

SOUTH ASIA HYDROMET FORUM (SAHF) REPORT

BACKGROUND

South Asia is highly prone to weather and climate-related disasters such as floods, drought, thunderstorms, heatwaves, landslides and cyclones. In the past two decades, over 50 percent of South Asians, or more than 750 million people, have been affected by at least one natural disaster.

The social and economic costs of such hazards have been staggering with almost 230,000 people dead and US\$ 45 billion in damages between 1970 and 2008. In the 2017 floods alone, almost 45 million people were affected. The scale is only expected to increase: a World Resources Institute estimate indicates that losses in the region can amount to US\$ 215 billion each year by 2030. In addition to losses and damages, the performance of the region's key economic sectors such as agriculture, aviation, water, urban infrastructure, hydropower, and tourism depends upon weather information-based services. However, users and communities have limited access to weather information products tailored to these sectors.

Investments in disaster early warning systems can be critical in saving lives and assets and strengthening the resilience of vulnerable communities. International experience suggests that for every dollar invested, the estimated benefits are in the range of US\$ 2-10 dollars. Similarly, development of hydromet services can make a critical contribution for enhancing the performance of weather-dependent and key economic sectors and improving the livelihoods of local communities.

Efforts to strengthen disaster early warning systems and weather services require national level modernization efforts but also have a regional dimension. Cyclones occurring in the Bay of Bengal affect a number of countries in the region. Each year, between March and May, severe thunderstorms develop in the region that commonly affect northeastern India, Bhutan, Nepal and Bangladesh taking their toll on people's livelihoods and property causing damages worth millions of dollars across the sub-region. The South Asian monsoon system delivers 70 to 80 percent of the rainfall to most countries in the region and variability in the timing and duration of precipitation poses serious risks and causes economic losses due to uncertainty to key sectors such as agriculture. Given the transboundary nature of weather and climate risks, regional collaboration can help improve understanding of these weather patterns and devise strategies to effectively respond to them.

Building on efforts made by each country in the region, and support provided by the World Meteorological Organization (WMO), the Global Facility for Disaster Reduction and Recovery (GFDRR) through the European Union financed EU-South Asia Capacity Building for Disaster Risk Management program and other development partners, the World Bank (WB) has been proactively investing in hydromet modernization efforts in the region. The World Bank's program takes a bottom-up approach with national level investments and/or engagement in the countries of the South Asia Region. Operations in Bangladesh, Bhutan, India, Myanmar, Nepal and Pakistan seek to transform the provision of hydro-meteorological services by supporting national hydromet agencies to develop and deliver user-oriented hydromet and climate services and disaster early

warning systems. Going forward, it is important to consider how to solidify these ongoing investments and scale them up through regional collaboration.

The United Nations (UN) reform agenda makes a call to join up efforts to better serve countries as a main direction going forward and creates a sense of urgency for country-level action. The draft WMO Strategic Plan 2020-2023 sets an ambitious goal: to close the capacity gap on weather, climate, and water information services between developed and developing countries. Scaling up effective partnerships is one of the Strategic Objectives to achieve this goal.

SOUTH ASIA HYDROMET FORUM (SAHF) – PATHWAYS FOR REGIONAL COLLABORATION

The World Bank, in partnership with the World Meteorological Organization (WMO) co-hosted the SAHF to bring together weather and climate stakeholders from the South Asia region, including the Heads of the National Meteorological agencies, representatives of disaster risk management agencies and other stakeholders. The forum was convened at the WMO building in Geneva, Switzerland from September 18 to 20, 2018.

Over 80 participants, including representatives from the 8 South Asian countries, regional organizations, such as ICIMOD and RIMES, and development partners (DFID, EU, GFDRR, USAID, UKMet, Korea Met, World Bank, and WMO) were in attendance. A full list of participants is presented in [Annex 1](#).



Objective

The objective of the Forum was to bring together high-level representatives from government agencies and development institutions working on weather and climate services to:

- Share information about ongoing national hydromet modernization efforts in the region;
- Identify areas to strengthen regional collaboration and;
- Discuss institutional arrangements needed to sustain and scale up ongoing national and regional efforts in the delivery of hydromet and climate services.

Vision

The Forum was conceived as the first in a series of such consultations that aims to showcase and push ongoing national-level modernization efforts in hydromet service delivery to the next level through regional-level collaboration. Its focus is on bringing together agencies providing and using weather services. As such, it put the issue of service delivery and the need for regional collaboration and innovation center stage. Though narrow in scope, the Forum aims to contribute to building and strengthening a constituency around the development of weather and climate services relevant to the productivity of key climate dependent sectors and impact lives of people in the region on an ongoing basis.

Structure of the Forum

Please see the forum agenda in [Annex 2](#). In general:

- Day 1 emphasized on sharing of information on ongoing modernization efforts in the region.
- Day 2 focused on service delivery in different sectors and on areas and pathways for regional collaboration in the development and delivery of weather and climate services.
- Day 3 brought voices from a broader group of stakeholders including development partners who can support modernization efforts in the region.

Partnerships

The Forum was made possible with the continued support and collaboration of the European Union (EU) and the Global Facility for Disaster Reduction and Recovery (GFDRR). Please see [Annex 4](#) for a full acknowledgements section.

Sessions

The forum had a total of eight (8) sessions with fruitful discussions, presentations, and contributions. Please see following pages for a detailed session by session description.

Outcomes

The Forum provoked a dialogue on how countries can build on linkages and common interests to start closer collaboration. The establishment of this Forum, as the platform for regional exchange, collaboration, and fostering innovation on hydromet, early warning and climate services is an important milestone for the region and its countries. It aims to:

- ✓ Increase the coverage, quality and access to hydromet services and ensuring their sustainability in the region;
- ✓ Strengthen technical, institutional and human capacity at scale for service delivery;
- ✓ Enhance partnerships that translate priorities for regional cooperation into programs and investments, and
- ✓ Strategically position this agenda as the central piece for climate resilient development

The forum's outcomes include a commitment to regional collaboration and priority actions, taking stock of National Meteorological and Hydrological Services (NMHS) strategic plans, pre-identifying priorities for regional collaboration, organizing a technical learning event on

addressing implementation challenges of ongoing hydromet modernization projects, and re-convening for the second SAHF to further the regional dialogue and resilience related agenda. The Outcome Statement is presented in Annex 3. The Forum website: has been established (www.worldbank.org/SouthAsiaHydrometForum).

Session 1: Importance of Hydromet Services in Resilient Development

Date: September 18, 2018

Time: 9:30 – 10:15 am

Chairs:

- Markus Repnik, Director, WMO
- Arati Belle, DRM Specialist and Regional Coordinator for the World Bank's SAR Hydromet, Early Warning and Climate Services program, WB



Speakers:

- Wenjian Zhang, Assistant Secretary-General, World Meteorological Organization (WMO)
- Sameh Wahba, Director, World Bank (WB)
- Dr. M. Rajeevan, Secretary, Ministry of Earth Sciences (MoES), India

Summary

This session highlighted the significant economic and social impact of weather and climate related



disasters in South Asia in the past decades. The intensity and frequency of the extreme weather events is increasing, as well as the losses and number of people affected. Furthermore, new challenges are being created by rapid urbanization, population growth and climate variability, which will require new solutions based on knowledge, investments and partnerships to bring the best of science and service delivery to South Asia. The importance of hydromet services

in South Asia was also discussed given the dependency of the performance of the region's key economic sectors upon weather information-based services. The session recognized that despite demand, access to weather, water, and climate related information services in the region is limited. The importance of regional collaboration in SA was also emphasized, given: (i) the trans-boundary nature of the weather patterns and climate risks, and (ii) the existence of economies of scale in regional collaboration.

The session acknowledged: the ongoing/initiated hydromet modernization efforts supported by World Bank investments and technical assistance in 7 SA countries under the umbrella South Asia Regional Program for Hydromet, Early



Warning and Climate Services; the strong technical role of WMO, and the support provided by India to other countries through regional centers and initiatives.

Key messages

- ✓ Weather patterns and climate risks in SA are trans-boundary requiring a sub-regional or regional approach and response.
 - ✓ Financing is not the only constraint in the development and/or strengthening of NMHS. Knowledge and capacity weaknesses, policy bottlenecks, last-mile service delivery challenges, and poor regional integration also limit the effectiveness of hydromet services.
 - ✓ Two important aspects of regional collaboration include revising policies on data sharing and strengthening capacity building.
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Session 2: Regional Delivery of Early Warnings and Climate Products

Date: September 18, 2018

Time: 10:45 am – 12:30 pm

Chairs:

- Sameh Wahba, Director, WB
- Roberta Boscolo, Climate and Energy Scientific Officer, WMO

Speakers:

- Rupa Kumar Kolli, Chief, World Climate Applications & Services Division (WMO)
- Dr. K. J. Ramesh, Director General, India Meteorological Department (IMD)
- Dr. A. Subbiah, Director, Regional Integrated Multi-Hazard Early Warning System (RIMES)



Summary

This session had a discussion of regional initiatives of the WMO, IMD, and RIMES with attention to regional early warning systems, prior experiences, and the use of innovative systems and emerging technologies.



The WMO Regional Approach for Climate Services in the SA context was briefly presented. The WMO Climate Services Information System (CSIS) is the component of the Global Framework for Climate Services (GFCS) most concerned with the generation and dissemination of climate information; and is considered to be the ‘operational centre’ of the GFCS. The Climate Services Toolkit is developed to aid

the deployment of the CSIS. The WMO Regional Climate Centres (RCCs) provide regional climate products in support of regional and national climate activities. There are currently three RCCs actively involved in supporting SA. To help the RCCs to reach out to the countries, WMO has the Regional Climate Outlook Forums (RCOFs); the RCOF for SA is the South Asian Climate Outlook Forum (SASCOF) established in 2009. On the way forward, WMO is looking at the enhancement of RCC products and services; expanding SASCOF product portfolio (e.g. monitoring, sub-seasonal products, regional climate change); the implementation of National CSIS (including National Climate Forums); and greater and sustained engagement of regional implementation partners (based on the successful experience with RIMES).

IMD shared the experience, knowledge, and best practices of building its multi-hazard early warning systems and impact assessment tools. IMD has been working in the improvement of

different types climate, hydrological, and meteorological models to generate warnings at different levels (local, national, regional-level) and for different sectors. This process has an important participation of different sectors, including agriculture, disaster risk management, and energy, among others. Some of the examples provided included the River Basin Scale Hydrological Response Assessment for Flood Warning, and the South Asia – Regional Flash Flood Guidance System (SAsiaFFGS).

RIMES key services include: observation and monitoring; earthquake, tsunami and ocean services; weather, climate, and hydrological services; impact forecasting and risk based Early Warning Systems (EWS); monsoon forum; and capacity building. The session provided a quick overview of the national and subnational focus of RIMES, and the development and delivery of early warning Decision Support Systems (DSS). DSS tools are developed for different sectors including: agriculture, health, disaster risk management, and water resources. Operational tools in SA countries include SESAME, SMART, FLOOD, CRISH, CDAAS, and Ocean. RIMES is looking at leveraging existing regional institutional resources to ensure cost effectiveness and long term sustainability in the future.

Key messages

- ✓ Regional collaboration in SA is not an option, it is a requirement imposed by nature. It is therefore important to put in place a sustainable and efficient regional mechanism for the delivery of early warnings and climate products.
 - ✓ A focused regional effort would facilitate systematic strengthening of early warning services in a comprehensive manner that would facilitate to the countries in SA the access to regional information as an essential input for national climate services.
 - ✓ WMO has the intention to demonstrate its regional approach in two regions initially, and SA is a prime candidate.
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Session 3: Hydromet Modernization Efforts in the Region

Date: September 18, 2018

Time: 1:30 – 4:30 pm

Chairs:

- Arati Belle, Disaster Risk Management Specialist, WB
- Lars-Peter Riishojgaard, WMO

Speakers:

- Dr. Rishi Ram Sharma, Director General, Department of Hydrology and Meteorology, Nepal (DHM) (via remote connection)
- H. E. Mahmood Shah Habibi, Head of Afghanistan Civil Aviation Authority
- Dr. Ghulam Rasul, Director General and Dr. Muhammad Hanif, Project Director, Pakistan Meteorological Department (PMD)
- Momenul Islam, Deputy Project Director, Bangladesh Meteorological Department (BMD)
- Karma Dupchu, Director, National Center for Hydrology and Meteorology, Bhutan (NCHM)
- M.M.P. Mendis, Deputy Director, Sri Lanka Department of Meteorology
- Thahmeena Abdul Kareem, Assistant Meteorologist, Maldives Meteorological Services



Summary

This session discussed ongoing efforts in the modernization of national hydrometeorological systems and services in the region, with particular focus on identifying challenges.



Strengthening hydro-meteorological services and associated institutions at the country level enhances the provision of essential weather, climate and water-related information and services to the community at large and to key economic sectors. Despite this important mission, many NMHSs face a number of challenges from lack of capacity, massive

underfunding and the failure to appreciate the societal value of the information and services that NMHSs should provide as a public service.

Major disasters in Nepal are flooding, landslide, lightning, droughts and storms. DHM is implementing the *Building Resilience to Climate Related Hazard* project, which includes hydromet modernization investments focusing on institutional strengthening and capacity building; modernization of the observation networks and forecasting; enhancement of the service delivery; and development of an Agriculture Management Information System (AMIS). Major

challenges include sustainability (manpower, operating cost, maintenance), and lack of technical expertise.

In Afghanistan, years of wars have impeded development. However, an initiative to modernize the meteorological service has started 3 years ago, and the government is committed to it, as well as to cooperate with neighboring countries and work with development partners. The speaker informed that a roadmap to support government efforts to strengthen and modernize its hydromet systems and better respond to user needs and requirements has been finalized. The roadmap consists a series of strategic actions at the national level for selected priority regions and a cost-benefit analysis for key sectors. The Government will launch the roadmap at the end of October 2018 with key stakeholders and development partners.

PMD is currently delivering services to different users/sectors including: Aviation Division; Disaster Risk Management Sector; Ministry of Water & Power; National Highway & Motorway Police; Aviation Sector; Planning & Development sector; Ministry of Science & Technology; Ministry of Climate Change; and Ministry of National Food Security & Research, among others. A project is under planning for strengthening of EWS at PMD, which has three main components: (i) Upgrading & Modernization of Observation /Forecasting System, (ii) Institutional Strengthening and Capacity Building, and (iii) Project Management Unit (PMU)-Consultancy & Integration.



The World Bank supported *Strengthening Meteorological Information Services and Early Warning System under Bangladesh Weather and Climate Services Regional Project (BWCSR)*, currently under implementation, intends to Modernize BMD's surface, ocean and upper air monitoring networks, and ICT systems. Some of the project activities include installing automatic weather stations, strengthening six divisional climate centers, establish a national framework of climate, and developing a capacity building training program, among others.

Major hydromet related disasters in Bhutan in the last 25 years are all due to floods (including monsoon, Glacier Lake Outburst, and cyclone induced floods). A road map for modernizing the weather, water, and climate services in the country has been prepared. The roadmap's short-term goals include preparing Strategic Plans based on users needs; strengthening sectoral collaboration and partnership, developing a training and staffing plan; developing regional collaboration plans; and developing education and awareness programs. Some of the medium-term goals are developing hydromet policy and legal framework, strengthening infrastructure and ICT facilities, carrying out a National Water Resources assessment; and improving agromet and aviation meteorological services.

Floods and droughts are the weather-related disasters that have affected more people in Sri Lanka in the last three decades. The Department of Meteorology has prepared a modernization plan to increase quality of services and products, including early warning and tailored services at the national, regional and provincial levels. Currently, the World Bank is supporting Sri Lanka's

Ministry of Irrigation, Water and Resource Management to conduct the required feasibility and economic studies to operationalize its modernization plan.

Main hydromet related hazards in Maldives are: tropical cyclones, heavy rain, flood, thunderstorms, gust winds, tidal waves, and swell waves. The provision of hydromet services in the country face many challenges including lack of an adequate observation network, financial resources, personnel, and expertise.

Key messages

- ✓ Common challenges in the modernization of the NMHSs in the region are related to governance, budget and sustainability, and capacity building.
 - Budget constraints lead to problems with sustainability and the provision of quality products and services. Sustainability issues include the lack of proper operation and maintenance of infrastructure, observation network, and ICT systems; and affects the agencies manpower capacity.
 - NHMs need to establish better partnerships with some of the sectors to determine possible avenues to get financial retribution from the provision of hydromet services (e.g. energy/hydropower sector).
 - There is also a need to show the economic benefit of strengthening the hydromet national services to try to secure adequate recurrent government budget.
 - There is a lack of personnel technical expertise. This reflects the need for capacity building to provide quality services to targeted users of hydromet services (including meeting the requirements of the future demand).
 - Governance common challenges are related to institutional arrangements and national policies.
 - ✓ The current role/engagement of the private sector is limited, but its role is emerging and government are interested in establishing potential partnerships under the technical guidance of WMO and WBG.
 - ✓ All countries in the region consider flood as one of the most concerning natural disasters.
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Session 4: Early Warnings and Disaster Risk Management

Date: September 19, 2018

Time: 9:00 – 10:30 am

Chairs:

- Dr. Subbiah, Director, RIMES
- John Harding, Head, CREWS Secretariat

Speakers:

- Dr. V. Thiruppugazh, Joint Secretary, National Disaster Management Agency (NDMA), India (via remote connection)
- Muhammad Idrees Masud, Chairman, National Disaster Management Agency (NDMA), Pakistan
- Dr. Srikantha Herath, Senior Advisor, Ministry of Megapolis and Western Development, Sri Lanka and D. D. Ariyaratne, Additional Secretary, Ministry of Irrigation and Water Resources Management (MIWRM), Sri Lanka

Summary

This session discussed experiences and lessons learned in the realm of early warning and Disaster Risk Management (DRM) from countries in the region. The NDMA from India compared the differences in disaster preparedness (including early warning) and response among different cyclone events using parameters like human casualties, number



of people evacuated, time needed to clear vital roads, and shelters availability. Some of the aspects highlighted were the importance of: timely issue of warnings and updates; warning dissemination through public media in languages and formats that can be clearly understood by the agencies and communities; DRM policy and legal framework; establishment of appropriate institutional mechanisms; adequate disaster management plans; construction and availability of shelters (at strategic locations) with adequate facilities (e.g. sanitation), and associated access roads; community based disaster preparedness (including awareness campaigns, capacity building to understand risk and warnings, mock drills); and pre-positioning of rescue equipment and teams.



Pakistan NDMA shared its Flood Forecasting and Early Warning System (FFWS) as example of a good EWS practice. Some of the current agencies priorities are relate to: legal and institutional reforms, Multi- Hazard Vulnerability Risk Assessments at Micro Level, risk financing mechanisms (including Macro & Micro level risk insurance mechanisms), developing a

disaster Management Information System, enhancing response and logistic capacities, and implementing building codes.

The Sri Lanka's Basin Level Flood Forecasting System was presented. Limitations of this system includes the inadequate spatial scale of the rainfall forecast (used for flood forecast), which should be area specific. It was also highlighted the issue of interpretation/communication errors in the early warning dissemination process (from forecaster to the general public).



Key messages

- ✓ Appropriate DRM related legal frameworks and institutional mechanisms are essential for disaster preparedness and response.
 - ✓ There is a gap between the meteorological services and the DRM agencies that includes institutional and cultural aspects.
 - ✓ Warnings issued by the meteorological services need to be disseminated in a clear language and format that allows: (i) taking action by the DRM agencies, and (ii) can be understood by the communities at risk.
 - ✓ Community based disaster preparedness is very important (e.g. awareness campaigns, capacity building to understand risk, warnings and contingency plans, mock drills, etc).
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Session 5: Linking Communities to Weather and Climate Service

Date: September 19, 2018

Time: 11:00 – 1:00 pm

Chairs:

- Maxx Dilley, Director, WMO
- Dr. L. S. Rathore, Chair, Inter-Governmental Board for Climate Service

Speakers:

- Dr. Archana Shrestha, Senior Divisional Meteorologist, DHM Nepal (via remote connection) and Mr. Shibnandan Shah, Project Director, Nepal Agromet Information System (NAMIS)
- Dr. Mazharul Aziz, Project Director, Department of Agriculture and Extension, Bangladesh
- Abdul Fattah Tunio, Member, Planning and Development, Sindh
- Dr. Satheesh C. Shenoi, Director, Indian National Center for Ocean Information Sciences
- Dr. Mandira Shrestha, Program Coordinator, River Basins and Cryosphere, International Center for Integrated Mountain Development (ICIMOD)
- Rodica Nitu, Global Cryosphere Watch Project Manager, WMO



Summary

This session focused on the challenges in the in the delivery of hydromet and climate services in various sectors. Some of the challenges in the production of Agromet Advisories & Delivery of Agromet Service in Nepal include weak farmers feedback mechanisms, lack of farmers skills to extract information from national bulleting for their districts, and not enough personnel to meet the user's demand for services. On the way forward, there is also the need to make farmers weather information responsive by training Farmers and district coordinators on weather based agricultural decision.

The Department of Agriculture and Extension of Bangladesh briefly presented the Agro-Meteorological Information Systems Development Project, which is the Component-C of a Bangladesh Weather and Climate Services Regional Project. Some of the highlighted challenges in the implementation of the project include the lack of proper weather observation network spatial coverage, and the lack of sufficient location specific research data.

Urban resilience in the mega city of Karachi in Pakistan (sixth most populous city in the world) faces numerous challenges. The session highlighted the institutional issues, which include constrains in the financial and human resources, overlaps in agencies mandates, and limited institutional coordination. Unplanned urbanization is another compounding challenge.

INCOIS presented about the Indian Ocean observation challenges, highlighting the need to expand the current observation network coverage in several areas (especially in the Western Indian Ocean, Southern Ocean and Eastern Indian Ocean); and the loss of observing systems due to vandalism. This network intends to monitor the Indian Ocean for monsoon, climate change, tsunamis and storm surges.



Regional flood information system and Cryosphere Monitoring in the Hindu Kush Himalaya (HKH) was presented by ICIMOD. Some of the key issues in the HKH region include: the diversity of technical, scientific, and institutional capacity, the limited exchange of real-time data especially across national boundaries. It was also discussed that the integration of risk information into EWS is still weak and

investment in Flood Early Warning Systems (FEWS) is low and of less priority.

The WMO Global Cryosphere Watch is a mechanism to address emerging needs in polar and high mountain regions (e.g. observations gaps, data and information, engagements between scientific and operational communities); and to facilitate the provision of data, information, and analyses on the state of the cryosphere (e.g. Third Pole Regional Climate Centre Network).

Key messages

- ✓ The design and development of hydromet products and services requires constant interaction with, and feedback from the targeted users (e.g. farmers) to properly understand the needs, and to customize products accordingly. At the same time, users need to be educated about the limitations, and the correct use of the products and services provided (e.g. educate farmers about the challenges/limitations of weather forecasts, and how to use it in decision making for their crops).
- ✓ Regional Collaboration is a must to maintain the large Indian Ocean observation network.
- ✓ International data exchange is a challenge, but also an opportunity for regional collaboration.

Session 6: Roundtable on Regional Collaboration - Thematic Areas and Working Modalities

Date: September 19, 2018

Time: 2:00 – 5:00 pm

Chairs:

- Vladimir Tsirkunov, Lead Specialist, WB
- Robert Masters, Director, Cabinet and External Relations Department, WMO

Summary

During this session, permanent representatives of participating countries with WMO and Heads of NMHSs, and other stakeholders discussed on themes and areas that were identified as entry points for potential regional collaboration, and modalities to establish and develop the South Asia peer group on weather and climate services.



The preparation of national strategic plans for the development and strengthening of hydromet services was acknowledged to be an imperative step, with regional collaboration being recognized as important in this effort. The role of regional climate, water, and weather-related entities (some of them represented at the forum) to provide the political support for regional collaboration was proposed. There was a general agreement on the need for regional collaboration in SA, and the need to collectively discuss the details for such collaborative initiatives.



As per the discussions that took place during Day 1 and Day 2 of the Forum participants discussed and agreed on the following common areas for regional collaboration: data sharing and assimilation, legal frameworks, systems sustainability, and capacity building, and sharing of good practices and lessons learned. For instance, the advanced development of agromet services by India was recognized to be potentially useful for other countries like

Nepal. WMO could be a central repository of legal frameworks, as it has been for national data policies of different countries. Representative from Maldives recognized that data assimilation is expensive, and Maldives could rely on products from RIMES and other regional organizations. Representative from Sri Lanka expressed that they could learn from other countries in several aspects like data analysis.

The need for a baseline critical observational system for the region, and the development of impact-based forecast was noted. One proposal was to determine common requirements for all countries in SA, and country specific requirements to establish the type of models, scales, analyses, and forecasting needs. However, every country would need to have a serious commitment to sustain the baseline observational network. Priority was given to the development of Early Warning Systems.



Key messages

- There was strong and broad agreement on the need for regional collaboration in SA, and the need to collectively propose concrete possible next steps.
- Areas for Collaborative action would include, among others,
 - Coordination on information sharing such as atmospheric & oceanic observations, data exchange, data assimilation, modeling, post processing, capacity building related to hydromet modernization for the benefit of all countries in the region both at regional and sub-regional levels;
 - Regional numerical weather prediction and early warning related coordination to increase confidence in the provision of higher quality forecasts related to severe weather events, such as cyclone and storm surges, seasonal (monsoon) and climate (regional drought outlook), utilization of Flash Flood Guidance Systems etc. including operationalizing joint forecasting capacity;
 - Enhancement of service development across timelines (short, medium range; seasonal/climate), and delivery on transboundary early warning and specialized sectoral services for weather dependent sectors. These include agromet, urban met, aviation met, agromet, disaster risk reduction, water and cryosphere, coastal and marine, among several others. This includes development of services and decision support as well as capacity enhancement for users and communities to access and use information in their decision-making;
 - Shared advocacy and strengthening of the enabling environment including legal and regulatory frameworks, budgetary allocations for operational sustainability, introducing/expanding opportunities for innovation and using disruptive technologies, enhancing public-private engagement, developing partnerships with universities and building research programs in collaboration with academic institutions, among others; and
 - Enhancing more gender parity in weather, water and climate services and bringing in inclusive aspects to reflect the needs of diverse populations.

Quotes

- *“The more we work together, the more we have economies of scale”* - Robert Masters
 - *“Weather and climate knows no boundaries, there is need for regional collaboration”* - Lars-Peter Riishojgaard
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Session 7: Development Partner Support for Regional Cooperation

Date: September 20, 2018

Time: 9:30 – 11:30 am

Chairs:

- Arati Belle, WB
- Robert Masters, Director, Cabinet and External Relations Department, WMO

Speakers:

- Robert Saum, Director, WB
- Gemma Tanner, DFID, U.K. and Julian Menadue, UK Met Office
- Ayse Tokar, USAID
- John Harding, CREWS
- Vladimir Tsirkunov, GFDRR, WB
- Christoph Pusch, Practice Manager, WB
- Markus Repnik, Director, WMO



Summary



This session included a broader discussion to better understand the role of development partners for scaled-up, coordinated, sustained and impactful investments in hydromet services. The discussion recognized the risk of overlapping programs and projects when multiple donors are implementing initiatives in the same geographic area; and stressed the importance of coordinated efforts among development partners to ensure complementarity. The Climate Risk Early

Warning System (CREWS) initiative and a new alliance among the World Bank, GCF and WMO were mentioned as examples of coordinated initiatives among development partners, donors and technical agencies. CREWS was launched by a number of countries at the Climate Change Conference of the Parties on Climate Change, in Paris, France, in 2015, to significantly increase the capacity of low-income countries to generate early warning system. World Bank and WMO lead the engagement with countries. The CREWS Trust Fund is managed by the World Bank, while WMO host the Secretariat. The effectiveness of CREWS investments is not only measured against the timeliness and accuracy of the forecasts and warnings issued by national weather and hydrological agencies, they are also measured against the loss of life and livelihoods, thus requirement stronger national institutional procedures to ensure warning are understood, trusted and ultimately acted upon. WMO highlighted its main contribution to hydromet initiatives as expert technical advisor.

The importance of partnerships was widely recognized, and successful examples in the region include the development of agromet services in some of the countries (e.g. Nepal) where meteorological and agricultural services has been working together. It was also note that, although SA is one of the least integrated regions in the world (which particularly affects the poor segment of the population), there are many good examples of its improvement in recent years (e.g. energy sector between India and Nepal, and digital connectivity between Pakistan and Afghanistan).



Key messages

- Development partners should work together to ensure that the hydromet related initiatives and investments in the countries and the region are well coordinated and complementary (avoid overlapping and duplication).
- Partnerships are key for regional collaboration. While partnerships among donors, development partners and technical agencies is key it also needs to happen among national governmental agencies in the countries.