

## Comparative Benefit-Cost analysis to evaluate most appropriate material for canal lining: Case Study of Neera Devdhar Canal

**Problem statement:** Water flowing in canals is prone to seepage and evaporation losses.

Seepage losses are dependent on channel geometry while evaporation losses are proportional to area of free surface. Increased seepage losses in unlined canals may lead to rise in water table, resulting in waterlogging and soil salinity. This would reduce cultivable area and may further need installation of costly drainage systems.

**Intervention:** The benefits of canal lining and corresponding B-C ratio were evaluated in Neera Devdhar canal. The results obtained upon lining are as follows:

	HDPE + Concrete	HDPE + Shotcrete	IITD + Concrete	IITD + Shotcrete
B/C ratio	10.43	7.33	9.59	6.88

- Seepage losses were found to reduce by 70% upon lining with concrete while they reduced by 90% when lined with shotcrete. However, these materials would also require continuous maintenance due to expansion and contraction of cracks.
- The study concluded HDPE sheets as best option for lining to aid in reducing seepage losses from lining cracks. Subsidies are also provided by the government to use these sheets for lining.
- Concrete and shotcrete may be used as covering, towards protecting HDPE from damages.
- Further, sensor system (Radar/ bubbler) may be used to evaluate discharge at different sections of canal. This could aid in locating section-wise seepage losses.

**Impact:** With the help of HDPE sheets and sensor system, seepage losses in canal may reduce up to 100%. This would lead to increase in command area, reduce requirement for maintenance and increase channel capacity.

*(Reference: Kadu, Rajmane and Hailkar (2017), 'Case Study of Neeru Devdhar canal seepage losses and canal lining', International Journal for research in applied science and engineering technology.)*