

WATER LEVELS DIP IN INDIA'S RESERVOIRS



Tehri dam and reservoir (Image by Ministry of Water Resources, Government of India)

India's reservoir water storage levels are down 15% since last year, intensifying concerns over declining water availability in the country, particularly north India. The figures by the Central Water Commission (CWC) also mirror anxiety over water security in India as well as in other countries in the Hindu Kush-Himalayan region where increased glacial melting is projected to affect water availability in coming years.

According to the latest CWC reservoir bulletin on January 1, there is 89.947 billion cubic metres (BCM) water in the country's 85 major reservoirs – 85% of the storage in the corresponding period last year.

More alarmingly, the storage recorded is only 58% of the total storage capacity of all the reservoirs. The “overall storage position” is also “less than the average storage of last ten years during the corresponding period”, the bulletin states.

The chief deficit regions cover most of the country – most of the northern as well as the central, eastern and western regions. Only the three southern states of Karnataka, Kerala and Tamil Nadu recorded more reservoir stored water compared to the corresponding period last year while the Himalayan state of Uttarakhand was the only one to have maintained status quo.

The northern region, which includes the states of Himachal Pradesh, Punjab and Rajasthan, has six reservoirs with capacity of 18.01 BCM. Of this only half – 49% or 8.88 BCM – was filled at the beginning of this year.

Similarly, the western region, which includes the states of Gujarat and Maharashtra, has 22 reservoirs with total storage capacity of 24.54 BCM. The storage recorded on January 14, 2015

is 14.48 BCM, 59% of the reservoirs' total capacity and less than both the previous year's figures as well as the average of the last 10 years.

The eastern region, including Jharkhand, Odisha, Tripura and West Bengal, has 15 reservoirs with total storage capacity of 18.83 BCM. The current water stored is 13.61 BCM, or 72% of the total. This is less than the corresponding period of 2014 but higher than the average storage of the last 10 years.

The central region, which includes Uttar Pradesh, Madhya Pradesh and Chhattisgarh, has 12 reservoirs with total storage capacity of 42.30 BCM. The stored water available is 28.64 BCM, or 68% of their total storage capacity of these reservoirs. Here, as in the case of the eastern region, the storage during the current year is less than the storage of last year but better than the average storage of last 10 years.

Himanshu Kulkarni, executive director of Pune-based Advanced Centre for Water Resources and Management (ACWADAM) said, "The decline in reservoir storage could be a consequence of many factors, both natural and anthropogenic because the inflow into a reservoir depends upon the precipitation (snow, hail and rain) as well as the state of the catchment. Outflows, similarly could be natural – infiltration and leakage – and human-driven in the form of releases and pumping."

"It is a complex situation," said Himanshu Thakkar, who heads the Delhi-based NGO, South Asia Network on Dams, Rivers and People (SANDRP). The CWC data on 85 reservoirs, Thakkar told thethirdpole.net, "gives a limited picture" as it represents barely 1.5% of the over 5,000 large reservoirs and hundreds of thousands of small, medium and big dams in the country.

Six months ago, in May 2014, the CWC had warned of declining water reserves across India. Analysts had noted at the time that a decline in water storage was expected during the hot summer months ahead of the monsoon. Traditionally, water levels pick up during the monsoon period, especially the peak July-August period.

But that didn't happen. Two months later – almost midway into India's monsoon season from June to September and with the India Meteorological Department (IMD) forecasting a weak monsoon – the CWC's figures showed continuing low storage levels.

According to Thakkar, India in 2014 recorded two deficit monsoons for the first time in 10 years – the main southwest monsoon with a 12.3% deficit, and the retreating northeast monsoon with 33%. This would have exacerbated the water deficit.

In Thakkar's view, reservoir storage capacity should not be viewed in isolation as it is linked to groundwater availability and use. "So much water is being used upstream of rivers that it will

impact flows downstream, which in turn will impact storage reservoirs,” he said, adding that downstream reservoirs do not get filled.

India, he said, was building too many storage reservoirs, “beyond the hydrological carrying capacity of river basins.”

“The relationship between reservoir storage and aquifer storage is complex and is a function of many factors, the foremost being the characteristics of aquifers and the extent to which these are used,” says Kulkarni, who was member of a working group on sustainable groundwater storage at India’s erstwhile Planning Commission. Local and regional geology also plays a role. A compounding factor is the increasing instances of floods in the country. Hydrology experts caution that floods aggravate groundwater scarcity as more water is lost during rapid run-offs instead of rainwater seeping into the soil and aquifers. Key Indian Himalayan states have been witnessing devastating floods in recent years – Uttarakhand in 2013 and Himachal Pradesh and Jammu and Kashmir in 2014.

The decline in reservoir water adds to the growing concern over depleting groundwater in northwest India, mainly due to over-exploitation. In 2009, a satellite-based study by US scientists published in *Nature* warned of over-exploitation of groundwater.

“Groundwater depletion was equivalent to a net loss of 109 cubic km of water, which is double the capacity of India’s largest surface-water reservoir,” stated the team, comprising scientists from the US National Aeronautics and Space Administration (NASA), University of California, California Institute of Technology and University of Italy. The study covered the period of August 2002 to October 2008.

Annual rainfall was close to normal during the study period, it said. “Although our observational record is brief, the available evidence suggests that unsustainable consumption of groundwater for irrigation and other anthropogenic uses is likely to be the cause.”

“If measures are not taken soon to ensure sustainable groundwater usage, the consequences for the 114,000,000 residents of the region may include a reduction of agricultural output and shortages of potable water, leading to extensive socioeconomic stresses,” it cautioned.

The International Water Management Institute (IWMI) too argues for a rethink on water storage policies and says a mix of storage options, including aquifer recharge, restoring natural wetlands, enhancing soil moisture, and small ponds and tanks should complement reservoir storage to increase water availability.

Experts highlight the crucial role of water storage in coping with variations in water supply and demand, supporting agriculture and livestock production during dry spells and generating power.

A 2010 report by IWMI says that per capita water storage is lower in Africa and Asia compared to other regions and lack of water storage infrastructure is a major constraint to poverty alleviation and economic development in many developing countries.

Rainfall apart, the additional important factor affecting water storage in reservoirs globally is sediment deposition. In September 2013, a team of Dutch, German and American scientists reported in the Water Resources Research journal that “the storage capacity and the lifetime of water storage reservoirs can be significantly reduced by the inflow of sediments.”

The team estimated the loss in reservoir capacity for a global data set of large reservoirs from 1901 to 2010 using data from computer-modelled sediment fluxes. It also used population data sets as a proxy for storage demand to calculate storage capacity for all river basins globally.

Their study identified major river basins in India and China among “most vulnerable”.

It said the declining net reservoir capacity as result of sediments deposits – estimated at about 5% of the installed capacity – challenges the sustainable management of reservoir operation and water resources management in many regions.

Source : <http://www.thethirdpole.net/water-levels-dip-in-indias-reservoirs/>