

# Smart and Green Life Cycle Solutions for Civil Infrastructure



Intensive development of civil infrastructure worldwide has created persistent problems with:

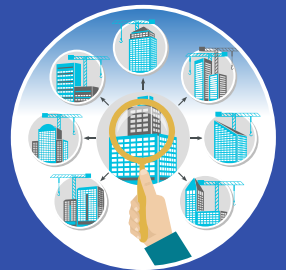
- Soil and groundwater contamination
- Structural support and issues with underground excavation
- Safety and stability of infrastructure over the life cycle



Overcoming the challenges of built infrastructure calls for sustainable, resilient, and long-term solutions

This ASCE collection highlights state-of-the-art research on resilient, sustainable, and green technologies for built infrastructure based on:

- On-site observations
- Theoretical analysis
- Mechanical testing



## Interventions for soil and groundwater conservation

### Microbially induced calcite precipitation (MICP)

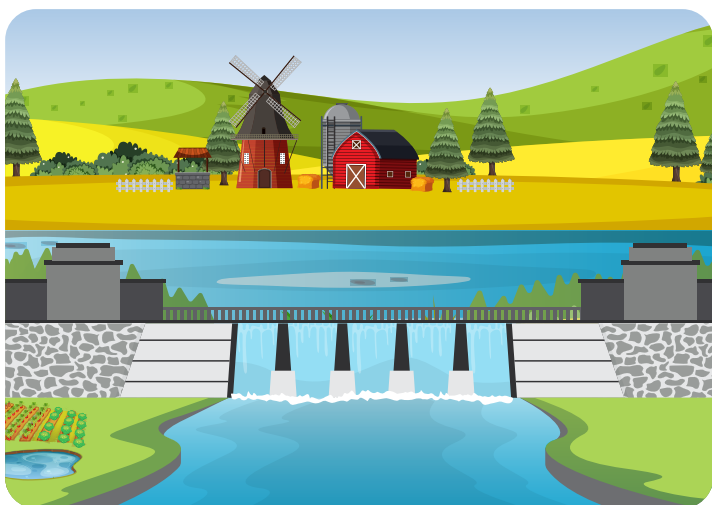
Biotreatment to introduce  $\text{CaCO}_3$



- Increased soil strength
- Decreased rainfall infiltration rate



Mitigates rainfall erosion of slopes



### Soil and water conservation structures for drought-prone regions

Small capacity dams, recharge shafts, continuous contour trenches, farm ponds, percolation tanks, and gabion walls



- Improved crop yield
- Increased water table and rainwater harvesting
- Better quality of life

Through state-of-the-practice case studies, this special collection highlights the importance of reducing imperviousness and preserving natural open spaces throughout watersheds and at the neighborhood scale, as well as the necessity of adding green infrastructure practices at the site level



Insights from successful on-site projects underscore the benefits of using smart and green infrastructure approaches to improve the sustainability and life cycle of infrastructure projects