implicitly strengthen intra-regional and South-South cooperation.
… leverage additional resources?	The hydrological forums can be opened to regional and global development partners and financing institutions as well as to the private sector. They will thus provide institutional donors with regional priorities as well as the solutions appropriate for the specific context and, if opened to the private sector, will also create business opportunities.
… complement existing work funded under ZNG budget?	The hydrological fora are the consistent advancement of the performance indicator 1.3.4. They will allow Regional Associations to design and implement transnational development options.

… accelerate action / scale down implementation?	Action will be accelerated through regional partnerships as well as the value proposition to donors that regional forums can generate. The forums are the filters that focus global level technical and methodological developments to the scale of impact relevant to the regions. The inclusion of scientific partners will help to strengthen the science-to-operations link and to catalyze and tailor scientific development that is end-user driven and monitored.
… encourage innovation?	The WMO Hydrometry Support Facility is explicitly addressing innovation aspects that support both the global agenda on sustainable development and peace. The regional forums can mirror this activity and bring focus on special regional needs. This could include future regional innovation calls, similar to the first global innovation call issued in 2018.

Benefit to Members: *What is the end-benefit being offered?*

- Better coordinated regional implementation mechanism for operqational water management and development planning
- Links to non-traditional stakeholders
- More funding
- Regional ownership
- Possibility to strengthen WMO strategy through regional experience
- More visibility nationally and at regional political level

Outputs and Milestones: *What will specifically be produced as a result? When and/or in what phases? Note: Numbers refer to numbers of additional regional domains achieving each output/milestone*	**2020**	**2021**	**2022**	**2023**
Regional Hydrological Fora, including work plan development and monitoring of implementation	First round of 6 regional forums		Second round of regional forums	
Regional development & financial plans		Plans developed and endorsed	Plans presented to donors	Implementation of plans
Advice to WMO technical comissions and Congress	Ongoing	Ongoing	Ongoing	Ongoing
Joint capacity and assessment capabilities developed and joint activities implemented	Pilot in the 6 regional fora	Ongoing	Ongoing	Ongoing
Link to non-traditinal WMO constituencies, private sector, regional political groupings, banks, development agencies, NGOs, foundations)	Partners active in the forums	Partners commit to implementation plans of forums	Joint implemetation	

Activities: *What specific activities will be implemented?*

- Organize biennial regional hydrological forums bringing together water administrations on a regional scale;
- Include technical days on specific topics to which technical experts of other organisations/the private sector can be invited;
- Support working progress between fora sessions - outreach, M&E, donor relations, link to the scientific community.

Cost Overview: *What is the intended use of the funds?*

- 2 biennial forum meetings in 6 regions, including work plan development and monitoring of implementation (1.2M)
- Joint implementation activities in 6 regions (1.8M)
- Support staff in WMO Secretariat for 4 years (350K)

Name of Additional Initiative:
HYDROLOGICAL STATUS AND OUTLOOK SYSTEM (HydroSOS)

Strategic Objective 1.3:
Further develop services in support of sustainable water management

Estimated Cost (in thousands of Swiss francs):	**2520.00**	Comments:

Brief Description:
The HydroSOS is WMO's initiative to strengthen national service capabilities in terms of producing national, regional and global information on the status and outlook of the hydrological cycle. The major outputs are: 1. Assessment of global hydrological status, including groundwater, river flow, large lakes, reservoirs and soil moisture.
2. Appraisal of where the current status is significantly different from normal, for example indicating potential drought and flood situations.
3. Outlook on future development of the state of the hydrological cycle, i.e. likelihood of improvement or worsening of extremes over coming weeks and months.

2030 Vision Statement: *Where do we want to stand in 2030?*
NMHSs concisely and consistently measure the hydrological cycle and provide national, regional and global level assessment data as well as outlooks. This system is the basis for a yearly state of the water report issued for UN deliberations.

Rationale: *Why is this additional to ZNG investment needed? What is the cost of doing nothing or postponing? What opportunities exist at this moment?*
The CHy has called for the HydroSOS to be developed in order to help countries and regions improve their water assessment capabilities and their ability to produce seasonal and long-term outlooks. A worldwide operational system that would not only address national and regional needs for water accounting and forecast/outlooks but also provide the first ever consistent State of the Water Report requires investment in hardware and knowledge. This must be leveraged through international funding streams. The HydroSOS development and proof of concept phase will cost USD 12 to 14 million. Initial funds (USD 700,000) are available and the WMO Secretariat, together with the HydroSOS team are addressing potential donors. The whole operational HydroSOS will probably require investments in the order of magnitude of USD 250 million. This can only be implemented through a joint technical and political process. At the moment, WMO Secretariat support is cut out of existing staff time and reduces the effectiveness of the activities supporting the flood and drought indicators in the Strategic and Operating Plans. Therefore, this additional activity is basically a staffing request to implement the decision of CHy-15 and EC-70 d06(1).

Value Proposition: *How would this initiative…*

… help close the capacity gap and address the needs of developing countries?	NMHs in developing countries will be the main beneficiaries of investment into the HydroSOS.
… leverage additional resources?	Resources for NMHSs will be leveraged through investments within the system's framework as well as through political recognition of national services, which, in turn, will raise the attractiveness of the value provision of national services.
… complement existing work funded under ZNG budget?	SO 1.3 is supporting the theoretical framework for HydroSOS. This proposed activity is necessary to transform the concept into a living operational system.

… accelerate action / scale down implementation?	The HydroSOS will make the difference between a Global State of the Water Report that is deducted from modelling and remote sensing alone and a report that is sustained through nationally mandated processes and thus a solid basis for operational management under national legislation as well as political agreement across sectors and borders.

Benefit to Members: *What is the end-benefit being offered?*

1. Global reference information for high level political decision support
The establishment of a mandated process to collect, share and analyze data for globally consistent information in support of decision-makers. This will help encourage Member States to share their data at the regional and global levels, contributing to a variety of products including improved models to increase the knowledge of climate impacts on water resources and improved anticipation of crisis situations and potential conflict.

2. Fact-based decision making
The availability of reference information facilitates fact-based decision making to improve mid- and long-term planning and quantification of social, economic and environmental risks and helps to improve water efficiency for sustainable development.

3. Supporting the 2030 Agenda and NAP processes through national capacitation
SDG indicators as well as the implementation of national adaptation plans (NAPs) can be evaluated in the light of hydrological baseline data. This will help countries assess and plan their development and adaptation measures regarding the physical water availability and vice versa. This information is needed to adjust national development priorities with regard to all water-related issues.

4. Building local and regional capacity in National Meteorological and Hydrological Services, river basin authorities and other relevant stakeholders (through standardization, technical support, joint assessments, linking monitoring systems to products).

Outputs and Milestones: *What will specifically be produced as a result? When and/or in what phases?*	**2020**	**2021**	**2022**	**2023**
Global reference information for high-level political decision support	Information of the COP stocktake	TBD	TBD	TBD
In situ measurements and remote sensing and modelling	Methodology applied in the first 3 regions	Methodology applied in the remaining 3 regions	Ongoing refinement of measurements and models	Ongoing refinement of measurements and models
Validation and further refinement of a state of the water report that is only based on proxy data as supported in SO 1.3	Include local data from additional 10 countries	Include local data from additional 10 countries	Include local data from additional 10 countries	Include local data from additional 10 countries

Activities: *What specific activities will be implemented?*

The HydroSOS team (one expert familiar with water cooperation at a senior level and a support staff at a more junior level) supports the activities needed to generate the benefit described above. This includes:

- Support Members in upscaling the HydroSOS from surface water to groundwater, water quality related issues and water resources driven by the cryosphere.
- Catalyze the rollout into WMO Regions in close cooperation and supporting Regional Offices and RA hydrological forums as described in AI 1.3(1). This activity includes the coordination of investment in hardware, software and capacity building and development.
- Support of high-level considerations for a global water stocktake, communication, reporting, monitoring.
- Support the synthesis of the national and regional data and information streams into the State of the Global Water Report.

Cost Overview: *What is the intended use of the funds?*

- Water cooperation expert for 4 years (960K)
- Support staff for 4 years (560K)
- Travel expenses and consumables for 2 experts for 4 years (1M)

Note: This activity could also be hosted in a WMO Member State.

Name of Additional Initiative: **PRIVATE SECTOR ENGAGEMENT**		
Strategic Objective 4.3: Scale-up effective partnerships for investment in sustainable and cost-efficient infrastructure and service delivery		
Estimated Cost (in thousands of Swiss francs):	**3050.00**	Comments:
Brief Description: *What is this initiative about?* Enhance the full spectrum of the weather, climate and hydrological services delivery to support the protection of life, property and the environment and the security of food production, energy and water resources. Scale up partnership investments to minimize cost and maximize the opportunity for the networks to be sustainable long beyond the lifetime of donor-funded projects.		
2030 Vision Statement: *Where do we want to stand in 2030?* The common vision of the Weather Enterprise is that weather information be made available to all that need it in the most efficient and inclusive way. The current situation with citizens 'deprived' of access to essential weather, hydro- and climate information will be resolved through partnership between the public, private and academic sectors. By 2030, the expectation is for a ten-fold growth of the Weather Enterprise with particularly rapid growth of the private sector. Together with the expected science and technology advancement, the weather business will be at its maturity, providing all type of tailored services to society and economic sectors. The Weather Enterprise consultative process will help to avoid the risks related to the rapid growth, to ensure the continuity of data collection and sharing, and to promote 'level playing field' for all stakeholders.		
Rationale: *Why is this additional to ZNG investment needed?* The Weather Enterprise is growing rapidly, in particular the private sector engagement. This brings the necessity of close coordination and WMO leadership to ensure the sustainable provision of information and services forming the global public good which forms part of the WMO mission. There are challenges and opportunities that need to be addressed through the Weather Enterprise consultative process and WMO should proactively play a lead role. This will involve activities by the Secretariat and experts from Members in maintaining a dialogue and conducting regular regional and global events in partnership with stakeholders like the World Bank, HMEI, academia organizations, civil society.		
Value Proposition: *How would this initiative…*		
… help close the capacity gap and address the needs of developing countries?	The main purpose of Public Private Engagement (PPE) and the Weather Enterprise is to ensure access to safety-critical information by all in need. The main mechanism to be promoted to achieve this goal is Public Private Partnerships (PPP).	
… leverage additional resources?	PPE offers huge opportunities for leveraging resources. In particular, the development assistance provided to Members will be more efficient and sustainable through broader engagement of the private sector.	
… complement existing work funded under ZNG budget?	New mechanisms for data sharing are being developed and proposed by the Weather Enterprise stakeholders. There will be a need for testing and proving new concepts through pilots and studies which are difficult to plan in advance. WMO engagement in this exploratory phase is very important, thus additional funding will be necessary.	

… accelerate action / scale down implementation?	The Weather Enterprise is the future of the provision of services. The collaboration between the public, private and academic sectors creates new opportunities and approaches for developing countries to raise their capacity in all aspects.
… encourage innovation?	This is the single most important area bringing innovation to all stakeholders of the Weather Enterprise and, most importantly, to the users at all scales.

Benefit to Members: *What is the end-benefit being offered?*

- Strengthened WMO position as a global convenor and standard-making organization for weather, climate and water in the Weather Enterprise;
- Alignment with the UN SDGs, Paris Agreement and the Sendai Framework for DRR on engagement with non-state actors for achieving the global SDGs;
- Better knowledge and information sharing and utilization of state-of-the-art technology;
- Economic gains from enhanced efficiency across systems as well as long-standing deficiencies in service delivery resolved, addressing in particular LDCs and SIDS.

Outputs and Milestones: *What will specifically be produced as a result? When and/or in what phases?*	**2020**	**2021**	**2022**	**2023**
Policy, concepts, guidance and communication materials developed to make PPE and Weather Enterprise mainstream topics in the WMO community	PPE policy	Update by Cg-ext		Update by Cg-19
Studies on "weather market" and the Weather Enterprise developments and trends	2 Studies	2 Studies	2 Studies	2 Studies
Annual conference, regional events and Weather Enterprise forum meetings	1 conference, 3 regional, 2 forum meetings	1 conference, 3 regional, 2 forum meetings	1 conference, 3 regional, 2 forum meetings	1 conference, 3 regional, 2 forum meetings
Good practices collected and promoted, in particular, linked to sustainable business models for developing countries with support from private sector, academia and development institutions		Compendium of practices		Update

Activities: *What specific activities will be implemented?*

- Organize annual conferences and forum meetings, etc.;
- Organize regional awareness events and dialogues on PPE and the Weather Enterprise (e.g. through RECOs);
- Conduct pilot projects;
- Work with technical commissions on engagement of private sector.

Cost Overview: *What is the intended use of the funds?*

- 2 additional staff members for 2020-23 (Chief/P5 and a junior expert/P3)
- Annual Weather Enterprise Conference - 100K per year
- Consultancy/temp staff - 50K per year
- Support to the inter-agency Weather Enterprise Forum meetings, website, outreach material - 100K per year
- regional events and dialogues - 3 per year - 100K per year

Name of Additional Initiative: **URBAN SERVICES: air quality, disasters, climate adaptation**		
Strategic Objective 1.4: Enhance the value and innovate the provision of decision-supporting weather information and services		
Estimated Cost (in thousands of Swiss francs):	**4450.00**	Comments:
Brief Description: *What is this initiative about?* The initiative will set up pilot Integrated Operational Platforms to Meet Urban Service Delivery Needs, thus leveraging on the guidance provided in Part 2 of the "WMO Guide for Integrated Urban Weather, Environment and Climate Services" which is currently under development. The pilot operational platforms will be developed as a model to demonstrate how Members can cost effectively develop such a platform to provide integrated impact-based services to urban users (health, energy, city authorities, disaster response, city planners etc). The funds will pay for platform implementation consultant(s), coordination forums and equipment as necessary.		
2030 Vision Statement: *Where do we want to stand in 2030?* 50 % of the Members will have developed and implemented platforms to provide integrated impact-based services to urban users (health, energy, city authorities, disaster response, city planners etc.).		
Rationale: *Why is this additional to ZNG investment needed? What is the cost of doing nothing or postponing? What opportunities exist at this moment?* ZNG funds will only be used to develop the Guidelines on Integrated Operational Platforms for urban service delivery and training. Without this additional funding, WMO will miss a chance to demonstrate to Members the proof of concept for setting up Integrated Operational Platforms for urban service delivery and thus fail to implement fully the decision contained in Decision 7 (EC-70): Integrated Urban Services. The Guidelines and the team of experts on urban service delivery which will be formed provide a solid basis for implementing the proposed pilot projects.		
Value Proposition: *How would this initiative…*		
… help close the capacity gap and address the needs of developing countries?	Service delivery targeted at urban users is a relatively new area of focus by WMO and gaps exist, especially in developing countries. This initiative will provide training, learning-through-doing and transfer of technology to developing countries and thus contribute to closing the capacity gap.	
… leverage additional resources?	Additional resources would be useful to provide for developing Integrated operational Platforms as many Members need these services, especially considering the rate of growth of the number of urban inhabitants and expanding urban complexes. The proposed model could be upscaled and used to raise additional resources for replication; the methodology/guidelines/skills could be adapted to different contexts.	
… complement existing work funded under ZNG budget?	The pilot operational platforms will complement the work of developing Part 2 of the "WMO Guide for Integrated Urban Weather, Environment and Climate Services" and the training that will be conducted under ZNG. In addition, the initiative will follow up on the outcomes of the Urban Survey that Members will be completing by Q1 2019.	

… accelerate action / scale down implementation?	The pilot platforms are inteded to inspire replication, and thus accelerate implementation of similar systems by Members
… encourage innovation?	Innovation will be an important ingredient in developing the integrated platforms as the pilot project beneficiary countries will need to keep pace with, and take advantage of, emerging state-of-the-art technologies as well as engage with diverse user cartegories.

Benefit to Members: *What is the end-benefit being offered?*

◦ Implementation of the New UN Urban Agenda supported through a novel approach of Integrated Urban Weather, Water, Environment and Climate Services;

◦ Cities assisted in facing hazards, such as storm surges, flooding, heat waves and air pollution episodes, especially in changing climates;

◦ Strengthened impact-based forecast and warning services for urban areas as well as strengthened decision support and services to coastal urban areas;

◦ Improved service delivery capacities of NMHSs to provide services to support the "smart cities" concept of high-density, high-resolution urban environmental information.

Outputs and Milestones: *What will specifically be produced as a result? When and/or in what phases?*	**2020**	**2021**	**2022**	**2023**
Enhanced normative documents and methodological tools including Standard Operational Procedures (SOPs), MoUs, etc. between NMHSs and users	Working arrangements to develop platform agreed upon	SOPs, MoUs and Services & communication channels agreed upon	Performance monitoring of the platform initiated and lessons learnt documented to determine social economic benefits (SEB)	Lesson learnt used to develop other platforms
Pilot Integrated Opeartional Platforms for Urban Service delivery developed in specific cities	Kick off meeting for the first city held and actions start	Development continued	Platform operational	2 more platforms under development or complete

Activities: *What specific activities will be implemented?*

◦ Use the Urban Survey outcomes to identify a suitable city for a pilot Integrated Operational Platform;
◦ Engage a consultatnt and purchase equipment, as necessary;
◦ Form a mechanism including experts to develop a blue print for the development of a pilot Integrated Platform;
◦ Organize meetings, share best practices, train, engage user agencies (including health authorities, disaster management, decision-makers) and other stakeholders, etc.;
◦ Determine impact-based forecast products (e.g. high-resolution multi-scale NWP outputs to support urban environment services needs and relevant application sectors through a joint effort with GDPFS) to provide to specific users, dissemination channels, etc.;
◦ Develop SOPs and MOUs between NMHS and partners as necessary;
◦ Develop a monitoring mechanism, working arrangements etc.

Cost Overview: *What is the intended use of the funds?*

◦ Additional staff members for 2020-23 (Chief/P5 and a junior expert/P3)
◦ Purchase essential equipment as needed for 4 cities (CHF 600K)
◦ City 1, (2020-2022): 1 meeting and 1 training workshop per year per city (CHF 400K)
◦ City 2, 3 and 4 (2022-2023): 1 meeting and 1 training workshop per year per city (CHF 600K)
◦ 4 Regional Workshops for Members in the pilot cities (2020-2023) to demonstrate the Pilot Integrated Opeartional Platforms for Urban Service delivery (CHF 500K)
◦ Monitoring, SEB assessment, reporting, promotion of platform to Members (200K).

Name of Additional Initiative: **CHIEF ECONOMIST: economic value of weather, water and climate services**		
Strategic Objective 1.4: Enhance the value and innovate the provision of decision-supporting weather information and services		
Estimated Cost (in thousands of Swiss francs):	**1440.00**	Comments:
Rationale: *Why is this additional to ZNG investment needed? What is the cost of doing nothing or postponing? What opportunities exist at this moment?* - Weather, climate and hydrological phenomena are having growing economic impacts worldwide. - It is essential to be able to demonstrate value of related services and investments by carrying out cost-benefit analysis in numeric terms. - The economic value calculations are also supporting the dialogue with WMO development financing institutions. - WMO should hire economist expertise to be able to support its Members with economic benefit calculations, which are based on the expertise at the developed country NMHSs and academic institutions.		
Cost Overview: *What is the intended use of the funds?* ◦ One D1 level WMO Chief Economist		

Name of Additional Initiative: **AIR QUALITY FORECASTING FOR HEALTH SERVICES**		
Strategic Objective 1.4: Enhance the value and innovate the provision of decision-supporting weather information and services		
Estimated Cost (in thousands of Swiss francs):	**4600.00**	Comments:
Brief Description: *What is this initiative about?* The goal is to develop and implement a global air pollution monitoring, analysis, and prediction system with downscaling capability in regions of the world affected by high levels of atmospheric pollutants, in particular in Asia, Latin America, and Africa. To obtain air quality information for a specific region, city or even street, higher spatial resolution of the forecasting model is required than the global air quality forecast. Such downscaling would require to use nested modelling approch with the high resolution input data (emissions and meteorology) on the scales of interest potentially going down to urban scale air quality forecasting. The development on the technical side must be accompanied by the efforts on the engagement of health sector that can use the provided products to issue health warnings.		
2030 Vision Statement: *Where do we want to stand in 2030?* Reduce the number of deaths due to air pollution by two-thirds by 2030 (committed by WMO as a common objective at the First WHO Global Conference on Air Pollution and Helath)		
Rationale: *Why is this additional to ZNG investment needed? What is the cost of doing nothing or postponing? What opportunities exist at this moment?* WHO associates 7 million premature deaths to poor air quality. The latter is closely interlinked with climate warming and especially climate extremes which can lead to increased number of acute pollution episodes. Policies related to air quality control and climate mitigation have to be implemented in an integrated way as there are both “win-win” and “win-lose” policy options. The effects of air on health are diverse and need further research. WMO made commitments at the First WHO Global Conference on Air Pollution and Health that include: (a) provision of scientific basis for policy-making and evidence-based monitoring of pollution via enhancing observations and communication, assessment and reports; (b) provision of tools to reduce risk via forecasts, warning and advisory services (including integrated urban and health services); and (c) enhanced capacity of countries to support the heath sector in close collaboration with WHO.		
Value Proposition: *How would this initiative…*		
… help close the capacity gap and address the needs of developing countries?	Air pollution is largerly happening in developing countries and they will be the major beneficiaries of the new services.	
… leverage additional resources?	Tthrough the demonstartion of the capabilities it is expected to (a) raise awareness and the support of national stakeholders and (b) develop additional funding proposals to GCF and other ponetial funding bodies (e.g. South-South cooperation).	

… complement existing work funded under ZNG budget?	This initiative will provide practical implementation examples of the general activities on coordination of the air quality reasearch supported through the regular budget of the GAW Programme.
… accelerate action / scale down implementation?	The initial implementation of the pilot projects will help to create regional hubs for the upscaling/replication of the successes and experience exchange between the implemeting countries and cities and other countries and cities in the same region.
… encourage innovation?	The initiative is very innovative as it will (a) facilitate the development of the resolution atmospheric pollution modelling; (b) advance the development of high resolution emission maps based on proxy data; (c) assit in the developmet of the dowscaling techniques; (d) implement combination of the high-end and low-cost sensor equipment for the air pollution mapping in the selected cities.

Benefit to Members: *What is the end-benefit being offered?*
Members will get access to the science-based tool to reduce population health exposure during acute air pollution episodes.

Outputs and Milestones: *What will specifically be produced as a result? When and/or in what phases?*	**2020**	**2021**	**2022**	**2023**
Organization of the technical workshops/stakeholder consulations and training on the conection of air pollution an health in the selected countries	Selection of countries and initial training		Techncial workshop on the models comparison	
Development of the concepts for the pilot projects	Projects design	Projects establishment /set-up of the systems		
Practical implementation through pilot and demonstration projects			Test phase of the pilot projects	Operationaliza tion of the pilot projects

Activities: *What specific activities will be implemented?*

◦ Regional technical workshops and training;

◦ Development of technical proposals (sub-contract of the implementing partners from the MAP-AQ Science Team for the optimization of the supporting observational network, selection of the modelling tool and development of the detailed emission inventories) and funding proposals;

◦ Implementation of pilot projects via purchase and set up of equipment and modelling tools, and staff training;

◦ Organization of the regional comparisons of the air quality forecasting models;

◦ Collection of lessons learned (to be used in updating MAP-AQ implementation guidelines) and a workshop on update of the MAP-AQ approaches.

Cost Overview: *What is the intended use of the funds?*

◦ 1 staff member in MAP-AQ Secretariat (a technical specialist/project manager, P2) for 4 years

◦ Support of the global coordination action through a dedicated office

◦ Organization of regional workshops and training events on the air quality forecasting

◦ Establishment of pilot "value chains" in several regions

◦ Initiation and coordination of the model comparison campaigns.

◦ 2-3 pilot projects in several developing countries preferably in different regions (regional to urban downscaling).

Name of Additional Initiative:
ENHANCED UTILIZATION OF THE SPACE WEATHER INFORMATION SERVICE FOR AVIATION

Strategic Objective 2.1:
Optimize the acquisition of observation data through the WMO Integrated Global Observing System

Estimated Cost (in thousands of Swiss francs):	**320.00**	Comments:

Brief Description: *What is this initiative about?*
At its seventh meeting of its 215th Session, the Council of ICAO when discussing the provision of space weather information service agreed to the designation of three global space weather providers to be operated collectively by a PECASUS consortium (Finland as Lead, Belgium, UK, Poland, Germany, Netherlands, Italy, Austria, and Cyprus), by the United States of America, and by an ACFJ consortium (of Australia, Canada, France and Japan). In addition, the Council of ICAO agreed that two regional providers, comprising South Africa and a China/Russian Federation consortium, will be established no later than November 2022. These outcomes were achieved, in part, thanks to excellent interagency cooperation and coordination between ICAO and WMO that is expected to continue in the period 2020-2023.

The ICAO-designated global space weather providers for aviation have embarked on the implementation phase of the service, including all associated preparatory activities such as roles and responsibilities and handover procedures. It is envisaged that the service will become operational in late 2019. Given the emergence of the operational space weather service for aviation, it is recommended that WMO continue to engage directly with ICAO during the eighteenth WMO financial period (2020-2023), including as the designated regional space weather providers become integrated into the service delivery model. This will be achieved throught the implementation of the Four-year Plan for WMO Coordination of Space Weather Activities 2020-2023.

2030 Vision Statement:
In order to successfully mitigate the detrimental impacts of space weather the extensive observational capabilities on Earth and in space (Sun to Earth) should be accompanied by numerical modelling capabilities representing both the phenomena and their technological impacts. At this time forecasting of space weather impacts is a challenging task; despite recent progress, it is still well behind user needs and requires significant efforts to successfully progress. The level of these forecasting efforts is beyond the capabilities of individual countries, thus the challenges posed by space weather are best addressed through coordinated efforts guided by WMO.

Rationale: *Why is this additional to ZNG investment needed?*
The Four-year Plan for WMO Coordination of Space Weather Activities 2020-2023 is in continuity of the activity pursued with the current Space Weather expert team, IPT-SWeISS, though with a significant expansion as necessary to move from a “demonstration stage” to an actual implementation enabling a breakthrough with tangible benefits in several applications. The engagement of Members through their space weather experts and the support from the Secretariat, ideally at the level of one full-time person, are critical for the success of this plan. Given the tight situation of staff resources within the Secretariat, a minimum level of support could be achieved in supplementing the Secretariat staff with experts seconded by Members and external consultancy.

Value Proposition: *How would this initiative…*

… help close the capacity gap and address the needs of developing countries?	In the least developed countries, it may be that telecommunication and Internet via satellite services are locally regarded vital assets, while extensive power grids are absent. It is of paramount importance that relevant space weather information is available to all WMO members as part of capacity building.

… leverage additional resources?	Given the new requirements for space weather services to aviation and the emerging demand in other sectors, it is recommended that WMO engages more directly during the eighteenth financial period (2020-2023), and possibly beyond, to build up a sustainable basis for global, reliable, space weather service capabilities.
… complement existing work funded under ZNG budget?	The early achievements of WMO Space Weather Expert Team, ICTSW in the sixteenth financial period (2012-2015) and the following-up achievements of IPT-SWeISS in the seventeenth period (2016-2019) illustrate the broad field of activity that could benefit from WMO involvement in space weather, and demonstrate the capability of WMO to effectively facilitate a breakthrough in this area and play a recognized role in the international space weather community.
… accelerate action / scale down implementation?	The present plan identifies a set of high-priority activities, which are considered necessary and feasible in the four-year time frame, and would lead to clear deliverables and tangible outcomes. Other desirable actions are identified and should be also be conducted - if time and resources allow.
… encourage innovation?	Once space weather services have reached a mature stage they can generate revenue to the information provider (e.g. cost recovery mechanism for the services required by ICAO, alert services to power grid, telecommunication or GNSS operators).

Benefit to Members: *What is the end-benefit being offered?*
As a result of this WMO effort, space-based and ground-based space weather observing systems will be better coordinated through the principles of WIGOS; consistent, quality-assured space weather products will be available to Members through WIS; and, the transition of space weather science to operations will be enhanced. The plan is expected to further facilitate the effective coordination with initiatives external to WMO and to enable the long-term improvement of space weather service capabilities. In order to standardize competencies of staff engaged in space weather service provision, the best practices and guidelines for meteorological personnel as documented by the WMO will be transferred to space weather personnel. This activity plan is expected to provide significant benefits to the Members, in terms of more precise observations and improved reliability, accuracy, and timeliness of forecasts and warnings to their users. A prerequisite is that countries, and organisations, make their space weather measurements and forecasts generally available by submitting the relevant information to designated Data Collection and Production Centres (DCPC) in the WMO Information System (WIS) for space weather (and by default to the Global Information System Centres (GISC)).

Outputs and Milestones: *What will specifically be produced as a result? When and/or in what phases?*	**2020**	**2021**	**2022**	**2023**

Improve the space weather data availability through the coordinated collection and improved visibility following WMO procedures	(1) Continued implementation of space weather ground-based metadata into OSCAR-Surface database; (2) Guide for incorporation of ground-based metadata produced by non-WMO organizations; (3) updated space–based metadata in OSCAR/Space database	Existing observational capabilities reviewed in order to identify risks or deficiencies in their sustained support for essential services	Existing space weather centres encouraged and guided to make their data and products available through the WIS by establishing a separate Data Collection/Data Production Centres (DCPC) for space weather	Space weather information providers (like various ISES members) that are not traditional NMHSs guided in the use of the WMO-WIS.
Improve data standardisation, quality, inter-operability	WIGOS observational metadata standard for space weather observation reviewed and updated in its correspondence to the metadata standards currently used for each space weather domain	Comprehensive templates developed based on WIGOS requirements, applicable to multiple types of space weather observations	The emergence of new high-priority services and corresponding new observational requirements promoted	(1) User needs reviewed and required developments identified in priority areas (e.g. aviation); (2) Observational gaps identified & feasibility studies conducted on new observational capabilities to satisfy emerging user

Include space weather practices for observations, forecasting, verification, meta-data standards and data exchange in the appropriate WMO documents for enhancing the visibility of space weather in WMO	Manual on WIGOS	WIGOS Metadata	Manual on WIS	Manual on GDPFS Manual

Activities: *What specific activities will be implemented?*

(1) Promote science related synergy between space weather and meteorological/climate communities:

a. Communicate with meteorological communities to discuss the interactions between space weather and weather and climate processes;

b. Coordinate with other international entities for discussing the space weather impact on the weather and climate processes. Where necessary, promote workshops for activating the discussion on these issues;

c. Place reports and recommendations for future steps that come out of the space weather related workshops mentioned above on the WMO website to help publicize the work, and set action plan for further developments.

(2) Information provision, training and capacity building:

a. Provide guidance for governments concerning their space weather risk assessments;

b. Continue the development of training and capacity building framework for space weather at various qualification levels and target audiences. The ICAO space weather services can be a useful testbed for training and capacity building;

c. Continue the improvements of the availability of relevant space weather information to all WMO members as an integral part of capacity building;

d. Host a research-to-operations workshop on new space weather observations, aimed at moving new developments (e.g. Cubesat mission instruments) from the research domain towards potentially meeting WMO operational observational requirements, as a part of the capacity building;

e. Investigate the opportunities to make the quantitative information about space weather risks (e.g. risk assessments) available to governments and regulatory bodies.

Cost Overview: *What is the intended use of the funds?*

- Participation of qualified experts in one annual meeting of IPT-SWeISS and related task teams (CHF 150,000)
- Participation of IPT-SWeISS members in relevant bodies of WMO technical commissions (CHF 30,000)
- Liaison with external partners (CHF 30,000)
- Communication actions, development or translation of training material (CHF 20,000)
- One seminar (CHF 30,000)
- Consultancy and financial support to secondment of staff to supplement the Secretariat (CHF 60,000)

Name of Additional Initiative:
DATA CONFERENCE

Strategic Objective 2.1:
Optimize the acquisition of observation data through the WMO Integrated Global Observing System

Estimated Cost (in thousands of Swiss francs):	**200.00**	Comments:

Rationale: *Why is this additional to ZNG investment needed? What is the cost of doing nothing or postponing? What opportunities exist at this moment?*
- The event will take place in early 2020 and explore the evolution and sustainability of systems for the acquisition and exchange of meteorological data, including possible pathways toward establishing innovative modes of collaboration, with the participation of a broad range of stakeholders from the public, private and academic sectors.
- It will support actions related to the review of the WMO data policies and practices expressed in Resolution 40 (Cg-12), Resolution 25 (Cg-13) and Resolution 60 (Cg-17).
- Recognizing that some Members are better equipped than others to manage the challenges of increasing data volumes and technical complexity, the review calls for practical steps to equalize capacity, guide decisions and extract genuine value from data for all Members.

Benefit to Members: *What is the end-benefit being offered?*
The Conference will contribute to ensuring that no Member is left behind in their capability to source, access and extract the highest value from data and from investment in data-related technologies, for the benefit of society.

Cost Overview: *What is the intended use of the funds?*
- Speakers and participants' travel;
- Conference materials and organization.

Name of Additional Initiative: **STRENGTHENING OF OCEAN SERVICES**		
Strategic Objective 2.1: Optimize the acquisition of observation data through the WMO Integrated Global Observing System		
Estimated Cost (in thousands of Swiss francs):	**1600.00**	Comments:

Rationale: *Why is this additional to ZNG investment needed? What is the cost of doing nothing or postponing? What opportunities exist at this moment?*

- Oceans are an essential part of Earth System observations, climate science and weather/safety services.
- There is a need to strengthen the ocean related activities in the above mentioned fields and allocate more resources to comfort the growing need.
- WMO is a growingly important actor on the global ocean agenda. E.g. the resources of IOC/UNESCO are currently severely cut and their focus is largely focused to biology and ocean waste.
- The ocean observing system GOOS should be strengthened by integrating it more closely with WMO observing activities.
- Also the vital role of oceans in multi hazard early warning should be better integrated with WMO DRR activities. E.g. the tsunami, tropical storm and coastal inundation components need to be strengthened.
- WMO has an opportunity to give a boost for ocean observations, early warning systems and climate science activities.

Cost Overview: *What is the intended use of the funds?*

- Additional staff members for 2020-23 (two P4 level experts)

Name of Additional Initiative:
OCEAN OBSERVING SYSTEMS MONITORING AND IMPLEMENTATION

Strategic Objective 2.1:
Optimize the acquisition of observation data through the WMO Integrated Global Observing System

Estimated Cost (in thousands of Swiss francs):	**800.00**	Comments:

Brief Description: *What is this initiative about?*
This activity will consolidate and assure sustainability of the ocean observing systems implementation support centre (JCOMMOPS), which is essentially funded from voluntary contributions of WMO Members and IOC of UNESCO Member States. JCOMMOPS provides a monitoring function of the ocean observing systems, assists with the collection of metadata from ocean observing platforms, and provides technical assistance to Members on implementation of relevant observing networks. This additional funding will support the creation of a manager position at JCOMMOPS, which will allow strengthening and sustaining the centre as well as introducing new functions, such as support to capacity development and projects.

2030 Vision Statement: *Where do we want to stand in 2030?*
JCOMMOPS is sustained and properly managed.

Rationale: *Why is this additional to ZNG investment needed? What is the cost of doing nothing or postponing? What opportunities exist?*
◦ The draft Strategic Plan 2020-2023 brings a focus on Earth System prediction, in which ocean observations play a critical role. It is important that WMO show commitment to improve this prediction and JCOMMOPS is expected to play a critical role to this end by facilitating network implementation and accessing new sources of ocean data. Establishing a long term JCOMMOPS manager position will contribute to making JCOMMOPS more sustainable and demonstrate WMO's commitment to SO 2.1.
◦ Management of JCOMMOPS is needed, which provides a neutral (i.e. neutral between the different observing networks, and between the different funding sources) perspective with integrated system approach in support of the WMO Integrated Global Observing System (WIGOS) and the Global Ocean Observing System (GOOS).
◦ In the context of the WMO reform and evolution of JCOMM into a new JCOM Committee, WMO needs to reassure IOC of UNESCO of its commitment to sustain the JCOMMOPS function and ensure proper management.
◦ JCOMMOPS, which is based in Brest, France, is expanding and planning to recruit additional staff, funded from extra-budgetary sources, to deal with new types of ocean observing networks such as ocean gliders, HF radars, etc. With current staff of 5 plus extra staff to be recruited in the future, it will be difficult to manage the Centre from Geneva.
◦ JCOMMOPS also provides a key contribution to GOOS, of WMO is a co-sponsor, by providing technical support to ocean observing system operators and exercising an ocean observing networks monitoring function. By commiting to a manager position at JCOMMOPS, WMO will introduce a substantial contribution to GOOS and demonstrate its continued engagement.
◦ A new manager position will allow JCOMMOPS to become proactive in capacity development and promote projects in developing countries supporting enhancement or development of their ocean observing networks.

Value Proposition: *How would this initiative…*	
… help close the capacity gap and address the needs of developing countries?	By monitoring the status of the ocean observing systems and facilitating their implementation, JCOMMOPS is helping close the capacity gap as well as promoting partnerships between developed and developing countries. The latter will benefit from easier assessment of gaps in their regions, receive assistance in the development of project proposals to governments and funding agencies, and receive technical assistance on the implementation of ocean observing networks.
… leverage additional resources?	Monitoring status ocean observing systems is key to gap analysis, which is essential for justifying investments in the ocean observing system. The JCOMMOPS Manager will be tasked to promote capacity development and related projects.
… complement existing work funded under ZNG budget?	JCOMMOPS currently functions with voluntary contributions, but sustainability issues have been identified and need to be adressed. The creation of a manager position at the Centre will help address these issues.
… accelerate action / scale down implementation?	JCOMMOPS provides direct technical support to national ocean observing network managers (e.g. on the use of satellite data telecommunication systems, acquirement of WIGOS IDs, quality information feedback and fault management, etc.), and thereby facilitates implementation and maintenance of these networks to address the requirements of WMO Applications.
… encourage innovation?	JCOMMOPS is in close contact with platform operators and follows up on new technologies under development. In this regard, JCOMMOPS is acting as a focal point and a source of information on new technologies.

Benefit to Members: *What is the end-benefit being offered?*
JCOMMOPS facilitates implementation of the national ocean observing networks by providing direct technical assistance to programme managers in charge of these networks, facilitating the collection of WIGOS metadata, and providing monitoring function on the status of these systems. While JCOMMOPS is currently funded only from voluntary contributions, the creation of a manager position is proposed to strengthen JCOMMOPS and assure its sustainability.

Outputs and Milestones: *What will specifically be produced as a result? When and/or in what phases?*	**2020**	**2021**	**2022**	**2023**
JCOMMOPS managed, leading to enhanced support to Members, incl. capacity development and promotion of projects	Recruit manager	Supervise	Supervise	Report on lessons learned and achievements
JCOMMOPS work plan (incl. performance indicators)	Discuss and develop work plan with stakeholders	Monitor & update worksplan as needed	Monitor & update worksplan as needed	Monitor & update worksplan as needed

Activities: *What specific activities will be implemented?*

- Recruit manager at JCOMMOPS;
- Develop JCOMMOPS work plan with performance indicators;
- Develop project proposals in support of developing countries;
- Monitor JCOMMOPS work plan.

Cost Overview: *What is the intended use of the funds?*

It is proposed to build on the existing infrastructure currently funded through voluntary contributions of WMO Members and IOC of UNESCO Member States and in-kind (host country) assistance. The only additional cost will be the recruitment of a JCOMMOPS Manager at P4 level.

Name of Additional Initiative:
WMO HYDROLOGICAL OBSERVING SYSTEM (WHOS): MEMBER CAPACITY DEVELOPMENT

Strategic Objective 2.1:
Optimize the acquisition of observation data through the WMO Integrated Global Observing System

Estimated Cost (in thousands of Swiss francs):	**3800.00**	Comments:

Brief Description: *What is this initiative about?*
The proposed initiative involves the creation of an expert task force that can be deployed to Members in order to help them install WHOS, improve their monitoring capacities as well as their capacity to share data according to their policies. The task force will comprise of one computer scientist, one expert in hydrological ontologies and one general technician with specialization in hydrometry.

2030 Vision Statement:
WHOS is fully operational in all WMO Member countries

Rationale: *Why is this additional to ZNG investment needed?*
WHOS has been successfully implemented in Sava and La Plata river basins. It is a component of WIGOS and is seen as an exemplary application by the CBS Management Group. WHOS is currently lacking an expert task force that can be deployed to Members in order to help them install WHOS, improve their monitoring capacities as well as their capacity to share data according to their policies. If this additional activity is not financed members will have to organize their own support for preparing their IT systems, installing, testing and rolling out WHOS operationally.

Value Proposition: *How would this initiative…*

… help close the capacity gap and address the needs of developing countries?	The WHOS team will be deployed to those national services that need support urgently in bringing up-to-speed their capabilities in data communication.
… leverage additional resources?	The WHOS team can efficiently link the implementation of WHOS through the regional hydrological forums described in AI 1.3(1), thus generating new funding opportunities for NMHSs.
… complement existing work funded under ZNG budget?	The WHOS team will be complementing the WHOS relevant activities defined under SOP 1.3
… accelerate action / scale down implementation?	The WHOS team will be able to work with regional centers, as well as with national administrations. It thus provides the possibility to downscale and customize solutions to the national service level as well as to give feedback.
… encourage innovation?	The implementation of WHOS will trigger a next step of development of NHSs IT systems implicitly. It will also provide the opportunity to include disclaimed data from other sources, to the extent allowed by the respective national legislation and policy.

Benefit to Members: *What is the end-benefit being offered?*
- Increased NMHS capacity to develop data and information systems;
- Hydrological data flowing into WIGOS (following the successful models from Sava and La Plata river basins).

Outputs and Milestones: *What will specifically be produced as a result? When and/or in what phases?*	**2020**	**2021**	**2022**	**2023**
National Implementation Plans	WHOS support to 10 countries	WHOS support to 10 countries	WHOS support to 10 countries	WHOS support to 10 countries
Regional Centers	Regional WHOS support defined in hydrological fora	Regional centers designated and trained	Regional centers fully operational	Reginal centers supported by regional political entities
Certification	Certify national and regional implementation	Certify national and regional implementation	Certify national and regional implementation	Certify national and regional implementation

Activities: *What specific activities will be implemented?*

◦ Set up a country demand-driven support activity comprised of one computer scientist, one expert in hydrological ontologies and one general technician with a specialization in hydrometry;
◦ Undertake activities to build WHOS capacity at regional, river basin and national scales;
◦ Help NHSs with WHOS installation;
◦ Conduct national trainings;
◦ Help WMO regions to identify and define regional WHOS centers, conduct trainings, and certify them;
◦ Guide WHOS implementation as an integral part of WIGOS and help the centres to function in the framework of GDPFS.

Cost Overview: *What is the intended use of the funds?*

◦ 1 computer scientist and 1 expert in hydrological ontologies for 4 years (1.6M)
◦ 1 general technician with specialization in hydrometry for 4 years (700K)
◦ Travel expenses and consumables (lumpsum for 3 experts during 4 years) and small procurements for Members (1.5M)

Note: This activity could also be hosted in a WMO Member State.

Name of Additional Initiative:
IMPACT OF VARIOUS OBSERVING SYSTEMS ON EARTH SYSTEM PREDICTION

Strategic Objective 2.1:
Optimize the acquisition of observation data through the WMO Integrated Global Observing System

Estimated Cost (in thousands of Swiss francs):	**1,100.00**	Comments:

Brief Description: *What is this initiative about?*
This activity will build on the experience of the 4-yearly series of WMO International Workshops on the Impact of Various Observing Systems on Numerical Weather Prediction (NWP), which have been critical within the Rolling Review of Requirements (RRR) for guiding impact studies and assessing their results in order to make surface- and space-based observing systems of the Global Observing System (GOS) evolve in the most impactful way. Here, in the WIGOS Framework, it is proposed to conduct a similar activity at the same frequency but with wider focus, i.e. Earth System Prediction, and promote impact studies for the different components of the Earth System (atmosphere, ocean, sea-ice, water, bio-sphere, etc.), in view of assessing the impact of various observing systems and guiding implementation and evolution of WIGOS.

2030 Vision Statement: *Where do we want to stand in 2030?*
Impact studies have been promoted and conducted and assessed through two international workshops, leading to key recommendations made to Members and partner organizations for making the observing systems evolve in such a way as to meet the requirements of Earth System Prediction in the most cost-effective and impactful way.

Rationale: *Why is this additional to ZNG investment needed?*
This activity will allow promoting new impact studies focusing on specific components of Earth System Prediction (e.g. ocean models, sea-ice models, cryosphere etc.) and identify impactful observing systems that would be difficult to realize otherwise. Opportunities exist with those components to work with partner organizations involved with specific modelling activities and promote an integrated approach to observing systems design and evolution, aligned with the results of impact studies.

Value Proposition: *How would this initiative…*

… help close the capacity gap and address the needs of developing countries?	Developing countries will be able to justify investments in the required observing systems and benefit from improved Earth System Prediction.
… leverage additional resources?	Justification of impact of observing systems on Earth System Prediction through impact studies is key to leverage additional resources from governments and partners.
… complement existing work funded under ZNG budget?	Work funded under ZNG is focusing on NWP. Here we will extend the focus to Earth System Prediction.
… accelerate action / scale down implementation?	Results from the new impact studies, which would have been conducted or readily available to WMO otherwise, will help accelerating recommendations to Members and partners regarding required evolution of observing systems.
… encourage innovation?	The impact studies will evaluate new observing technologies and promote new types of tools to assess impact of various observing systems on Earth System Prediction.

Benefit to Members: *What is the end-benefit being offered?*

- More cost effective and impactful observing system resulting in improved Earth System Prediction;
- Socio-economic benefits of Earth System Prediction better addressed.

Outputs and Milestones: *What will specifically be produced as a result? When and/or in what phases?*	**2020**	**2021**	**2022**	**2023**
Assessment of the impact of various observing systems on Earth System Predictions	Consult with community and partners	Plan workshop	International workshop on impact of observations	Assessment published
Recommendations to Members and partners on evolution of global observing systems				Recommendations to Cg-19
Guidance on impact studies and tools for assessing impact of various observing systems on Earth System Prediction	Consult with community and partners	Plan workshop, and initiate inventory of impact studies and tools	International workshop on impact of observations	Develop guidance

Activities: *What specific activities will be implemented?*

- Plan and organize international workshop on the impact of various observing systems on Earth System Prediction (set up an organizing committee with experts from various Earth System domains; define programme for the workshop, conduct initial impact studies prior to the workshop in view of assessing their results at the event, publish workshop report with recommendations).
- Develop recommendations to Members on how to make the observing systems evolve in most cost-effective and impactful way.
- Work with experts and partners to develop guidance on impact studies and observations impact assessment tools.

Cost Overview: *What is the intended use of the funds?*

- Main cost will be to organize the international workshop on impact of various observing systems on Earth System Prediction, including inviting experts from all domains of Earth System (CHF 150K per year)
- Preparation for the workshop will involve a couple of meetings of the Organizing Committee prior to the workshop (CHF 100K)
- Publication of guidance (CHF 150K)
- Additional staff (CHF 250K).

Name of Additional Initiative:
INTEGRATING THE OBSERVING SYSTEMS CAPABILITY ANALYSIS AND REVIEW TOOL (OSCAR/Space, OSCAR/Surface, OSCAR/Requirements)

Strategic Objective 2.1:
Optimize the acquisition of observation data through the WMO Integrated Global Observing System

Estimated Cost (in thousands of Swiss francs):	**2,000.00 for all OSCAR**	Comments: It is estimated that OSCAR/Space will need to be resourced at least at the same level as OSCAR/Surface

Brief Description: *What is this initiative about?*
◦ OSCAR is a central element of RRR, which is essential to maintain and build up WIGOS towards Vision 2040. Processes required to conduct RRR for all WMO application programmes need to be streamlined and operationalized.
◦ Presently OSCAR/Space and OSCAR/Surface are based on different databases, user-interfaces and maintenance concepts. They are also differently resourced. In order to ensure their sustainability, the databases and user-interfaces need to be harmonized to the extent possible.
◦ Other existing challenges include maintaining, servicing, and updating the underlying database of OSCAR/Space. Collection and quality control of input data needs to be automatized, where possible. M2M interfaces need to be developed for all OSCAR elements.
◦ Maintaining OSCAR/Space will become more and more challenging, as an ever-growing number of new satellite systems is expected to be deployed in the coming years. The effort required to keep OSCAR/Space updated will increase by several factors in the future.
◦ In addition, WMO's scope of work will continue to expand with the Earth System approach from mainly meteorological to climate and other environmental (including hydrological) applications, thus further enhancing the complexity of the system.

2030 Vision Statement:
WMO as the recognized international expert body which ensures that observing systems meet user requirements through processes such as RRR.

Rationale: *Why is this additional to ZNG investment needed?*
◦ OSCAR is essential to WMO's core business, in particular to the successful conduct of RRR.
◦ All OSCAR elements need to be properly resourced and their maintenance and functionality, including the quality of its input data, ensured.
◦ At this moment its sustainability is not ensured. If OSCAR/Space collapses it can have a detrimental domino effect for many OBS activities. Ensuring sustainability of OSCAR/Space is therefore a major priority for 2020-2023.

Value Proposition: *How would this initiative…*

… help close the capacity gap and address the needs of developing countries?	By ensuring that Observing Systems are properly planned to meet the requirements of developing countries.
… leverage additional resources?	Without a functioning OSCAR, the WMO core process will not work.
… accelerate action / scale down implementation?	Facilitates monitoring of WIGOS component observing systems; gap analysis for RRR and making relevant recommendations on evolution of global observing systems in line with identified observational user requirements.
… encourage innovation?	Maintenance of OSCAR will require innovative solutions, including M2M interfaces.

Benefit to Members: *What is the end-benefit being offered?*
OSCAR is essential for ensuring that WMO can deliver on its promises.

Outputs and Milestones: *What will specifically be produced as a result? When and/or in what phases?*	**2020**	**2021**	**2022**	**2023**
OSCAR/Space maintenance concept	Assess possible solutions	Implement	Validate	Operationalize
OSCAR/Space and OSCAR/Surface integration	Assess possible solutions	Implement	Validate	Operationalize

Activities: *What specific activities will be implemented?*

- Discuss integration of OSCAR/Space with OSCAR/Surface (Meteo Swiss);
- Identify possible solutions;
- Hire/establish OSCAR/Space maintenance staff (upgrades to user interface and underlying database, required updates to database core/structure, ensuring 99.9% availability, providing user helpdesk);
- Devise solutions for inputting data and data quality control, including possibility of M2M interfaces.

Cost Overview: *What is the intended use of the funds?*

It is estimated that OSCAR/Space will need to be resourced at least at the same level as OSCAR/Surface. If not outsourced, it will require several new staff positions within OBS/SAT. At a minimum this requires a programmer familiar with the database and able to upgrade (not only update) the system (P3/P4), supported by 2 IT engineers (P2/P3) to provide helpdesk services and database maintenance. It furthermore requires an expert at the P3/P4 level to conduct quality checks of the database content.

Name of Additional Initiative:
FILLING OBSERVATIONAL GAPS IN DATA SPARSE REGIONS

Strategic Objective 2.1:
Optimize the acquisition of observation data through the WMO Integrated Global Observing System

Estimated Cost (in thousands of Swiss francs):	**260.00**	Comments: Workshop and consultancy

Brief Description: *What is this initiative about?*
- Increased access to Earth System observations in data sparse regions (polar and high mountain regions, oceans, areas lacking upper air observations) from systems assessed as operationally compliant to defined observing standards through partnerships with other data providers (non-NMHSs) and targeted investments (e.g. in developing countries).
- Strategy and plan for WIGOS implementation in data-sparse areas of polar and high mountain regions, with a focus on partnerships.

2030 Vision Statement:
(1) All existing observations made by partner organizations in data sparse regions are made available to WMO and (2) new observations are made in data sparse regions to allow 50% of the gaps identified initially to be filled in.

Rationale: *Why is this additional to ZNG investment needed?*
ZNG activities will essentially look at reenforcing implementation of existing and new observing networks (e.g. GBON, RBON). Additional efforts are needed to address identified gaps in data sparse regions.

Value Proposition: *How would this initiative…*

… help close the capacity gap and address the needs of developing countries?	This initiative specifically targets the filling of observational gaps in developing countries
… leverage additional resources?	The strategy and plan will promote projects benefiting developing countries
… complement existing work funded under ZNG budget?	ZNG activities will essentially look at reenforcing implementation of existing and new observing networks (e.g. GBON, RBON). Additional efforts are needed to address identified gaps in data sparse regions.
… accelerate action / scale down implementation?	Promoted projects will allow acceleration of capacity development in developing countries.
… encourage innovation?	New cost-effective technologies will offer opportunities to fill in the gaps

Benefit to Members: *What is the end-benefit being offered?*
Filling the observational gaps in data sparse regions will allow improving services associated to WMO Applications as well as better addressing socio-economic benefits. All Members will benefit from improved Earth System Predictions. Also, as most of the data sparse regions are within developing countries, the ctivities proposed under this additional activity will directly benefit to these Members.

Outputs and Milestones: *What will specifically be produced as a result? When and/or in what phases?*	**2020**	**2021**	**2022**	**2023**
Strategy and implementation plan for increased access to Earth Sytem observations in data sparse regions	Strategy developed	Plan developed		Plan implemented
Project promotion and oversight or support for targeted investments in developing countries, aiming to fill in the gap in data sparse regions	Project proposal	Oversight & support	Oversight & support	Oversight & support
Activities: *What specific activities will be implemented?* ◦ Develop strategy and plans to promote and develop partnerships with other data providers (non-NMHSs); ◦ Promote targeted investments in developing countries through new projects or integration of required observational components into other planned projects which address the entire value chain.				
Cost Overview: *What is the intended use of the funds?* - Workshop with key experts and consultancy to develop strategy and implementation plan (CHF 150K) - Seed money for promoting relevant projects (CHF 110K)				

Name of Additional Initiative:
DATA REVOLUTION

Strategic Objective 2.2:
Improve and increase access to, exchange and management of current and past observation data and derived products through the WMO Information System

Estimated Cost (in thousands of Swiss francs):	**1660.00**	Comments:

Brief Description: *What is this initiative about?*
To ensure efficient meteorological/hydrological services in the 21st century, an important task is the generation of new ideas and the introduction of these ideas into competitive products. National Meteorological and Hydrological Services currently have an important challenge to have the capacity to manage meteorological/hydrological information from observations, numerical models, satellites, radars, drones, etc. and non-meteorological information coming from health, food, agricultural, hydrological, ocean or socio-economic organizations and to deliver products and climate services with added value useful for increasing the RESILIENCE and improving decision-making in real time. Associated to the management of gigantic volumes of data of very diverse nature, whose treatment cannot be done with conventional analytics and tools, the science of data represents a new reality for society as a whole, in different fields and disciplines where the impact of new technologies has disruptive consequences and generates an authentic REVOLUTION in the models of business. Problems to solve involve storage capacity and the definition of standards, analysis of information from different points of view in a quick way, the diagnosis of business cases and the decision of appropriate scheme model. Information systems, data mining or big data are systems to find repetitive patterns and it can be used to generate models predictive factors that facilitate the generation of products required by society and easy to use (web platforms, reports, statistics, etc.).

2030 Vision Statement: *Where do we want to stand in 2030?*
Data revolution for increasing resilience. Enhancing national capacities in high-quality observations, data collection, dissemination and analysis of Earth System Model in order to answer the user requierements in the most cost-effective and impactful way by using advanced information technology.

Rationale: *Why is this additional to ZNG investment needed?*
The activity will promote the generation of a system of systems to strengthen unified efforts at all levels and among all relevant stakeholders, public and private, national and international.

Value Proposition: *How would this initiative…*

… help close the capacity gap and address the needs of developing countries?	Enhance WIGOS, WIS and GDPFS systems coordination in addressing the overarching long-term development concerns of society with concrete deliverables pertaining to the Agenda 2030 for Sustainable Development, the Sendai Framework for Disaster Risk Reduction 2015-2030 and the Paris Agreement.
… leverage additional resources?	Justification can be done considering that governments adopted the 2030 Agenda and called for innovation and data-driven development
… complement existing work funded under ZNG budget?	ZNG will support WIGOS, WIS and GDPFS. This additional allotment will support Systems of Systems.
… accelerate action / scale down implementation?	This initiative will facilitate national coordination among IT and NMHS communities

… encourage innovation?	New technologies in data management required

Benefit to Members: *What is the end-benefit being offered?*

◦ Observing Network of WMO Members will evolve into an optimized, truly Earth System Observation Network, in support of Earth system prediction, following WIGOS principles with strengthened partnership with key stakeholders (global, regional and national) outside of NMHSs. The WMO data partnership will be greatly promoted by combining quality observations in the above domains at key selected geographic locations, including in support of in situ/satellite product integration. The plans will also reflect on how to optimize the use of low-cost, third-party and citizen observations with big data technology.

◦ In the area of WIS, the additional initiative will be aimed at implementation of WIS 2.0, which will result in: (i) strengthening of the fundamental role of WMO in relation to data sharing policies and principles, and (ii) an increase in observations that are available to members for which WIGOS metadata are available to describe observation quality. In the area of GDPFS, the additional initiative will be aimed at implementation of the system, which will result in an increase in data, products and services. Finally, Members will improve the national capacities in high-quality observations, data collection, dissemination and analysis delivering better services in order to satisfy user requirements in the most cost-effective and impactful way.

Outputs and Milestones: *What will specifically be produced as a result? When and/or in what phases?*	**2020**	**2021**	**2022**	**2023**
Assessment of the impact of various IT systems on Earth System Model	Consult with community & partners	Plan workshop	International workshop supporting SDG's	Assessment published
Recommendations to Members and partners on evolution of global observing systems	Consult with community & partners	Plan workshop	Intl. Workshop supporting SDG's	Recommendations to Cg-19
Guidance on impact studies and tools to be used to assess impact of various observing systems on Earth System Prediction			Initiate analysis of impact studies/tools	Develop guidance

Activities: *What specific activities will be implemented?:*

This initiative will apply the same methodology proposed for observation system but will include additional information (economic infor, social, impact).

◦ Plan and organize an international workshop and consultative meetings on the impact of IT systems on Earth System Model (organizing joint committee with experts from various Earth System domains and IT); define programme for the workshop, and initial impact studies to be conducted prior to the workshop in the view to assess their results at the workshop, publish workshop report with recommendations).

◦ Develop recommendations to Members on how to make the information evolve in most cost-effective and impactful way.

◦ Work with experts and partners to develop guidance.

Cost Overview: *What is the intended use of the funds?*

◦ One additional P4 level staff member for 2020-23;

◦ International workshop, consultative meetings, initial impact studies, publication of report (100K per year);

◦ Development of guidance and tools to be used to assess impact of various observing systems on Earth System Prediction (200K).

Name of Additional Initiative:
INTEGRATED GLOBAL CRYOSPHERE INFORMATION SYSTEM (IGCryoIS)

Strategic Objective 2.2:
Improve and increase access to, exchange and management of current and past observation data and derived products through the WMO Information System

Estimated Cost (in thousands of Swiss francs):	**800.00**	Comments:

Brief Description: *What is this initiative about?*
The Integrated Global Cryosphere Information System (IGCryoIS) is proposed within the framework of the Global Cryosphere Watch Data Portal as a long term mechanism to address the requirements for consistent cryosphere data and information, as a component of component of the Earth system. This proposal provides a roadmap for developing IGCryoIS as a unified system, providing consistency in supporting WMO strategic goals for understanding and addressing disaster risk (priority 1, Sendai framework), strengthening the hydrosphere-cryosphere linkage, as input to water resource decisions, including transboundary aspects; it would address the data needs of climate assessments for data sparse regions, e.g. with in the framework of IPCC. It will facilitate the development, dissemination, and implementation of standards and policies on cryosphere observations and data sharing cryosphere and relevant data, information. Its core mandate will be to foster consistency of data and information, generated and managed by multiple entities (research, internationally funded activities) focusing on regions with information gaps, aligned with Member-focused WMO initiatives, e.g. in the context of the HydroMet Alliance, and act as a bridge between the international scientific and operational community. This initiative recognizes that there are multiple sources of data, with diverse capabilities and goals, and that a breakthrough in terms of accessibility and authority of information requires an integrated approach to consistency in methodologies (e.g. harmonization), and a culture of standardization and compliance.

2030 Vision Statement: *Where do we want to stand in 2030?*
Nations, governments, businesses, and individuals are able to provide authoritative services and support effective policies addressing water resources, climate adaptation, and resilience policies, information on extreme events, in regions where changes in cryosphere have impact, by having access, in a cost effective manner, to consistent and accurate information on cryosphere, to understand disaster risk, and develop and implement strategies and policies, sufficiently in advance, to be effective and sustainable.

Rationale: *Why is this additional to ZNG investment needed? What is the cost of doing nothing or postponing? What opportunities exist at this moment?*
The current implementation of the Global Cryosphere Watch includes the development of the GCW Data Portal, as an in-kind contribution from Norway, and the development of specific products (trackers, assessments). The Data Portal is developed to access data from stations in the GCW Surface Observing Network in standardized, machine readable formats. It includes limited capacity to integrate data from other data centres and does not include capacity for hosting data, data quality monitoring and assessment, data transformation, and visualization capabilities.
This proposal is for additional funding for an advanced mechanism, building on the capabilities already available on the Data Portal, to facilitate the access to consistent cryosphere information in the Earth system approach. IGCryoIS will provide a structured integration of diverse data centers and sources, with an emphasis on regions and Members where the capabilities are fragmented or limited, and in coordination with, and complementing current international initiatives with related goals (e.g. meeting targets under the 2030 Agenda). As observations in polar and mountainous regions are very costly and difficult to sustain, IGCryoIS will address the need for data and authoritative information through standardization, integration and harmonization, developing and promoting compliance and providing tailored solutions to address capacity gaps within the WMO's regulatory framework. This investment is required to build co-ownership and to attract other sources of funding by building on the capabilities within GCW framework.

Value Proposition: *How would this initiative…*	
… help close the capacity gap and address the needs of developing countries?	The initiative aims primarily at developing countries affected by changes in the cryosphere. It will integrate fragmented sources of data and information, where multiple international projects are run, often with limited knowledge of the host countries. Pilot projects will tailor the solution to priority areas and regions.
… leverage additional resources?	IGCryoIS will leverage GCW/WMO innovative data and information capabilities through (a) engagement with international initiatives (b) ensuring the engagement of national stakeholders and (c) enhancing the value proposition of funding proposals and projects.
… complement existing work funded under ZNG budget?	The core GCW Data Portal activities are a strong foundation for an enhanced cryosphere information system. This initiative will enhance the functionality of the existing system, addressing an increased range of needs. Once the system is developed on the backbone of GCW, it could be upscaled effectively.
… accelerate action / scale down implementation?	The initiative will scale up and accelerate the implementation of the GCW core functions in in developing countries, through pilot projects.
… encourage innovation?	IGCryoIS will be a driver for innovative approaches to data standardization and interoperability practices, bridging between operational and scientific communities, an essential contribution to increasing the relevance of partner organizations, including NMHSs, and the further development of analysis and modelling tools.

Benefit to Members: *What is the end-benefit being offered?*

◦ Provision of accurate information on the state of the cryosphere, as an indicator of climate changes, in support of meeting targets under the 2030 UN Agenda, the Paris Agreement and the Sendai framework.
◦ Provision of more accurate/detailed information on cryosphere change, and support advances in model coupling;
◦ Quantification and validation of effects of cryosphere changes and socio-economic implications;
◦ Increased evidence base for climate, water and adaptation policy and trade-off decisions.

Outputs and Milestones: *What will specifically be produced as a result? When and/or in what phases?*	**2020**	**2021**	**2022**	**2023**
Pilot projects, tailoring GCW Data Portal functions to address the needs for data interoperability with stations and data centers in developing countries, jointly with other initiatives.	Stakeholder consultation	Development and evaluation	Deployment of new features	Feedback mechanisms
Standards and practices for data, metadata, harmonization of data, monitoring, by bridging between scientific and operational communities.	Joint workshops and working groups	Joint workshops and working groups	Joint workshops and working groups	Publication of standards and guidelines

Practical implementation and impact assessments through pilot and demonstration projects, in conjunction with other stakeholders (academia, user communities)		Workshops	Test phase of pilot projects	Pilot projects operationalized

Activities: *What specific activities will be implemented?*

- Consult with stakeholders and other international initiatives to assess the level of readiness, gaps, and map engagements.
- Organize workshops and working groups to address requirements for standards, harmonization, compliance mechanisms, including region specific requirements.
- Develop specific functions to demonstrate its capabilities, by leveraging in-kind contributions and other funding initiatives.
- Present IGCryoIS at international meetings and contribute to the global stock take process, the monitoring of specific targets, etc.

Cost Overview: *What is the intended use of the funds?*

- Consultations and national workshops, including training, and development of region specific technical proposals (8 workshops): 400K
- Consultancy (specifications, engagements): 200K/4years;
- Publications of standards (translation): 100K
- Expert support in Secretariat including travel: 100K

Name of Additional Initiative: **ENHANCED GLOBAL GREENHOUSE GAS BUDGET MONITORING**		
Strategic Objective 3.3: Advance policy-relevant science		
Estimated Cost (in thousands of Swiss francs):	**1600.00**	Comments:
Rationale: *Why is this additional to ZNG investment needed? What is the cost of doing nothing or postponing? What opportunities exist at this moment?* - The global greenhouse gas monitoring network is very sparse, which is an obstacle for understanding the carbon budget: sources, sinks to vegetation and oceans and processes in the atmosphere. Only a few developed regions in Europe, North America and Japan have needed coverage of GHG stations. - This is an obstacle for the implementation of the Paris Agreement and a major scientific challenge - There is a need to enhance the number of ground-based stations tenfold, continue and enhance the GHG satellite programmes and simulate the carbon climate with general circulation models.		
Cost Overview: *What is the intended use of the funds?* ◦ Additional staff members for 2020-23 (two in P4 level experts and national resources for additional Global Atmosphere Watch station establishments)		

Name of Additional Initiative: **INTEGRATED GLOBAL GREENHOUSE GAS INFORMATION SYSTEM (IG3IS)**		
Strategic Objective 3.3: Advance policy-relevant science		
Estimated Cost (in thousands of Swiss francs):	**5300.00**	Comments:
Brief Description: *What is this initiative about?* IG3IS is an international framework for the development and implementation of the observation-based tool in support of greenhouse gas emission mitigations. Best practices have been documented in the IG3IS Science Implementation plan and several developed countries and a number of cities are the beneficiaries of the additional information that supports their emission mitigation actions. The aim of this particular initiative is to scale up the success of these early IG3IS adopters for it to become a more globally adopted practice. The initiative will facilitate practical implementation through piloting of the good practices in several developing countries supporting main IG3IS objectives (national, urban and industrial methane). The particular upscaling would be required for the land use and land use and land cover sectors considering the substantial role for this sector in carbon trading schemas and in the IPCC report on 1.5C. The pilot projects will further feed into the refinement of the good practices documented in the IG3IS Science Implementation Plan.		
2030 Vision Statement: *Where do we want to stand in 2030?* Nations, sub-national governments, businesses and individuals have additional data with which to inform strategies to reduce climate-disrupting greenhouse gas emissions while increasing the well-being of society (as adopted by EC-68/Doc. 4.5 (1)).		
Rationale: *Why is this additional to ZNG investment needed? What is the cost of doing nothing or postponing? What opportunities exist at this moment?* The Paris Agreement to reach its goal of 2C will require Members to take actions on emission reductions or increase sinks of greenhouse gases in a transparent manner. IPCC SR1.5C call on taking immediate actions. To do so, accurate information is needed to inform mitigation strategies on national and sub-national levels. To assist countries in meeting their commitments, WMO and its partners have initiated the development of IG3IS. Work is currently being undertaken in two directions: documentation of good practices in the IG3IS Science Implementation Plan and practical implementation through pilot and demonstration projects. There are four objectives of IG3IS, including improvement of the national emission estimates in collaboration with the inventory community, providing actionable information on emissions distributions and variability to the urban stakeholders, guidance to the actions on methane emission reductions from industrial sectors and support the global stocktake exercise. As the observations and the modelling are developed on the different scales, a number of cross-cutting benchmarking activities will be also initiated through IG3IS to ensure consistency between those scales . One of the specific objectives outlined in the UNFCCC agreement with WMO directly refers to implementation of IG3IS pilot projects. This additional funding is requested to develop and implement several projects in developing countries on a competitive basis (starting from the countries that are ready to undertake the project, have initial capacity and have an interested user community in place).		
Value Proposition: *How would this initiative…*		
… help close the capacity gap and address the needs of developing countries?	The project aims at developing countries and will bring new capacities to support mitigation activities in those countries as well as support the revision of the NDCs	

… leverage additional resources?	Through the initial consultation at the national level this initiative is expected to (a) raise the support of national stakeholders and (b) develop additional funding proposals to GCF.
… complement existing work funded under ZNG budget?	The projets which will be supported will provide direct input to the normative and coordination activities of IG3IS operated through the regular budget
… accelerate action / scale down implementation?	The initiative directly aims at the upscaling of the IG3IS practices in developing countries
… encourage innovation?	The pilots will have diverse economic sectors addressed and will need innovative approaches to the setup of the observational network and the application of the analysis and modelling tools

Benefit to Members: *What is the end-benefit being offered?*

◦ Provision of actual information on state greenhouse gases, the main drivers of climate change, in support of implementation of the Paris Agreement;
◦ Provision of more accurate/detailed information on emissions/sinks distribution and their changes with time within the countries/cities;
◦ Quantification and validation of effects that emission reductions made by countries and non- state actors have on the atmospheric levels of greenhouse gases and support of the NDCs ;
◦ Increased evidence base for climate policy and trade-off decisions (e.g. identifications of emission reduction opportunities for the sectors where emissions have large uncertainty, or removal of these emissions is distributed like in the case of the land-use sector).

Outputs and Milestones: *What will specifically be produced as a result? When and/or in what phases?*	**2020**	**2021**	**2022**	**2023**
Development of the concepts for the pilot projects	Initial consultation & stakeholder meetings	Projects design	Projects implementation	
Good practices documented in the IG3IS Science Implementation Plan			First results fed into the updated IG3IS Implementation Plan	
Practical implementation through pilot and demonstration projects			Test phase of pilot projects	Pilot projects operationalized

Activities: *What specific activities will be implemented?*

◦ Consult with national stakeholders to assess the level of readiness for the project;
◦ Support and optimize the technical network design for the selected country/city (the focus will be on 2, max. 3 projects);
◦ Design and implement the pilot projects;
◦ Collect lessons learned and provide the results to the science team for the IG3IS implmentation plan update;
◦ Present IG3IS at international meetings and feed its results into the global stocktake process.

Cost Overview: *What is the intended use of the funds?*

◦ 2 support staff in IG3IS Secretariat (a technical specialist and a resource mobilization specialist) for 4 years (900K)
◦ Consultations with the interested countries (national workshops) and development of technical proposals (sub-contract of the modelling centre for the optimization of the supporting observational network) and development of funding proposals for 2 years (800K)
◦ Implementation of the projects (where feasible) via purchase and set up of equipment and training of the staff (3500K)
◦ Workshop on update of the IG3IS good practices (last year of the period) (100K)

Name of Additional Initiative:
COUNTRY PROFILE DATABASE: software, maintenance and updating

Strategic Objective 4.1:
Address the needs of developing countries to enable them to provide and utilize essential weather, climate, hydrological and related environmental services

Estimated Cost (in thousands of Swiss francs):	**1500.00**	Comments:

Rationale: *Why is this additional to ZNG investment needed? What is the cost of doing nothing or postponing? What opportunities exist at this moment?*
- WMO has established a country profile database to trace the status of infrastructure, services and resources of its Members. This is necessary to be able to coordinate and target the WMO resources. The database is used for identifying development needs for government and development financing partners.
- WMO Secretariat is a central place to gain holistic information on Members and their expertise. This minimizes the need to send questionnaires to Members.
- There is a need to maintain and further develop the software and hardware of the Country Profile Database and to ensure regular updating of the information.

Cost Overview: *What is the intended use of the funds?*
Additional staff members for 2020-23 (an P3 level IT expert and P4 level applications expert)

Name of Additional Initiative:
ENHANCED CONTRIBUTION TO UN DEVELOPMENT SYSTEM

Strategic Objective 4.1:
Address the needs of developing countries to enable them to provide and utilize essential weather, climate, hydrological and related environmental services

Estimated Cost (in thousands of Swiss francs):	**800.00**	Comments:

Rationale: *Why is this additional to ZNG investment needed? What is the cost of doing nothing or postponing? What opportunities exist at this moment?*

- The United Nations General Assembly adopted Resolution A/RES/72/279 Repositioning of the United Nations development system in the context of the quadrennial comprehensive policy review of operational activities for development of the United Nations system. This resolution emphasizes that adequate, predictable and sustainable funding of the resident coordinator system is essential to delivering a coherent, effective, efficient and accountable response in accordance with national needs and priorities.
- In this regard, by adopting the resolution, the General Assembly decided to provide sufficient funding in line with the report of the Secretary-General, on an annual basis starting from 1 January 2019, though, inter alia, doubling the current United Nations Development Group cost-sharing arrangement among United Nations development system entities.
- This has resulted in the requirement of WMO for annual contribution of USD 200,000 (instead of USD 100,000) to the inter-agency pooled funds, managed by the United Nations Development Group Multi-Partner Trust Fund Office and administered by UNDP.
- WMO attaches importance to the United Nations Development System Reform process and strongly supports the implementation arrangements of the above United Nations General Assembly resolution.
- In accordance with the WMO Strategic Plan for 2020-2023 (Long-Term Goal 4, Strategic Objective 4.1), WMO should address the needs of developing countries to enable them to provide and utilize essential weather, climate, hydrological and related environmental services, leveraging the investments of the UN system and other development partners towards this goal.

Cost Overview: *What is the intended use of the funds?*
Annual WMO contribution to the UN Development System

Name of Additional Initiative: **REGIONAL MULTI-HAZARD EARLY WARNING SYSTEMS (MHEWS-As)**		
Strategic Objective 4.1: Address the needs of developing countries to enable them to provide and utilize essential weather, climate, hydrological and related environmental services		
Estimated Cost (in thousands of Swiss francs):	**2800.00**	Comments:
Brief Description: *What is this initiative about?* This initiative proposes the development of regional or sub-regional multi-hazard early warning advisory systems (MHEWS-As), including in Africa, South America and Central Asia. Such systems will collect, possibly on virtual platforms, existing information, products and tools needed for provision of accurate impact-based forecasts and warnings to support informed decision-making by national authorities in relation to hazards. It is aimed to function as a cooperative platform where forecasters from different countries can jointly work on the identification, monitoring and forecasting of hazards and their potential impacts, especially in the case of weather events affecting multiple countries. These systems will leverage SWFDP, FFGS, CIFDP and other project initiatives. Aggregation and visualization of the Members warnings will be the topmost layer of information. The initiative will complement ZNG activities to achieve Strategic Objectives 4.1 and 1.1 as well as reach the related KPIs.		
2030 Vision Statement: *Where do we want to stand in 2030?* With the aim of leaving no one behind, we want to help all our Members reach the Sendai target G and be able to demonstrate their enhanced capacities.		
Rationale: *Why is this additional to ZNG investment needed? What is the cost of doing nothing or postponing? What opportunities exist at this moment?* With ZNG resources only, it will be very difficult to support enough NMHSs in their capacity development projects related to MHEWS.		
Value Proposition: *How would this initiative…*		
… help close the capacity gap and address the needs of developing countries?	The key idea is to foster regional cooperation through projects aiming at developing Members' operationnal capacities regarding the provision of Multi-Hazard Early Warning Services at the national level.	
… leverage additional resources?	The concept of regional cooperative systems aims at leveraging all capacity development initiatives in Member States and provide clear evidence of these achievements through an integrated approach designed to avoid duplication of efforts and resources.	
… complement existing work funded under ZNG budget?	The initiative will complement activities carried out under ZNG resources and accelerate implementation with regards to the global agendas, such as the Sendai Framework for DRR.	
… accelerate action / scale down implementation?		
… encourage innovation?	Encouraging regional cooperation at operationnal level will contribute to sharing innovative practices and further refine and improve warning services through enhanced capacities.	

Benefit to Members: *What is the end-benefit being offered?*

- Strengthened regional cooperation;
- Harmonized forecasts and warnings among NMHSs, especially in transboundary areas;
- Increased operational forecasting capabilities of NMHS staff and improved capability to provide high-quality services to humanitarian agencies;
- Improved understanding of NMHS products and services by humanitarian agencies.

Outputs and Milestones: *What will specifically be produced as a result? When and/or in what phases?*	**2020**	**2021**	**2022**	**2023**
Concept notes and implementation plans for the development of regional multi-hazard early warning advisory systems (MHEWS-A), including Africa, South America and Central Asia, in line with the implementation plan for GMAS	x			
A virtual platform designed, consisting of information and tools for forecasters created and serving as a cooperative platform where forecasters from different countries can jointly work on identification of potential hazards and their impacts, especially in the case of weather events affecting multiple countries		x		
Technical implementation and further integration in the GDPFS			x	
Performance Review				x

Activities: *What specific activities will be implemented?*

- Develop a concept for each region;
- Conduct regional workshops;
- Collect, in one virtual platform, existing information, products and tools needed for provision of accurate forecasts and warnings to support informed decision-making related to the hazards by the national authorities;
- Provide operational forecasters with effective and tested tools for forecasting hazardous hydrometeorological events and their possible impacts.
- Aggregate and display national warnings at regional and national scales, according to MHEWS development/GMAS implementation plan.

Cost Overview: *What is the intended use of the funds?*

- Regional workshops to kick-start the project in at least three regions (300K)
- 1 expert (320K)
- Software development (500K)
- System operationalization regarding robustness, business continuity etc. (1180K)
- Performance assessment workshops (500K)

Name of Additional Initiative: **MANAGEMENT TRAINING FOR NMHS DIRECTORS**		
Strategic Objective 4.2: Develop and sustain core competencies and expertise		
Estimated Cost (in thousands of Swiss francs):	**600.00**	Comments:
Rationale: *Why is this additional to ZNG investment needed? What is the cost of doing nothing or postponing? What opportunities exist at this moment?* - Effective Management is one of the cornerstones of a successful NMHS - There is an urgent need to invest in management skills of the executive directors and upper and middle management of NMHSs. This enhances their ability to affect the government resourcing and support, undertake effective business planning, and promote in-house development of staff. . - Most of the PRs of WMO do not generally have a chance to participate in management training courses in their national context.		
Cost Overview: *What is the intended use of the funds?* Finnacial resources for WMO trust fund for management training and in-kind management training course offerings.		

Name of Additional Initiative:
REGIONALIZING WMO: STRENGTHENING NATIONAL INSTITUTIONAL SYSTEMS IN NMHS FOR WEATHER WATER CLIMATE SERVICES

Strategic Objective 4.2:
Develop and sustain core competencies and expertise

Estimated Cost (in thousands of Swiss francs):	**2100.00**	Comments:

Brief Description: *What is this initiative about?*
To provide more systematic support to Members in key areas, this initiative will focus on the following activities:
a) Systematically improving the institutional and governance arrangements of NMHS (legislation and national strategic/development plan) at the national level in LDCs and SIDS. This has been identified as a significant pathway to improving visibility at national level, raising political awareness and positioning NMHS to contribute effectively to the development agenda of their respective nations.
b) Providing avenues for skill enhancement of PRs/Directors and senior managers especially in relation to role of PR as a representative of the Member /management skills / planning and policy development / engagement with private sector / resource mobilization within and beyond the national budget.
c) Supporting LDCs and SIDS to maximize their input into the Country Profile Database (CPDB) as a means for the Secretariat and ROs to better understand their needs.

2030 Vision Statement: *Where do we want to stand in 2030?*
All WMO Members NMHS have a robust legal, strategic and administrative operating environment.

Rationale: *Why is this additional to ZNG investment needed? What is the cost of doing nothing or postponing? What opportunities exist at this moment?*
The WMO Regional and Field Offices are the organization's "front line". They are the gateway to the WMO Members for the Secretariat and the conduit back to the Secretariat of the expectations, needs and priorities of the Members and the Regional Associations. A primary focus for ROs, with support of ETR is to assist Members in their respective Regions to develop their National Meteorological/Hydrological Services (NMHSs) Strategic Plans and enabling legislation to creating a robust operational environment and enable them to play their full role in the economic and social development of their countries as well as in continuing and ongoing high priority areas of the Organization.

The WMO Regional Offices accomplish the above as much as possible mainly through regional initiatives (RB and XB), the Voluntary Cooperation Programme (VCP) and as much as possible delivering direct support in response to specific requests from Permanent Representatives with WMO. However, this is on an ad hoc basis and needs to be systemized as VCP/projects cannot support the needs expressed in all regions currently.

Value Proposition: *How would this initiative…*

… help close the capacity gap and address the needs of developing countries?	The initiative is particularly targeted at developing countries, LDCs and SIDS, especially in terms of the development of national strategic plans, legislation, and identification of capacity gaps through CPDB data analysis.
… leverage additional resources?	The CPDB data and analysis will facilitate development partners to target better their investment based on regional trends and reliable country-level data. It will also help reduce duplication and better coordination among donors on country-level assistance, partnerships, priorities and needs.

… complement existing work funded under ZNG budget?	As mentioned above, the initiative will systemize work that is currently implemented on an ad hoc basis with ZNG budget and voluntary contributions.
… accelerate action / scale down implementation?	All WMO Regional Offices will be outposted to the respective regions by the end of 2019. While this will further enable more direct contact with Members, a strong bridge for regional and technical integration will be needed to maintain links between the ROs and Technical Departments remaining at HQ to ensure that technical programmes are responsive to regional needs/priorities.
… encourage innovation?	The support provided will be based on global best practice and know-how.

Benefit to Members: *What is the end-benefit being offered?*

◦ Improved institutional and governance arrangements of NMHS aimed at enhanced visibility at the national level as well as increased political awareness and positioning of NMHS to contribute effectively to the national development agenda;
◦ Improved understanding of the needs of LDCs and SIDS and enhanced engagement with the countries directly;
◦ A bridge for regional and technical integration built to ensure responsiveness of technical programmes to regional needs and priorities following the regionalization of WMO (Regional Offices outposted to the respective regions).

Outputs and Milestones: *What will specifically be produced as a result? When and/or in what phases?*	**2020**	**2021**	**2022**	**2023**
Legislation and National Strategic/Development Plans at the national level in LDCs and SIDS, which improve the position and visibility of NMHS	10 countries per year	10 countries per year	10 countries per year	10 countries per year
Strengthened managerial, resource mobilization, planning and policy development skills of PRs/Directors				
Maximized LDC and SIDS input to Country Profile Database and enhanced WMO engagement with countries directly				

Activities: *What specific activities will be implemented?*

◦ Assist in improving institutional and governance arrangements of NMHS (legislation and national strategic/development plans);
◦ Organize trainings/workshops for PRs and senior managers on management, planning and policy development, engagement with the private sector, resource mobilization, etc.;
◦ Assist LDCs and SIDS in regularly updating and maintaining their profiles on the Country Profile Database;
◦ Coordinate and maintain links between Regional Offices and technical programmes at HQ.

Cost Overview: *What is the intended use of the funds?*

◦ Strategic development/planning specialist for 4 years (800K)
◦ Support/develop legislation/NSPs 10 countries per year x 4 years (800K)
◦ CPDB: 3 staff in RAP Office, RAM Office and RAF Office for 2 years (800K)
◦ Travel expenses and consumables (lumpsum for 3 experts for 2 years) (200K)