

SW-BBMB-1 Assessment of the effects of sedimentation on the capacity/life of Bhakra Reservoir (Gobind Sagar) on River Sutluj and Pong Reservoir on River Beas
National Institute of Hydrology, Roorkee and BBMB

Objectives

Deposition of sediment in reservoirs can reduce their storage capacity and reduce their useful operational life. Reservoir management may be assisted by greater understanding of sediment inflow rate and by improved knowledge of where within the live and dead storage sediment is being deposited. The PDS sought to investigate:

- i. Estimate sediment inflow rates to Bhakra and Pong reservoirs by three separate methods, which were compared against existing hydrographic survey data:
 - Remote sensing of reservoir water area and deducing volumes lost by sedimentation,
 - Use of sediment rating curves to estimate sediment inflows from inflow rates, and
 - Use of the SWAT model on downstream parts of the Beas and Sutluj catchments to estimate sediment rates.
- ii. To use the increased knowledge of sediment inflows to improve management of the two reservoirs.

Results and Recommendations

- i. For Pong Reservoir remote sensing estimated the sediment inflow as 19.8Mm^3 annually and the hydrographic method measured it as 19.9Mm^3 ; a very good agreement.
- ii. The corresponding figures to Bhakra Reservoir were 18.1Mm^3 and 22Mm^3 a poorer agreement. However, a previous study by the HP Department of Forestry and Conservation in 1986 had estimated sediment inflow to Bhakra as $35.8\text{Mm}^3/\text{annum}$ and average depth of 50cm within the reservoir.
- iii. The SWAT method provided good results but requires considerable data and judgment of parameter values. The SWAT model tends to underestimate sediment inputs as it models suspended sediment only and cannot quantify bedload.
- iv. Remote sensing gives good estimates of sediment deposition in the live storage zone of reservoirs but cannot quantify sedimentation losses to dead storage.