



South Asian Climate Outlook Forum (SASCOF-4)

Kathmandu, Nepal, 18-19 April 2013

Consensus Statement

Summary

A consensus outlook for the 2013 southwest monsoon rainfall over South Asia was developed, through an expert assessment of the available indications. The outlook was prepared based on the various prevailing global climate conditions and forecasts from different empirical and dynamical climate models. It is recognized that there is uncertainty partly because of spring-time predictability limit and partly due to likely absence of any strong forcing from the Pacific or the Indian Ocean during the monsoon season. The consensus outlook indicates that the large-scale summer monsoon rainfall for South Asia and the season (June – September) as a whole will most likely be within the normal range with a slight tendency towards the higher side of the normal range.

In terms of spatial distribution of rainfall, the more likely scenario is for below normal rainfall over some areas of northwestern and southern parts of South Asia and for above normal rainfall over some areas along the Himalayan region. Rainfall conditions close to the long-period average are more likely over the remaining parts.

For more information on the summer monsoon outlook and further updates on national scale, the relevant National Meteorological and Hydrological Services should be consulted.

Verification of consensus outlook statement of 2012:

The consensus outlook for the summer monsoon season (June to September) of 2012, developed in the third session of the South Asian Climate Outlook Forum (SASCOF-3) had indicated that summer monsoon rainfall over South Asia as a whole during 2012 was most likely to be within the normal range with a slight tendency towards below normal . The observed rainfall over the region as a whole during the 2012 summer monsoon was normal but in the lower side of the normal limits, in general agreement with the forecast. The spatial distribution of the observed 2012 summer monsoon rainfall over the region also matched the pattern in the forecast, with below normal rainfall conditions over some parts of northwestern and southern parts of South Asia and normal rainfall over the remaining parts of South Asia.

Introduction:

The fourth session of SASCOF (SASCOF-4) was held at Kathmandu, Nepal, hosted by the Department of Hydrology and Meteorology (DHM), Nepal during 18-19 April 2013. SASCOF-4 was preceded by a 3-day (15-17 April, 2013) capacity building training workshop on “Long Range Prediction of Southwest Monsoon Rainfall” for participants from the South Asian countries. The training workshop was attended by representatives from 8 South Asian countries, namely, Afghanistan, Bangladesh, Bhutan, Maldives, Myanmar, Nepal, Pakistan and Sri Lanka. One representative each from the SAARC Meteorological Research Center (SMRC), Dhaka and the APEC Climate Center (APCC), Korea also participated in the training workshop. International experts from the World Meteorological Organization (WMO), UK Met Office (UKMO), Météo France, Japan Meteorological Agency (JMA), the India Meteorological Department (IMD), and the Indian Institute of Tropical Meteorology (IITM), Pune organized, facilitated and delivered the training. SASCOF-4 was co-sponsored by WMO through the funds provided by the United States Agency for International Development (USAID), with technical coordination by IMD and logistic coordination by DHM.

In SASCOF-4 (18-19 April 2013), the above experts as well as experts from Beijing Climate Center (BCC), Regional Integrated Multi-hazard Early Warning System for Africa and Asia (RIMES), Thailand and scientists from different research institutes within the host country including the DHM, The International Centre for Integrated Mountain Development

(ICIMOD) and Tribhuvan University took active part in deliberations for assessing the available forecast information and for finalizing the consensus outlook for the summer monsoon rainfall over South Asia. Forecasts from National Centers for Environmental Prediction (NCEP), USA, Météo France, UK Met Office (UKMO), European Centre for Medium Weather Forecasting (ECMWF), Canadian Meteorological Centre (CMC), Bureau of Meteorology, Australia, International Research Institute for Climate and Society (IRI), USA, WMO's Lead Centre for Long Range Forecasting - Multi-Model Ensemble (WMO LC-LRFMME), Japan Agency for Marine-Earth Science and Technology (JAMSTEC), APCC, JMA and CPTEC, Brazil etc. were also considered for preparing the consensus forecast.

The Forum deliberated on various observed and emerging climatic features that are known to influence the performance of the monsoon, such as sea surface temperature (SST) conditions over the equatorial Pacific and the Indian Ocean, winter and spring northern hemisphere (NH) snow cover and land surface temperature anomalies. The key features of these conditions are as follows:

Sea Surface Conditions over the Pacific Ocean

The 2011-2012 weak/moderate La Niña event dissipated in the early part of April 2012 and ENSO neutral (neither El Niño nor La Niña) conditions prevailed till June 2012. Subsequently borderline El Niño sea surface temperature (SST) conditions were observed across the equatorial Pacific for a brief period between July and September 2012. Neutral conditions returned during October and have continued till the early part of April 2013. The latest forecasts from a large number of dynamical and statistical models favour (about 60% probability) ENSO neutral conditions to continue during the monsoon season. However, for the latter part of the season, a few statistical models suggest the possibility of weak La Niña ocean conditions, while a few dynamical models suggest weak El Niño conditions (up-to-date information about ENSO is available in the WMO ENSO update, at http://www.wmo.int/pages/prog/wcp/wcasp/enso_update_latest.html). If ENSO neutral conditions prevail during the summer monsoon season, as most models indicate, there is little scope for typical ENSO impacts on the regional rainfall activity.

Conditions over the Indian Ocean

It is important to note that, in addition to ENSO events, several other factors such as the Indian Ocean SSTs also influence monsoon performance. Currently, positive SST anomalies are observed over most areas of the tropical Indian Ocean except over some parts of central Bay of Bengal and northwestern Arabian Sea. Relatively larger positive SST anomalies are observed over western and eastern equatorial regions. Recent forecasts from many coupled models favour development of a weak negative Indian Ocean Dipole (IOD) event during the NH summer, with a peak during the NH autumn. In general, a negative IOD weakens the monsoon. But as the negative IOD is likely to evolve only in the last part or after the monsoon season, it is unlikely to have much impact on monsoon circulation, at least in the early part of the monsoon season.

Snow Cover over the Northern Hemisphere

Since October 2012, the snow-covered area averaged over the NH has been normal to above normal with highest anomalies observed during December 2012. The NH snow cover during winter and spring has a negative relationship with the subsequent Asian summer monsoon.

Consensus Outlook for the Summer Monsoon Rainfall over South Asia:

A consensus outlook for summer monsoon rainfall over South Asia was prepared based on the expert assessment of prevailing large-scale global climate indicators mentioned above, experimental models developed during capacity-building workshops conducted for the South Asian countries in association with the previous and the current SASCOF sessions, and experimental as well as operational long-range forecasts based on statistical and dynamical models generated by various operational and research centres of the world.

There was consensus among the experts about the existence of large uncertainty in the forecast information, partly due to well-known spring-time predictability limitations and partly to the likely absence of any strong forcing from the Pacific or the Indian Ocean during the monsoon. However, in the relatively less likely scenario of extreme sea surface temperature conditions developing over the Pacific and/or the Indian Ocean, particularly related to ENSO (El Niño or La Niña), such a situation could have implications for the Indian

summer monsoon, and there is therefore a need for continued monitoring of these conditions.

The outlook for summer monsoon rainfall over South Asia, shown in Fig. 1, illustrates the most likely categories over the region, as well as the probabilities for each tercile category¹. The tercile probabilities were derived by synthesis of the available information and expert assessment.

The outlook suggests that over South Asia, and for the season as a whole, the large-scale summer monsoon (June to September) rainfall would most likely be within the normal range with a slight tendency to be in the higher side of the normal range. There is slightly enhanced likelihood of below-normal rainfall conditions over some broad areas of northwestern and southern parts of South Asia and above-normal rainfall over some regions close to the Himalayas. Rainfall conditions close to the normal are more likely over the remaining parts of South Asia. However, the forecast signals are rather weak.

For more information on the summer monsoon outlook at national scale and for further updates, the relevant National Meteorological and Hydrological Services should be consulted.

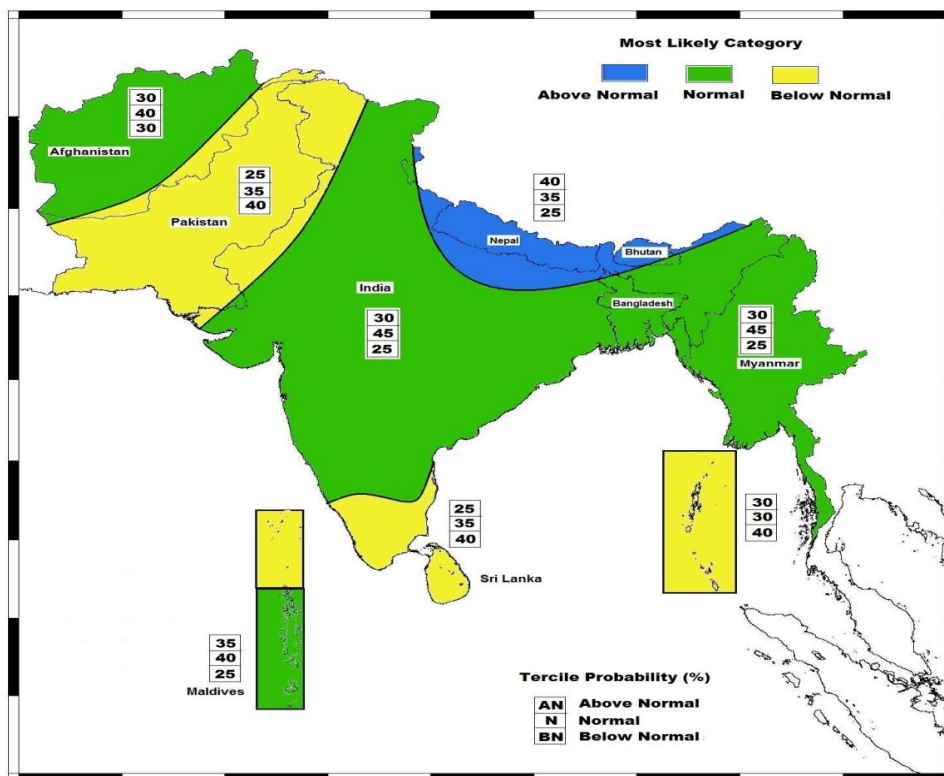


Fig.1. Consensus outlook for 2013 Southwest Monsoon Rainfall over South Asia.

¹Tercile categories have equal climatological probabilities, of 33.33% each.

Background of SASCOF

Climate predictions are of substantial benefit to many parts of the world in risk management and adaptation to the impacts of climate variability and change. Recognizing this, regional climate outlook forums (RCOFs) were conceived with an overarching responsibility to produce and disseminate a regional assessment of the state of the regional climate for the upcoming season. Built into the RCOF process is a regional networking of the climate service providers and usersector representatives. In Asia, China has been coordinating the 'Forum on Regional Climate Monitoring, Assessment and Prediction for Regional Association II' (FOCRA II) since 2005, covering the entire Asian continent.

Asia is a large continent with large differences in the climatological settings on sub-regional scales. Therefore WMO's Regional Association II (Asia) recommended sub-regional RCOFs devoted to specific needs of groups of countries having similar climatic characteristics. Implementation of the South Asian Climate Outlook Forum (SASCOF) in 2010 is a step in that direction with specific focus on the climate information needs of nations affected by the Asian southwest monsoon climate. The long-term historical patterns of the summer monsoon rainfall over South Asia (Fig.2), characterized by remarkable spatial variability, provide the general reference points at the respective locations for the rainfall anomalies indicated in the outlook.

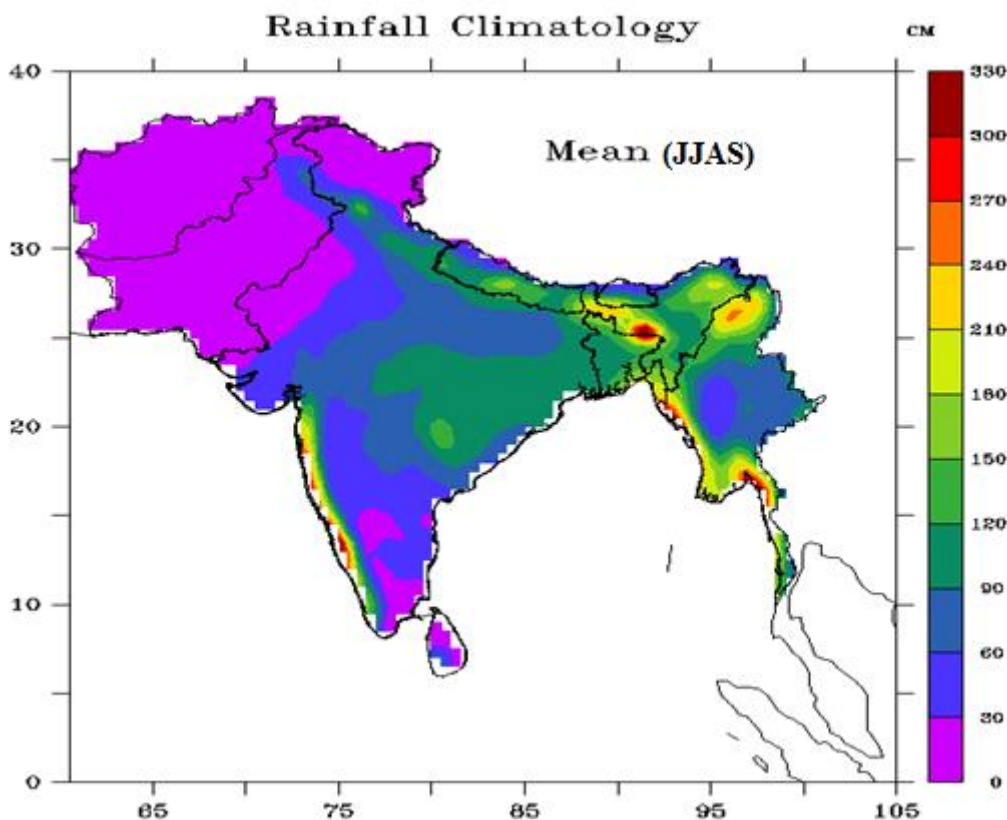


Fig.2 Rainfall Climatology over South Asia (Source: APHRDITE's Water Resources home page, <http://www.chikyu.ac.jp/precip/>]