



Case Study: Public Finance for Urban Nature-Based Solutions

Relevant disciplines: Public Finance, Financial Institutions and Markets

Level: Postgraduate

Time allotment: 90-minute session

Authors: Professor Fredrik Carlsson, University of Gothenburg and Professor John Garvey, University of Limerick

1. Introduction

This simulation places you in the role of Fredrik Larsson, Head of Climate & Biodiversity for the Malmö Municipality. You are tasked with making a critical public investment decision regarding a high-profile "blue" Nature-based Solution (NbS) in the city's former industrial port.

The simulation is structured around a three-fold decision problem, forcing you to navigate technical, economic, and public finance challenges:

1. The Go/No-Go Decision: Should the municipality invest in this urban marine restoration?
2. The Efficiency Trade-off: If yes, how should we balance cost with the speed of ecosystem recovery? (Choosing between restoration methods)
3. The Funding Dilemma: How should the chosen project be financed, considering equity, political feasibility, and municipal fiscal rules?

1.1. Learning Objectives

Upon completion of this case study, you will be able to:

1. Apply cost-benefit analysis (CBA) to an environmental public good with non-market values.
2. Understand and utilize Willingness-to-Pay (WTP) data from contingent valuation studies.
3. Evaluate public funding mechanisms (taxes, bonds, developer levies) against criteria of efficiency, equity, and feasibility.





4. Craft a politically astute and fiscally responsible recommendation for a complex urban sustainability project.

2. Case Narrative: The Protagonist's Challenge

Date: October 26, 2025

To: Fredrik Larsson

From: The City Executive Board

Subject: Final Recommendation for the Nyhamnen Eelgrass Restoration Project

2.1. Background

Malmö has committed to becoming a global leader in sustainable urban development. The transformation of the Nyhamnen port district is a flagship project. Following the successful sand-capping and basic restoration of the adjacent Södra Varv area, we now face the decision for the 9-hectare Nyhamnen seabed. The baseline environmental remediation (sand-capping) is legally mandated and budgeted at 70.3 million SEK.

2.2. Your Dilemma

The political coalition is split. The *Green Party* demands the fastest, most biodiverse outcome, citing the EU Nature Restoration Law. The *Moderate Party* is concerned about municipal debt and wants the cheapest option. The *Social Democrats* are focused on public support and equitable funding. The City Board has commissioned a state-of-the-art WTP study (see attached summary from researchers Carlsson et al.) to inform this decision.

2.3. Your Task

Prepare a single-page briefing memo for the City Board with a clear, evidence-based recommendation that addresses the threefold problem. You must:

1. Recommend whether to proceed beyond the baseline remediation.
2. Recommend a specific restoration method.
3. Propose a funding mix.

Your credibility and the success of the city's climate agenda hinge on this proposal.



3. Data Dossier: The Evidence Base

A. Project Costs Estimates (Total for 9ha, in million SEK)

Method	Baseline Remediation	Active Restoration Cost	Total Project Cost	Time to Full Biodiversity
1. Natural Recovery	70.3	0	70.3	~18 years
2. Seeding	70.3	4.4	74.4	~8 years
3. Planting Shoots	70.3	13.5	83.8	~2 years

B. Public Benefit Estimates (Willingness-to-Pay – WTP)

Contingent Valuation Study of Malmö & County Residents (Carlsson et al.)

Method	Mean WTP (One-time tax, SEK/person)	Conservative Median WTP (SEK/person)
1. Natural Recovery	500	200
2. Seeding	1370	500
3. Planting Shoots	1900	800

C. Demographic & Fiscal Context

- Adult Population of Malmö: ~210,000
- Municipal Debt Level: Moderate, but under scrutiny from central government.
- Nyhamnen Development: Private developers are constructing 3,000+ new homes and commercial spaces. Land values are rising.
- EU & National Grants: Potential for co-funding up to 30% of "innovative NbS" projects.
- Municipal Green Bond Framework: Recently established; AAA credit rating.

D. Key Qualitative Findings:

- Distance Decay: Malmö residents' WTP is significantly higher than county residents'.
- Speed Premium: The public highly values faster restoration, but with diminishing sensitivity (the jump from 18 to 8 years is valued more than from 8 to 2 years).
- Benefit Drivers: Proximity, existing use of the harbor, and affinity for water activities increase WTP.





4. Group Exercise: The Decision Workshop

4.1. The CBA Calculation (15 mins)

- In your groups, calculate the Aggregate Social Benefit for each option.
- Use the conservative Median WTP (200, 500, 800 SEK).
- Apply it only to the Adult Population of Malmö (210,000). This is your lower-bound benefit estimate.
- Calculate the Net Present Value (NPV) and Benefit-Cost Ratio (BCR).
- For simplicity, assume benefits accrue immediately upon project completion (no discounting needed for this quick analysis).
- Formulas:
 - $\text{Aggregate Benefit} = \text{Median WTP} * 210,000$
 - $\text{NPV} = \text{Aggregate Benefit} - \text{Total Project Cost}$
 - $\text{BCR} = \text{Aggregate Benefit} / \text{Total Project Cost}$

4.2. The Policy & Finance Debate (25 mins)

- Based on your CBA, discuss and decide on your recommended restoration method.
- Design your funding mix. Consider the following tools. What percentage would come from each? Argue for your choices.
 - Municipal Green Bond: Funds large infrastructure, locks in long-term financing, enhances reputation. Adds to debt.
 - Developer Impact Fee: A levy on new construction in Nyhamnen, arguing they benefit from increased amenity value. Politically sensitive.
 - Targeted Municipal Tax Rise: A small, one-time surcharge on Malmö residents' local income tax. Requires political courage.
 - EU/National Grants: "Free money," but competitive and administratively burdensome.
 - Reallocation from Other Budgets: Which department loses out? (Parks? Roads?).
- Anticipate political opposition. How do you counter arguments from:
 - A councilor saying: "This is a waste of money on invisible underwater grass."
 - A taxpayer group: "We can't afford more taxes for this niche project."
 - A developer: "Our construction fees are already paying for the new infrastructure."

4.3. Draft Your Recommendation Memo (20 mins)

Prepare the key arguments for your one-page memo to the City Board. Structure it clearly:

1. **Recommendation:** E.g., "Proceed with the Planting Shoots method, funded by a mix of..."
2. **Rationale:** Present your core CBA result (NPV and BCR) and the strategic argument for speed/public value.
3. **Funding Plan:** Specify your proposed funding mix and justify its fairness and feasibility.
4. **Political & Risk Mitigation:** Briefly address one key political concern and one project risk (e.g., restoration failure).



5. Instructor's Guide & Debriefing Points

5.1. Expected Outcomes:

- Most groups will recommend 'Planting Shoots' due to the high BCR (≈ 2.0), demonstrating that public value can justify higher upfront costs.
- Funding mixes will vary, creating rich debate. A likely optimal proposal: 40% Green Bond, 30% Developer Fees, 30% EU Grant.

5.2. Key Debriefing Themes:

1. **Valuing the Invisible:** How do we make decisions about public goods (biodiversity) that have no market price? The WTP method's strengths and weaknesses.
2. **The Time Value of Nature:** The study reveals a "social discount rate" for environmental goods—citizens are impatient for restoration.
3. **The "Who Pays?" Principle:** Link funding to benefit incidence. Should only Malmö residents pay, or should developers/regional taxpayers contribute? Discuss benefit principle vs. ability-to-pay.
4. **Fiscal Instruments in Practice:** Compare debt (bonds) vs. current revenue (taxes) vs. levies. Discuss the signaling value of a Green Bond.
5. **From Analysis to Politics:** The final decision isn't just about the highest BCR. It's about building a coalition through equitable funding and compelling narrative ("A Living Harbor for All").

5.3. Conclusion:

This simulation teaches that modern public finance for sustainability is not just about accounting. It's about quantifying public value, designing smart fiscal instruments, and navigating the politics of the common good.

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