Food and Agriculture Organization of the United Nations

Consiglio Nazionale delle Ricerche

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Istituto di Ricerca sugli Ecosistemi Terrestri

FAO GREEN CITIES INITIATIVE

SUITMA 13 PISA 2025

International Union of Soil Sciences

Renaturalization of Urban and Peri-urban Spaces

Maxine J. Levin
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GLOBAL SYMPOSIUM ON SOIL SEALING AND URBAN SOILS

Healthy soils for healthy cities

Management of park areas, sport fields, and school yards, including golf courses and public right of ways

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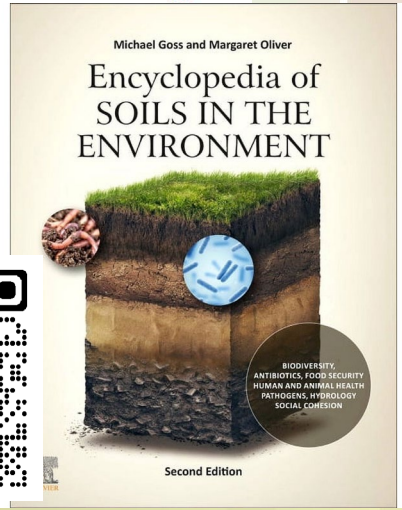
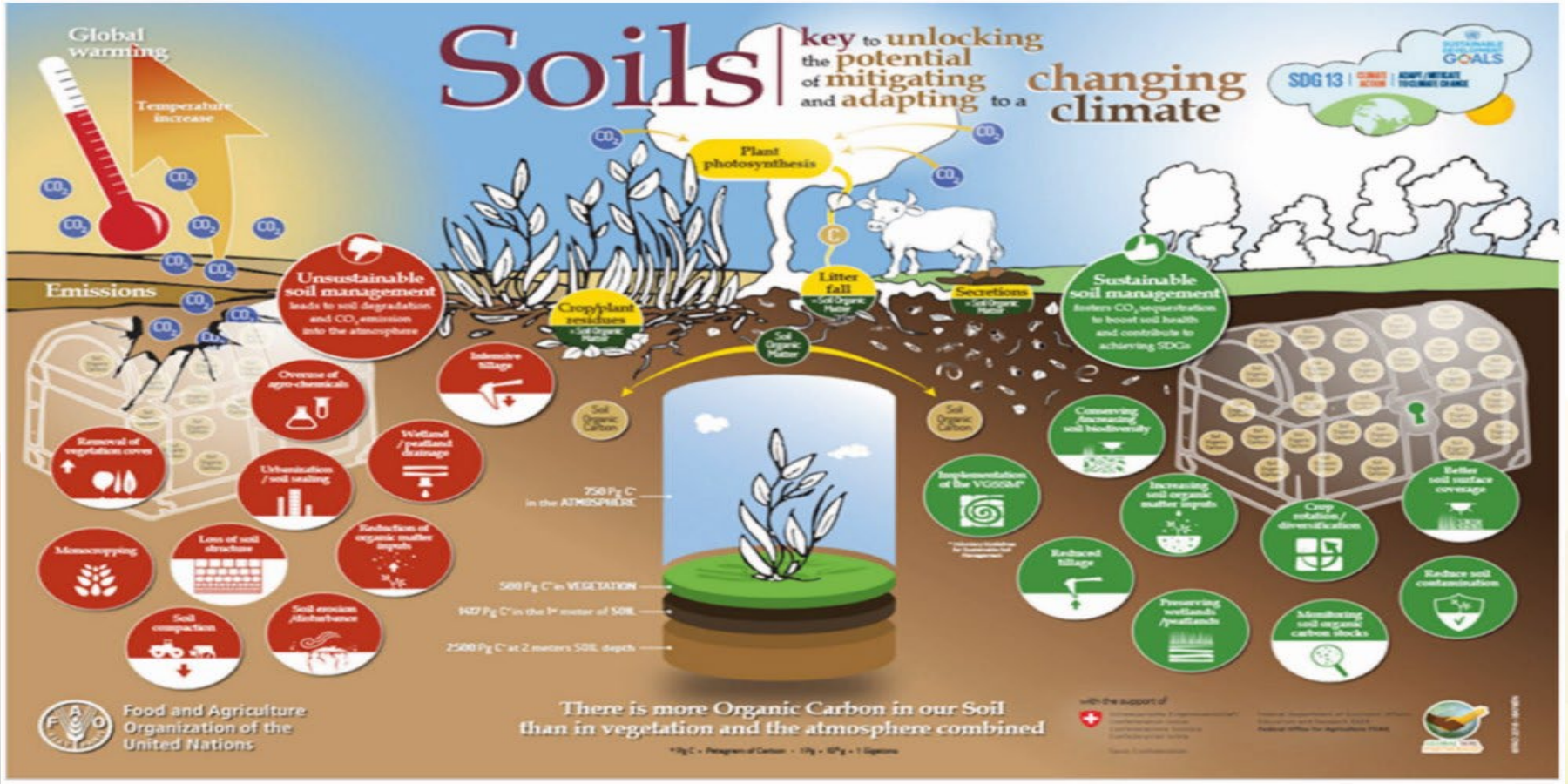


Sealing into Greening—IUSS SUITMA



Effective strategies for reintroducing natural functions

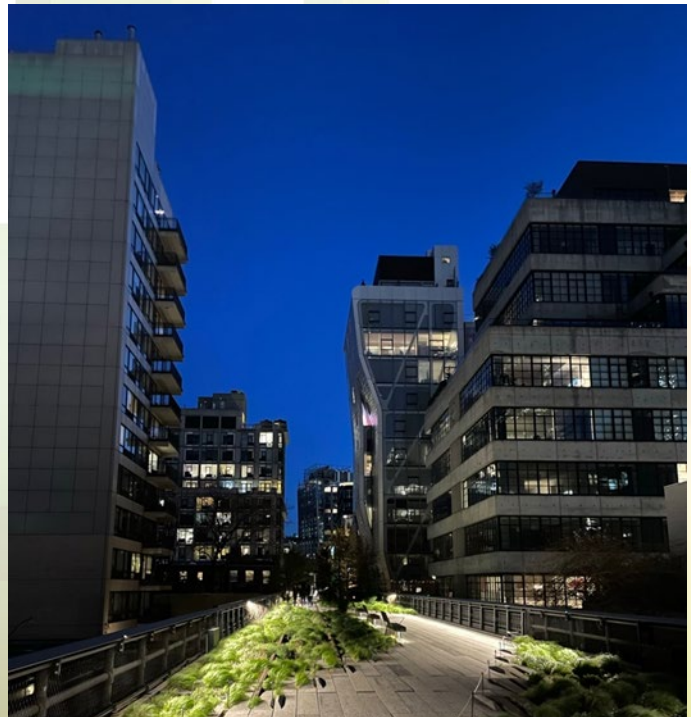
1. **De-Sealing and Physical Soil Restoration**
2. **Biological Remediation and Biodiversity Enhancement**
3. **Implementation of Green Infrastructure (GI)**
4. **Soil Translocation and Engineered Substrates**

The High Line Project—New York City USA

- Abandoned elevated railway viaduct
- Green Roof system to restore natural functions
- Organic management to enhance biodiversity

The High Line Project –New York City USA

Liabilities into assets

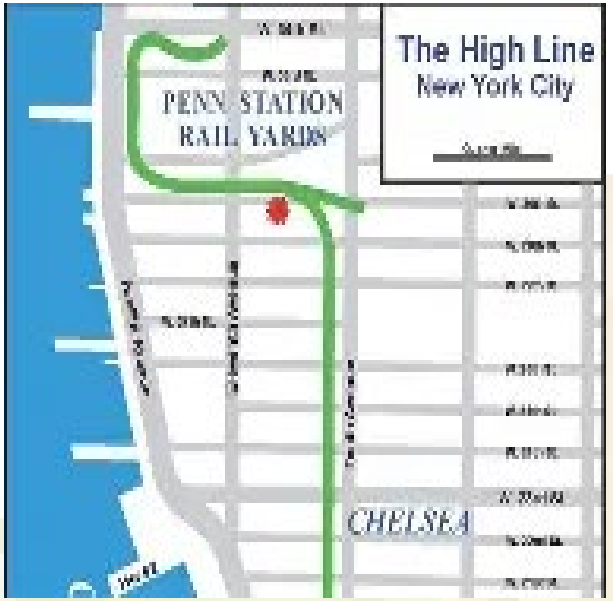


Mainstreaming These Strategies in City Planning

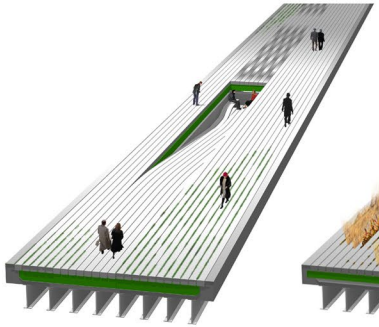
- Policy and Regulatory Frameworks
- Collaborative and Participatory Planning
- Education and Capacity Building
- Monitoring and Adaptive Management

The High Line Project –New York City USA

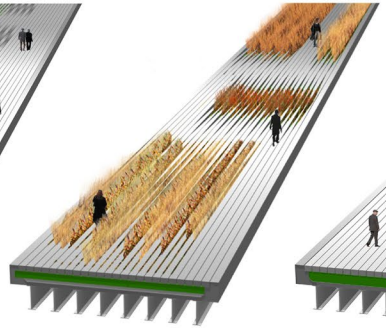
- History and Origins 1930-1970
- Late 1990's demolition deferred by local residents and advocates
- NYC Surface Transportation Board
- 2004 Design competition
- Phased Development



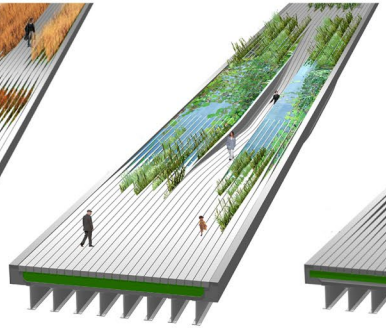
Location: From Gansevoort Street in the Meatpacking District to 34th Street near Hudson Yards (enter at 14th, 16th, 23rd, 28th, or 30th Streets).



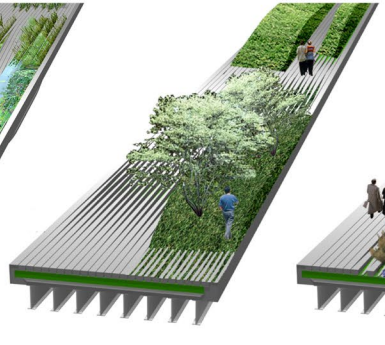
PIT
0% : 100%



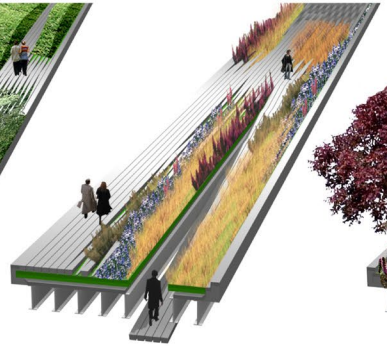
PLAINS
40% : 60%



BRIDGE
50% : 50%



MOUND
55% : 45%



RAMP
60% : 40%

FLYOVER
100% : 10%

MOSSLAND — wet

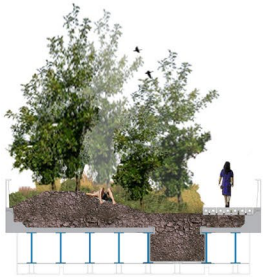
Dieranum
Leucobryum
Polytrichum
Thuidium

TALL MEADOW — dry

Avena
Festuca
Miscanthus
Pennisetum
Sorghastrum

WETLAND — wet

Aster
Carex
Epimedium
Luzula
Lythrum
Verbena



WOODLAND THICKET — wet/average

Adiantum spp.
Asarum
Betula nigra 'Heritage'
Clethra barbinervis
Sassafras albidum
Osmunda spp.
Viburnum dilitatum

MIXED PERENNIAL MEADOW — dry/average

Artemisia
Eryngium giganteum
Heuchera
Monarda
Persicaria
Sanguisorba officinalis
Salvia

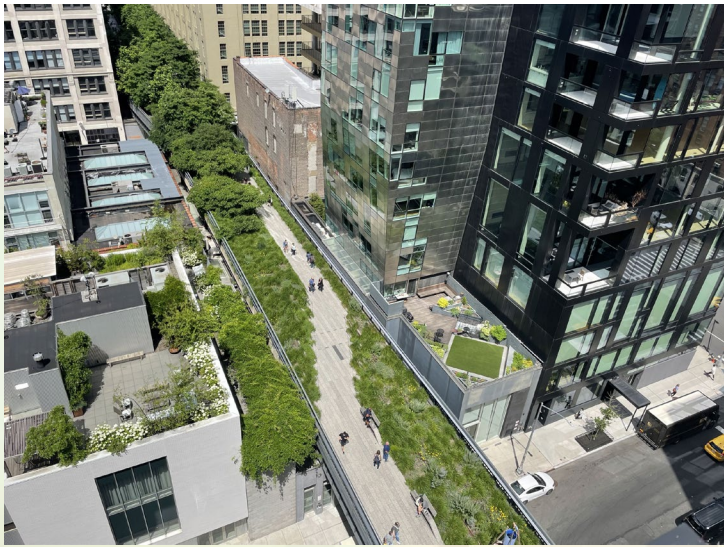
YOUNG WOODLAND — average

Agastache
Buxus sempervirens
Cercis canadensis
Lavatera
Rhus chinensis
Salix eleagnos

The High Line Project –New York City USA

Liabilities into assets

- Preserved 70% of the original structure, using innovative materials
- Pesticide-free, compost-based, and adapted for climate change with resilient plants to handle extremes like heatwaves and storms.
- Owned by NYC Parks, but maintained by private Friends of the High Line with a $20+ million annual budget from donors, grants, and city funds.



The “High Line effect” Economic Boost

- $115 city investment sparks $5 Billion in private investment
- Created 12000 new jobs and raised property values by 103%
- Inspired similar rails to trails projects worldwide

The High Line Project –New York City USA
Liabilities into assets

- Cost about $187 M over 15 yrs but generated $1Billion tourism & property value uplift
- Created habitat for 300+ species and drew 8 M annual visitors
- Managed Stormwater and Saved $1.4 Billion in sewer upgrades with soil- based solutions like High Line Bioswales

Key advantages to re-naturalization

- Resilience improves water infiltration, reducing flood risks by up to 30-50% in urban settings, as seen in green infrastructure networks and enhances heat mitigation
- Multifuctionality and diverse uses improve the ecological (biodiversity hotspots), social (community green spaces), and economic (urban agriculture yielding food security)

Key advantages to re-naturalization

Cost-Effectiveness Evidence:

- Bioremediation and green infrastructure are 2-3 times cheaper than chemical or physical soil treatments
- Cities found it 42% less expensive than gray alternatives, factoring in avoided costs like disaster recovery.
- Maintenance is ongoing but offset by ecosystem services valued at $1-10 per square meter annually (e.g., air filtration, pollination).

Potential for Cost Effective interventions

Gray infrastructure often excels in immediate, single-purpose protection (e.g., flood control)

but incurs high upfront and maintenance costs, with limited adaptability to compounding climate risks like extreme heat or biodiversity loss.

In contrast, soil renaturalization leverages natural processes for layered benefits, often at 40-50% lower lifecycle costs while delivering 30-40% more overall value through co-benefits.

Challenges and Considerations

- Initial Soil Testing and site-specific designs
- Scaling and Policy support
- Monitoring for Local Stressors
- Bioremediation continuing research
- Public education

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Thank you for your attention

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