

An Assessment of Bathymetric Changes in the Lower Usuma Reservoir, Abuja, Nigeria

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Abstract : Siltation is a serious problem that affects public water supply infrastructures such as dams and reservoirs. It is a major problem which threatens the performance and sustainability of dams and reservoirs. It reduces the dam capacity for flood control, potable water supply, changes water stage, reduces water quality and recreational benefits. The focus of this study is the Lower Usuma reservoir. At completion the reservoir had a gross storage capacity of $100 \times 106 \text{ m}^3$ (100 million cubic metres), a maximum operational level of 587.440 m a.s.l., with a maximum depth of 49 m and a catchment area of 241 km² at dam site with a daily designed production capacity of 10,000 cubic metres per hour. The reservoir is 1,300 m long and feeds the treatment plant mainly by gravity. The reservoir became operational in 1986 and no survey has been conducted to determine its current storage capacity and rate of siltation. Hydrographic survey of the reservoir by integrated acoustic echosounding technique was conducted in November 2012 to determine the level and rate of siltation. The result obtained shows that the reservoir has lost 12.0 meters depth to siltation in 26 years of its operation; indicating 24.5% loss in installed storage capacity. The present bathymetric survey provides baseline information for future work on siltation depth and annual rates of storage capacity loss for the Lower Usuma reservoir.

Keywords : sedimentation, lower Usuma reservoir, acoustic echo sounder, bathymetric survey

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