



## **The impact of dam construction on hydro-geomorphology of Sefidrud river (Iran)**

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The second longest river in Iran Sefidrud, have been regulated by the Sefidrud hydropower dam (1.8 km<sup>3</sup>) to irrigate 240000 ha fertile lands in north of Iran. The river transport large amount of sediment and reservoir sedimentation is a major challenge in the reservoir operation (annual sediment inflow is 43 Mt (megatonne)). During 1963-1982, about 41% of initial storage capacity of reservoir was lost and a sediment flushing operation has since been established. In this paper, the impact of dam on river regime and geomorphology of Sefidrud River below dam is studied. Changes in the river morphology, hydrology and sediment yield were evaluated using remote sensing technique and observational data at Rudbar and Astaneh stations. The hydrologic assessment shows, that after dam construction the magnitude of extreme floods reduced 58% to 79% for 2 to 10000 year return periods. In addition, meeting irrigation demand during low natural flow by storing water in winter and spring changed the river geomorphology as seen in changes in river width, slope and meandering patterns. During normal dam's operation (before sediment flushing period 1963-1980) a main part of annual sediment yield was stored in the reservoir and only 5.1 Mt of sediment released by the dam's outlet, while during flushing period (1980-1995) the mean annual sediment transport was 53Mt. The sediment concentration below the dam during normal operation varied between 0.6 – 4 g/l (inflow was 13-19 g/l) while during initial months of flushing period was reached to 40 g/l. During normal operation, reducing the amount of transported sediment lead to eroding river bed and an increase in the suspended load at the downstream station from 23.45 Mt at Rudbar station close to the dam to 35.15 Mt at Astaneh station downstream. In contrast, after the flushing period, the erosion process was switched to sedimentation process along the river and reduction in the suspended load was observed from 58.5 Mt at Rudbar to 25.57 Mt at Astaneh.