Reed as a Renewable Resource 2013

Sustainability assessment of common reed-based production

Greifswald , Germany

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Sustainability of using common reed

- Common reed can be used for various purposes (energy, construction, fertilizer etc.)

- Utilization of common reed has several beneficial sustainability impacts:
  - Improved nutrient balance, positive biodiversity impacts
  - Recreational values improved, jobs for contractors
  - Economic profitability?
  - etc.

What is the most sustainable way to utilize common reed?

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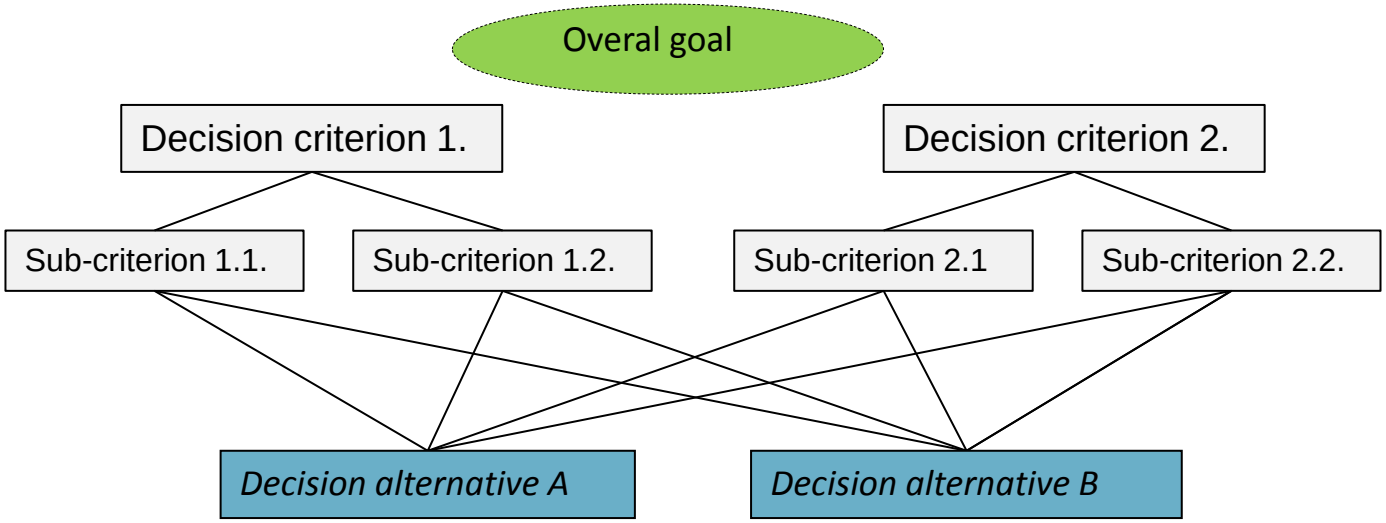
Methods assessing sustainability: Life-cycle assessment (LCA)

- Environmental impacts of a product from a gradle to a grave

	Characterized Impact assessment scores	
	Alternative A	Alternative B
Climate change	55 kg CO2-Eq	89 kg CO2-Eq
Acidification	17 kg SO2-Eq	10 kg SO2-Eq
Metal depletion	25kg Fe-Eq	8 kg Fe-Eq

- No unambiguous comparisons of alternatives!

Methods assesing sustainability: Multi-criteria (decision) analysis (MCA)



- MCA determines the decision alternative with the highest utility with respect to decision-makers preferences
- no advanced tools for assessing environmental (or other) impacts

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Methods assesing sustainability
Life-cycle assessment (LCA)
+Multi-criteria (decision) analysis (MCA)

	Characterized Impact assessment scores		
	Alternative A	Alternative B	Weight
Climate change	55 kg CO2-Eq	89 kg CO2-Eq	0.33
Acidification	17 kg SO2-Eq	10 kg SO2-Eq	0.33
Metal depletion	25kg Fe-Eq	8 kg Fe-Eq	0.33

Single scores:

Alternative A = 32.01

Alternative B:=35.31

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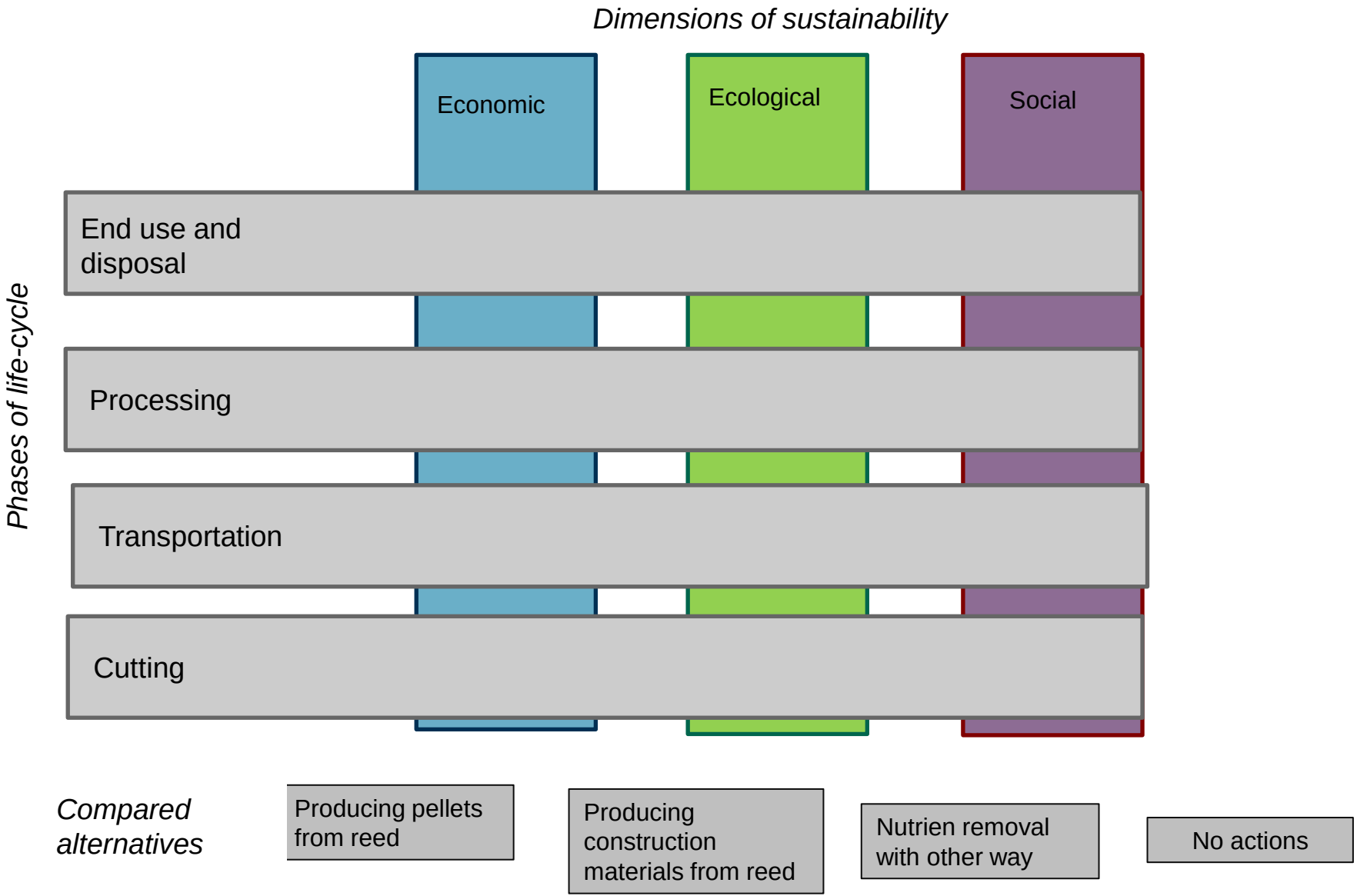
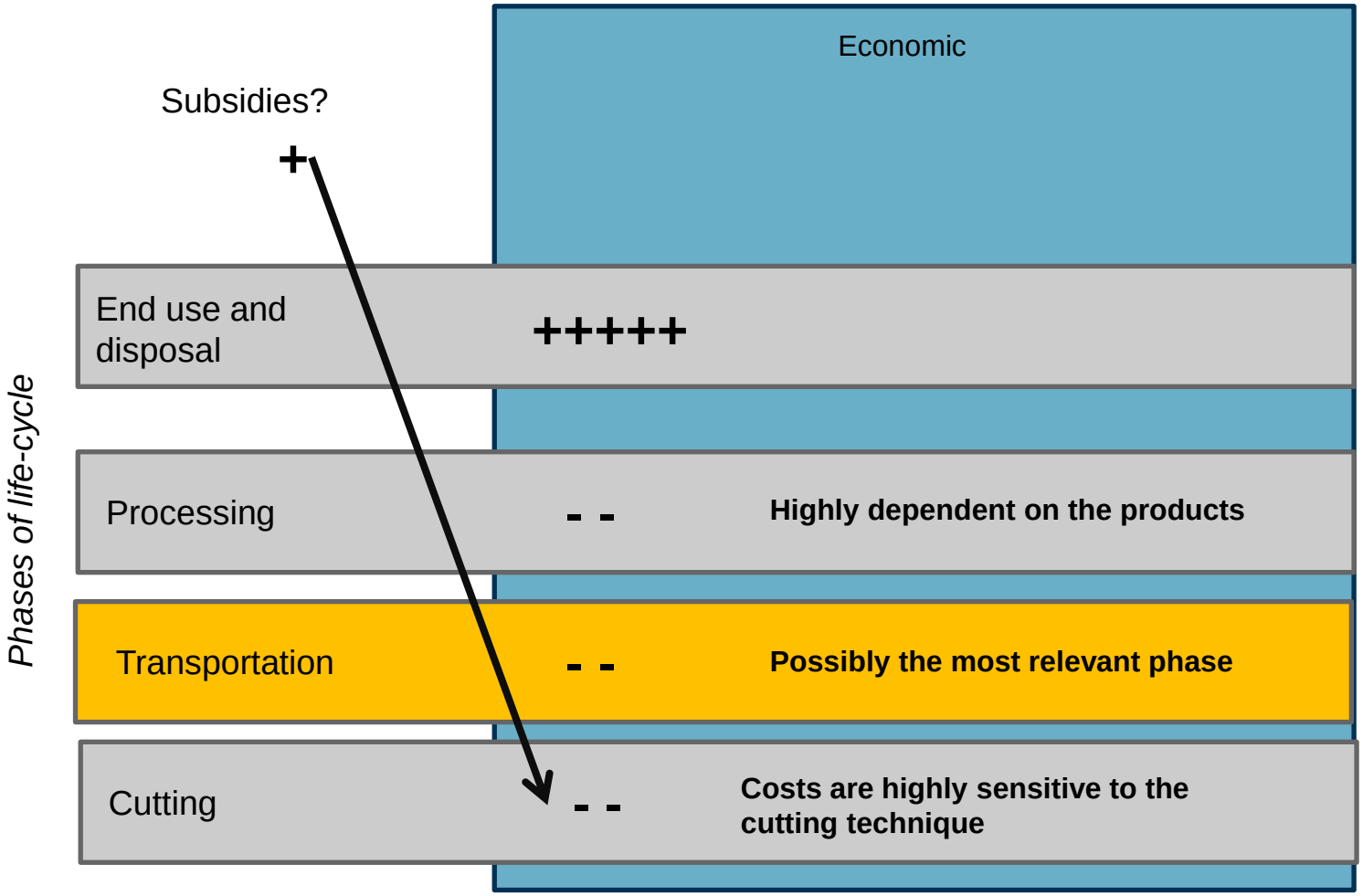
Sustainability assessment of common reed-based production (a case-study in Eastern Finland)



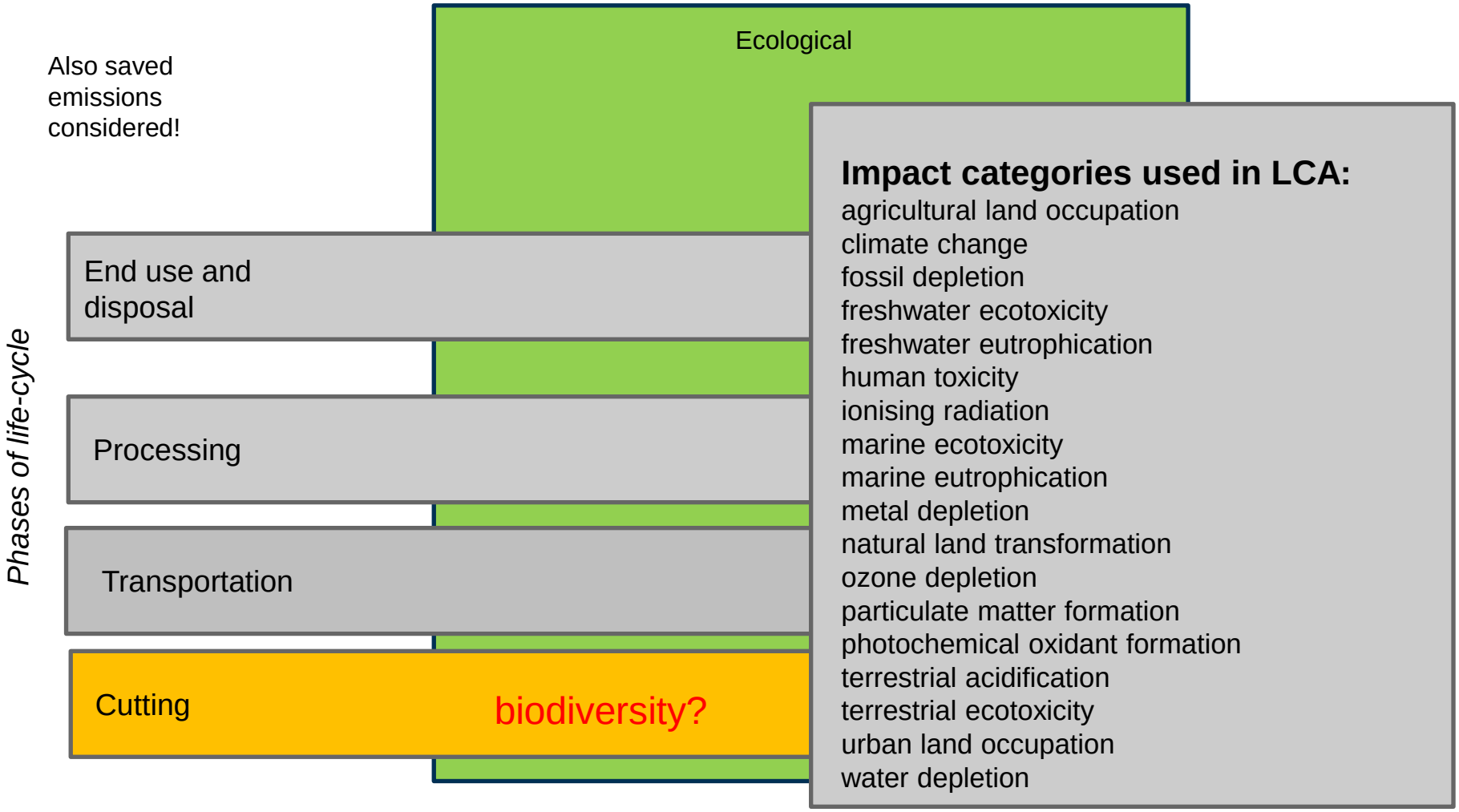
Economic sustainability of using common reed



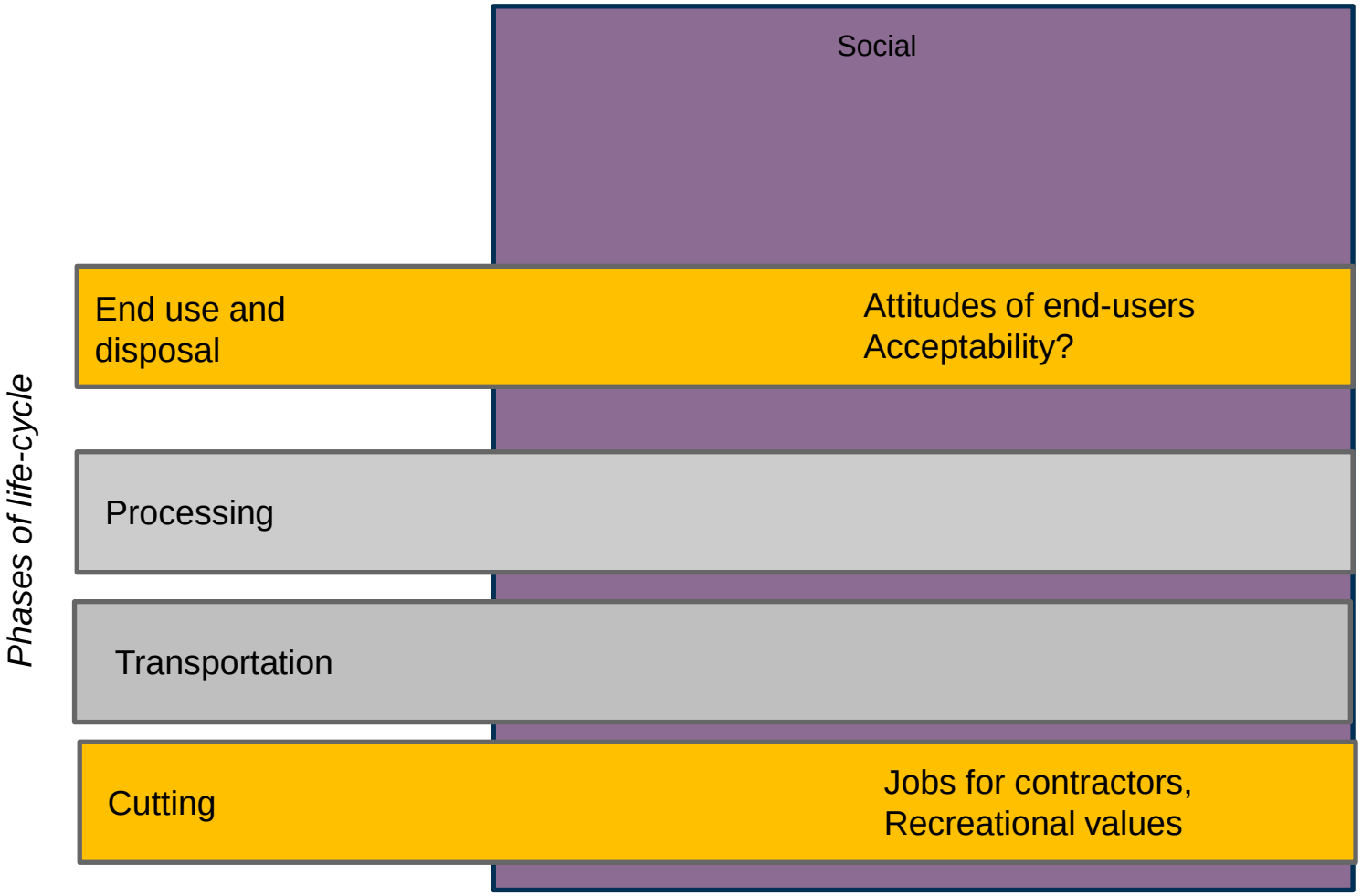
Compared alternatives

- Producing pellets from reed
- Producing construction materials from reed
- Nutrient removal with other way
- No actions

Ecolgical sustainability (=Life cycle anssessment) of using common reed



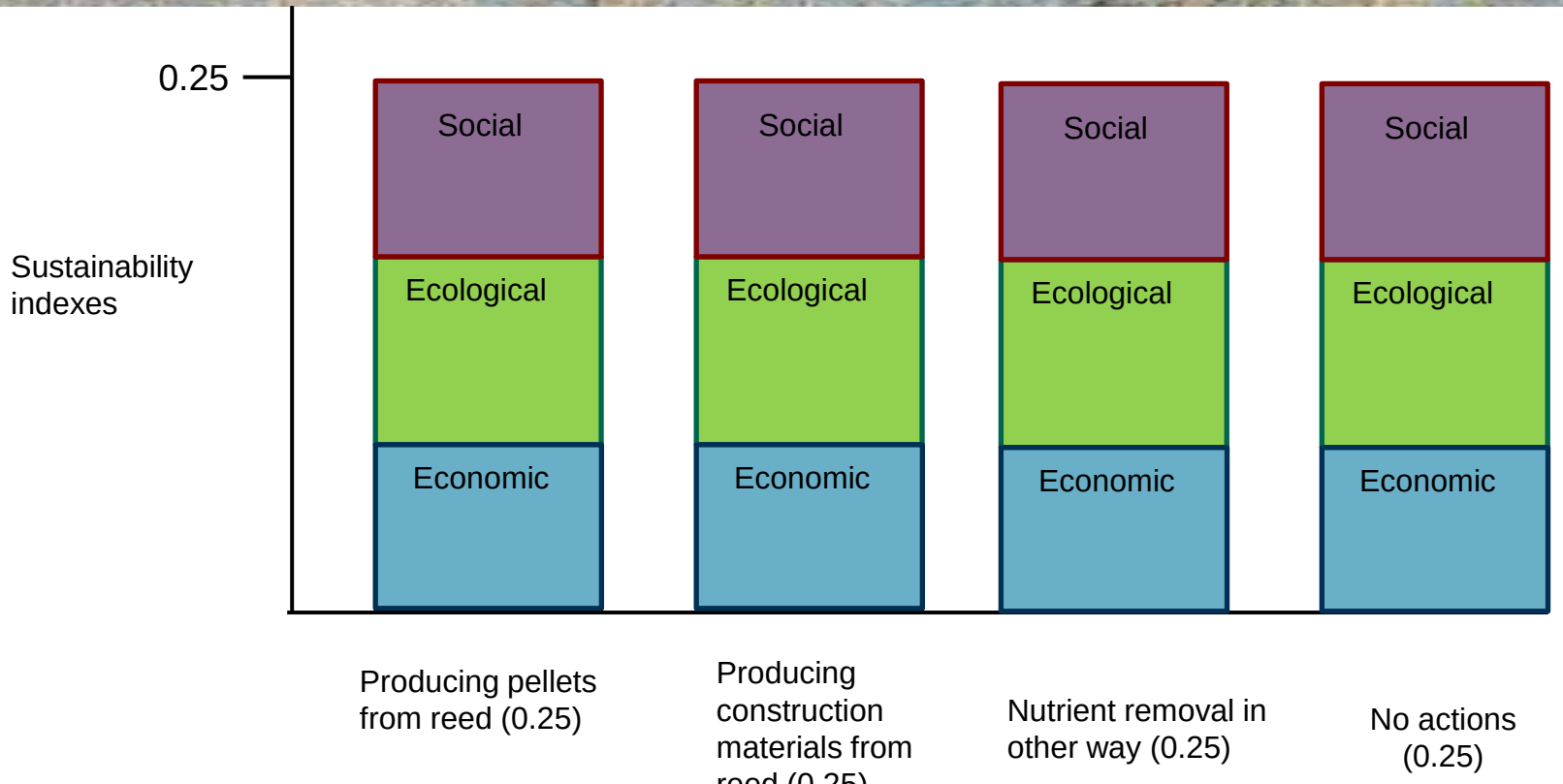
Social sustainability of using common reed



Compared alternatives

- Producing pellets from reed
- Producing construction materials from reed
- Nutrient removal in other way
- No actions

Results of sustainability assessments (empirical results missing)



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Leskinen P, Kähkönen T, Lähtinen K, Pasanen K, Pitkänen S, Sironen S et al. Moniulotteinen kestävyyden arviointikehikko puuenergian tuotannolle - Multi-dimensional sustainability framework to evaluate forest and wood energy production. Finnish environment 9/2012. (in Finnish)

Discussion on methodological and empirical challenges

- Who should complete weighting
- Which MCA-method should be used
- Data availability
- How to compare environmental impacts to social and economic aspects
- Acceptability of the results