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Life of cement nala bund in Hanjagi watershed

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ABSTRACT : Three cement nala bunds in the village Hanjagi, Tal. Akkalkot, Dist. Solapur were selected for estimation of storage life of cement nala bund in the year 2006. The experimental site Hanjagi watershed is located at 35 km away from Solapur on Solapur-Akkalkot road (diversion from Walsang 10 km). The average annual rainfall of the site is 645 mm. The sediment volume distributed in cement nala bunds was computed by using area –increment –method based on the assumption that the area curve, after sedimentation will be parallel to the original curve. The initial storage capacity of CNB-1, CNB-2 and CNB-3 were 2.699, 3.698 and 4.723 TCM. After completion of six years, the sediment deposited in CNB-1, CNB-2 and CNB-3 were 1867.64 m^3, 1201.30 m^3 and 4103.60 m^3, respectively. Hence, the useful capacity of CNB-1, CNB-2 and CNB-3 were reduced by 69.2 per cent, 32.5 per cent and 83.1 per cent, respectively. The sediment of 172.53 cu. m in the year 2011 was removed from CNB-3 which increased the storage by 3.7 per cent. The storage capacity of CNB-3 was reduced more followed by CNB-1 and CNB-2 according to length of nala *i.e.* 430 m, 360 m and 180 m, respectively and also one big stream and one small stream meet the CNB-3.

KEY WORDS : Life, Cement nala bund, Storage capacity

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The rainwater conservation structures are integral part of soil and water conservation programmes and also important component of the watershed development and management programmes. The management of watershed can be viewed as planning and executing the action plan for sustainable development of watershed with minimum hazard to land and water resources of watershed. Since 1983, almost all the development works pertaining to natural resources are being carried out on watershed basis in Maharashtra (Patil, 2003). The water harvesting structures not only control the erosion but also conserve the water. Gule *et al.* (2006) opined that, 117.25 tonnes of soil has been arrested in the nala bund during the period from 1999 to 2002 which has been prevented from going out of watershed alongwith runoff water. Recharging of ground water storage can be effectively done by *in situ* rain water conservation as well as construction of percolation tanks, nala bunding, cement nala bunds, etc. to ensure sustained agricultural production. Nala bunding is one of the important activities of the comprehensive watershed development programme in Maharashtra. Nala bunds are embankments constructed across the nala for storing runoff water, increasing water percolation and improving soil moisture regimes. Embankments which are made of stone masonary are called cement nala plug / bunds.

An estimated average annual soil loss rate of 16.4 t/ha/year on all India basis works out to 5380 Mt soil loss annually. Most of this erosion leads to problems of deposition of silt in reservoir thereby reducing its capacity and useful life. This causes deposition in the large rivers, which leads to reduction in stream slope and this in turn causes problems of flood on banks during high discharge (Atre *et al.*, 2008). The soil loss to a tune of 12626.95 tonnes was estimated to be lost from the croplands of the Kandhamal district at the rate of 94.23 t/ha. It was observed that more soil is eroded from the areas where the land surface is left uncovered in the peak soil eroding season from June to September (Dwitirkishna *et al.*, 2009)

The ultimate destiny of all reservoirs is to get filled with sediment. If the sediment inflow is large in comparison to the reservoir capacity, the useful life of the reservoir may be very short. Jadhav *et al.* (2009) found that the storage capacity of the cement nala plug was reduced by 2.16 per cent in 5 years due to silting with sit retention rate of 24.124 tonnes/year.

Considering the importance of sedimentation, the study was initiated in the year 2006 to determine the annual sediment deposition in cement nala bund. The experimental site is located at Hanjagi watershed, 35 km away from Solapur on