SOUTH ASIA
HYDROMET FORUM

SAHF Strategy 2030 for Observations to Improve Forecasting

Foreword

By the co-chairs of SAHF EC *[To be prepared after approval]*

The Context

As the impacts of weather extremes increase in frequency and severity in South Asia, it is essential that we can provide accurate forecasts and timely warnings that enable early action and response.

Weather forecasting generates significant societal benefits, which can be increased by improving accuracy and lead-time through better meteorological monitoring, modelling and computing. Numerical weather prediction (NWP) across timescales (from nowcasting to climate prediction) forms the basis of most weather and climate predictions and related products and services for decision-making on a day-to-day basis. Significant skill improvements have been accomplished through a combination of ever-increasing computing power, improved models with more accurate representation of atmospheric processes, new techniques and increasingly sophisticated algorithms that ingest ever-increasing volumes of observations into the models, with space-based observations being the most important.

Surface-based observations also contribute substantially to NWP performance, but current availability in Antarctica, Africa, South America, the Pacific and parts of Asia is insufficient. More observations from South Asia would improve global NWP and forecasting quality, particularly in the data-sparse regions themselves, but also over the rest of the globe.

According to the WB study “The Value of Surface-based Meteorological Observation Data” (WB, 2021), it is estimated that improvements in the coverage and exchange of surface-based observations to meet the World Meteorological Organization’s Global Basic Observing Network (GBON) specification can deliver additional global socioeconomic benefits of over $5 billion annually, but this would only be realized if there are many aspects in place in addition to the observation networks. This is a conservative estimate omitting non-financial benefits such as potential lives saved and improvements to well-being, so underestimates the full benefits, particularly for developing countries. Investing in improving surface-based observations in data sparse regions is also highly economically efficient. Assuming sufficient observational

coverage, international data exchange is a very efficient multiplier of the value of observations. However, exchange is currently insufficient across all regions, including South Asia.

Developing, maintaining and operating Observation Networks is a major endeavour in terms of financial, scientific, technical and human resources. Many NMHSs are currently facing reductions in personnel and budget, which constraint their ability to implement, operate and sustain such systems. There have been a number of Development Partners' investments in enhancing the observation networks in a number of countries in South Asia. In addition, the Systematic Observations Financing Facility (SOFF) is providing grant financing and technical assistance for the sustained collection and international exchange of surface-based weather and climate observations according to the Global Basic Observing Network (GBON) standards; however, only four countries in the region are benefitting from SOFF.

The typical observations' related issues in South Asia (and even elsewhere) include:

- Limited number of stations operating in countries;
- Limited number of stations reporting in real- or near-real-time;
- Limited calibration of stations;
- Limited capacity to operate and maintain the stations
- Limited capacity to utilize these data for forecasting within countries (poor models, little or no data assimilation).

In addition, EUMETSAT has re-positioned its Meteosat-9 meteorological satellite over the Indian Ocean; providing crucial data for monitoring severe weather events. In addition, available satellite data in the region from India, Korea, Japan and China are still under-utilized by SAHF members.

Under current Hydromet modernization projects, there is an attempt to address some of these gaps, but there is still the need to further improve through building a pathway through a Strategy and Roadmap that can address these aspects at regional level.

Drivers for regional strategy for NWP

- Under the influence of rapidly changing global warming regime, societies of south Asia in particular are facing an increase in the frequency and intensity of high-impact extreme weather and climate events. Differential incidence of such extremes together with exponential population growth and demographic shifts seen over the 21st century (e.g., urbanization, increase in coastal populations even after threatened by sea level rise) are increasing the detrimental socio-economic and built infrastructure losses.

- Incidental economic shocks that the Governments of South Asia are faced with have also enhanced demands for improved monitoring of disruptive and potential high-impact weather events.
- Innovations in observation, computing, networking, storage, data acquisition and communication technologies are expanding the possibilities of growing role for the private sector involving the weather and climate enterprise.

South Asia's Vision for Observations

In consideration of today's hydrometeorological service landscape, South Asia NMHSs are positioning "Regional integration of high-quality observations to best represent the state of the atmosphere at any place in South Asia and at any time in three dimensions " as its 2030 vision for Observations.

SAHF has been providing a cooperative knowledge transfer and capacity enhancement through DataEx for data exchange of weather and climate monitoring data.

Pillars, goals and strategic actions for building the roadmap 2030

The overarching framework of this strategy consists of three main Pillars: Improved Availability and Quality, Data and Knowledge Exchange, and Integration and Optimal Use. This strategy establishes ten ambitious goals under these pillars (see **Figure 1**) aimed at enhancing observation and monitoring capabilities.

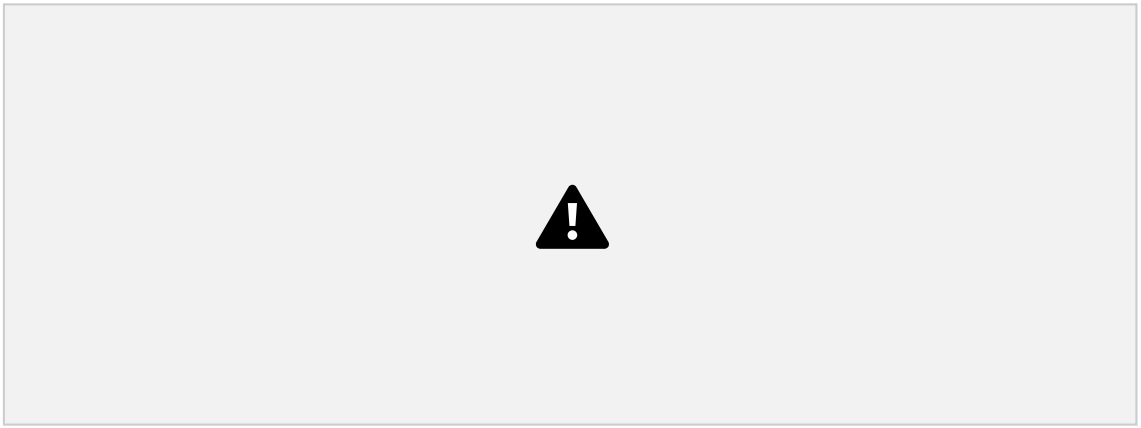

Figure 1 - Framework of the Regional Observations Strategy 2025-2030.

There are three main principles associated with this strategy. First, **collaboration within the region**, which is at the heart of everything we do. Second, **partnerships with the international community**, to support technical assistance for the implementation of activities and capacity building; as well as to fully taking advantage of and enhancing the existing service landscape. Third,

flexibility to account for uncertainties associated with advances in science and technology.

PILLAR 1: IMPROVED AVAILABILITY AND QUALITY

Target 1: Establishing a South Asia Regional Basic Observing Network (RBON) and ensuring calibration facilities in the region.

Goal 1.1: More observations available and shared across the region

Aim 1.1: To establish a South Asia Regional Basic Observation Network (RBON) for improving monitoring, forecasting and application services in

Strategic Actions:

SA1.1.1: Establishing data-sharing agreements and protocols for a South Asia RBON.

SA1.1.2: Implementing a South Asia RBON following the Regional Association II plans.

SA1.1.3: Performing quality control of observations.

SA1.1.4: Capacity building.

Goal 1.2: Reliable observations and calibrated stations in the region

Aim 1.2: Sensors are calibrated as per the WMO standards across the region.

Strategic Actions:

SA1.2.1: Establishing a regional instrument centre as per the WMO standards.

SA1.2.2: Supporting country calibration of sensors at the regional centre.

SA1.2.3: Capacity building.

PILLAR 2: DATA AND KNOWLEDGE EXCHANGE

Target 2: Ensuring operational use of a data exchange platform compatible with international standards, and availability of a pool of observation experts.

Goal 2.1: Robust, cost-effective and agile platform for efficient and easy data exchange compatible with international standards

Aim 2.1: To ensure

Strategic Actions:

SA2.1.1: Strengthening DataEx as the SAHF data exchange platform.

SA2.1.2: Making DataEx compatible with WIS2.0.

Goal 2.2: Pool of experts to support the region in instrumentation and ICT

Aim 2.2: To enhance partnerships and collaborations within the region in instrumentation and ICT in order to support operation and

Strategic Actions:

SA2.2.1: Enhancing partnerships and collaborations with WMO Regional Training Centres (RTCs) within and outside the region and attachment trainings.

SA2.2.2: Supporting secondments of instrumentation and ICT staff to assist in operation and maintenance, while building the capacity of local staff.

PILLAR 3: INTEGRATION AND OPTIMAL USE

Target 3: Optimizing the use of satellite and radar data in the region.

Goal 3.1: Radar composite.

Aim 3.1: To exchange radar data and make available a composite for use by all SAHF members.

Strategic Actions:

SA3.1.1: Establishing radar data-sharing agreements and protocols.

SA3.1.2: Developing a radar composite and making data available through DataEx.

SA3.1.3: Capacity building on manipulation and use of radar composite data.

Goal 3.2: Optimal use of satellite data.

Aim 3.2: To ensure that all available satellite data are available and used by SAHF members.

Strategic Actions:

SA3.2.1: Enhancing partnerships and collaborations with EUMETSAT and available satellite data providers in the region i.e. India, Korea, Japan and China.

SA3.2.2: Capacity building on the use of satellite data.

Goal 3.3: Regional precipitation grid using Public-Private-Partnerships

Aim 3.3: To pilot a regional precipitation grid.

Strategic Actions:

SA3.3.1: Establishing a public-private partnership using commercial microwave links.

SA3.3.2: Developing a pilot a regional precipitation grid to enhance spatial coverage and accuracy of precipitation forecasts.

SA3.3.3: Capacity building on manipulation and use of the regional precipitation grid data.

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