

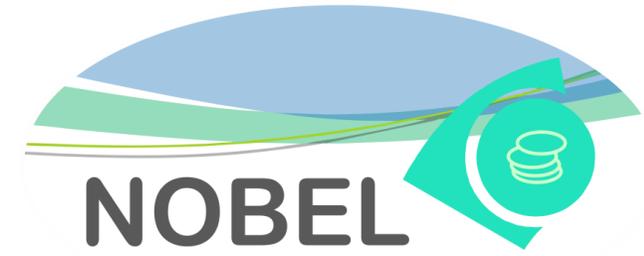
Auction cases from Denmark and Portugal

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A small SINCERE field experiment
with a reverse auction for
biodiversity contracts in Denmark

The background

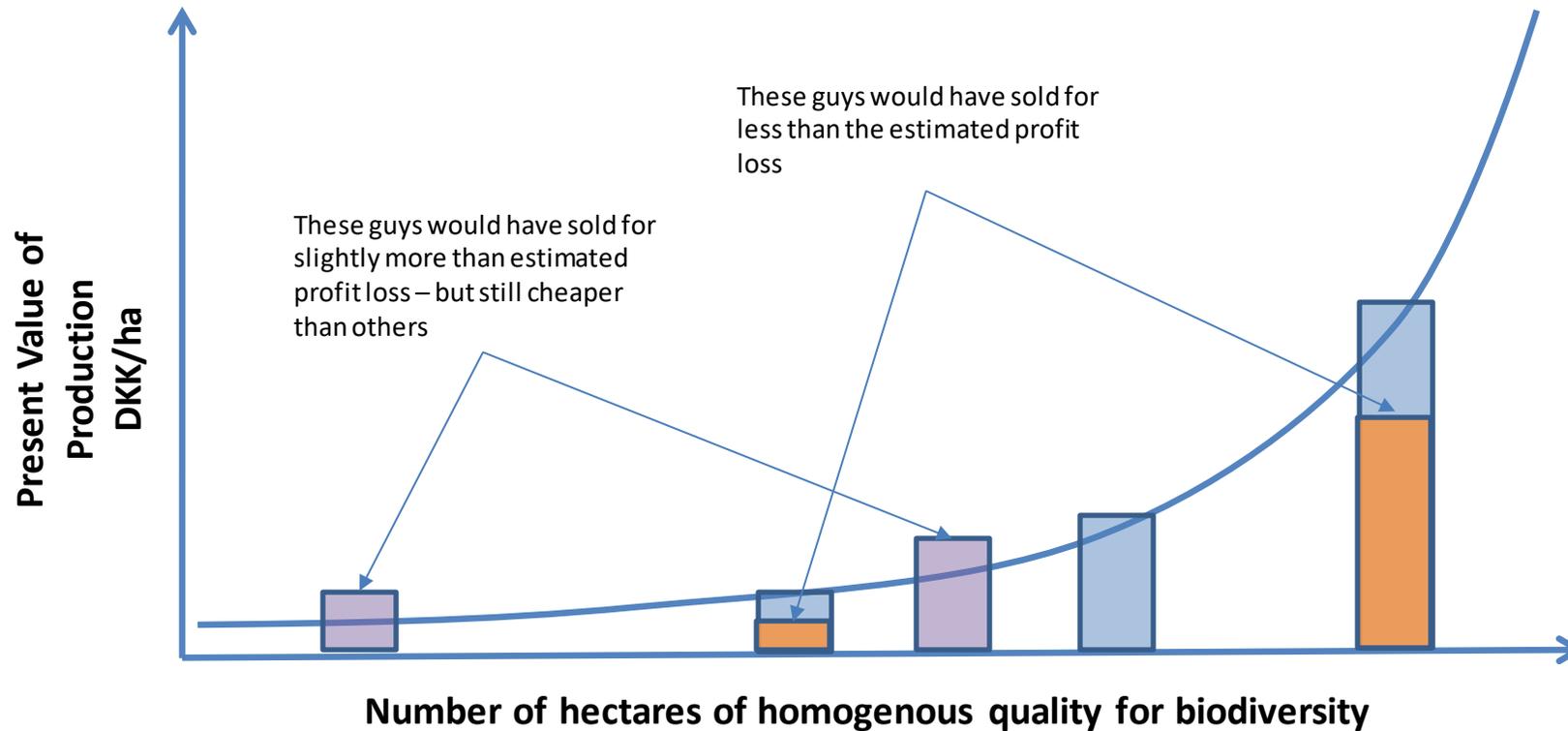
Can we get more for the money than current conservation instruments?

They support and prioritize set according to rank as

1. Presence of Natura 2000 class 1 or 2
 2. Presence of Natura 2000 class 3, 4 or 5
 3. Presence of areas with High Nature Value score 8 or more...
 4. Other areas of interest
- Within a rank, offers are prioritized according to the area
 - Compensation equals estimated present value... take it or leave it
 - You cannot trade-off across ranks
 - But forest owners come in many forms... and have different objectives



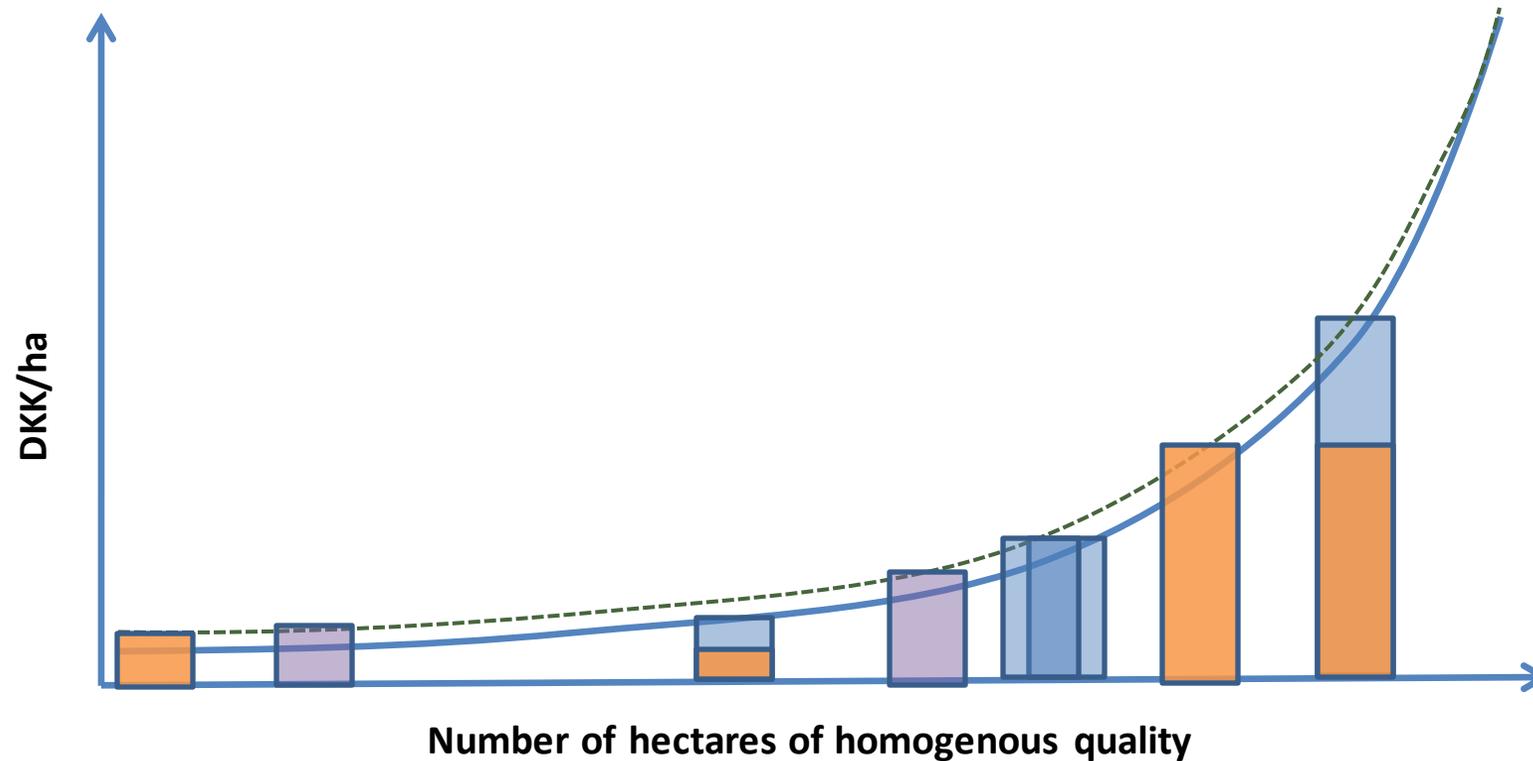
Pros and cons of the current instrument



- Simple to use and explain
- May be said to avoid "subjective" trade-offs
- No profit-based over compensation... in principle

- Trade-offs are in place – but not so obvious
- If price is set wrong, supply is too low
- Over compensation happens on other parameters

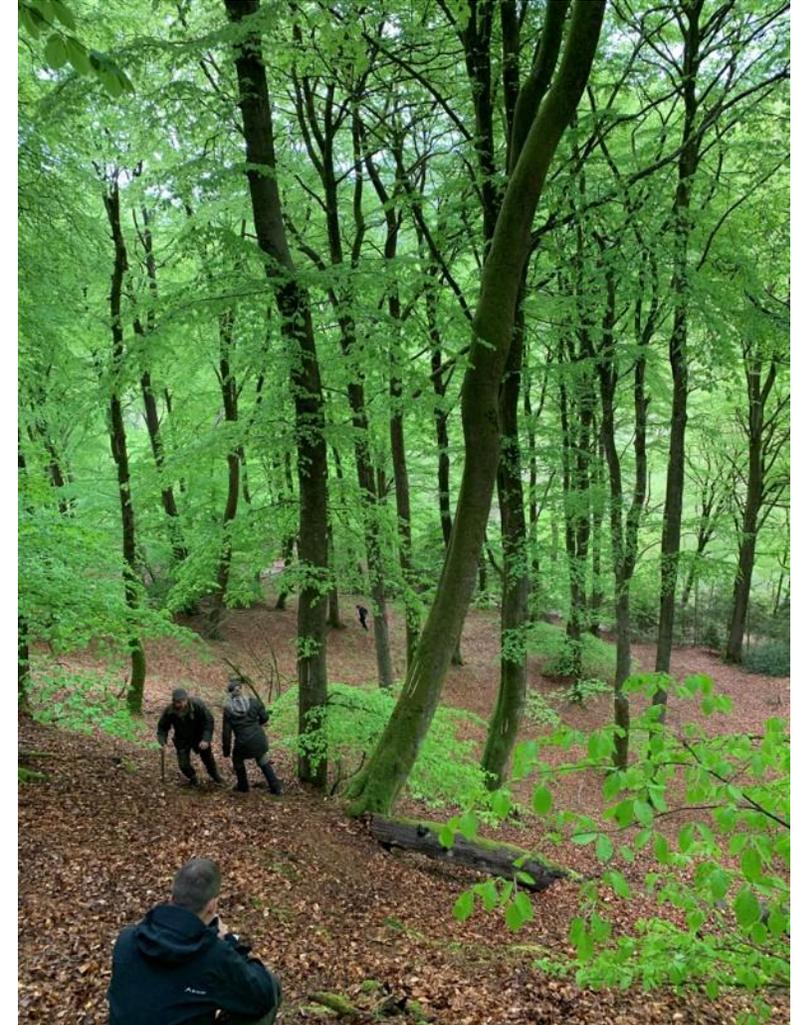
A reverse auction with discriminatory pricing



- Owners get the price they set – or nothing
- There is a small incentive for overpricing a bit
- This could be much more cost effective

We ran a small 1:1 field experiment in SINCERE

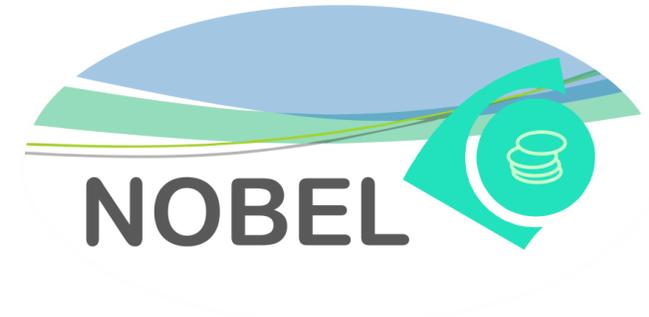
- We designed a reverse auction using a €60K budget
- In May 2020, we announced a call for small biodiversity focused projects where **owners competed on content and price** – both set by themselves
- We obtained 24 different bids for a total sum of more than €185K – implying a clear competition
- We scored these on biodiversity potential, spatial context, scale and permanence – all information known and requested from owners.
- We selected 13 interesting sites for field visits (at a cost of up to €120K)
- We re-evaluated scoring and **selected the best 8**, that exhausted the budget. We revisited all sites to seal contract details.
- Contracts registered on the deeds and binds future owners



A case study of limited scale and no control – but...

- ...we can still make some interesting observations
- Considerable variety in what is offered
 - ... a few offered private goods for low prices
 - ... some offered public goods at (too?) high prices
 - ... many offered public goods at very competitive prices
- ‘Set aside’ offers comparable to current instrument targets varied in price from DKK 40K to DKK 110K/ha within the winning set.
- This is roughly and approximately **50% cheaper** than current subsidy schemes for setting aside untouched forests areas or single trees
- Many biologically interesting land areas are not registered as such





Exploring multicriteria
forward auctions in
Portugal

Reverse and forward mechanisms

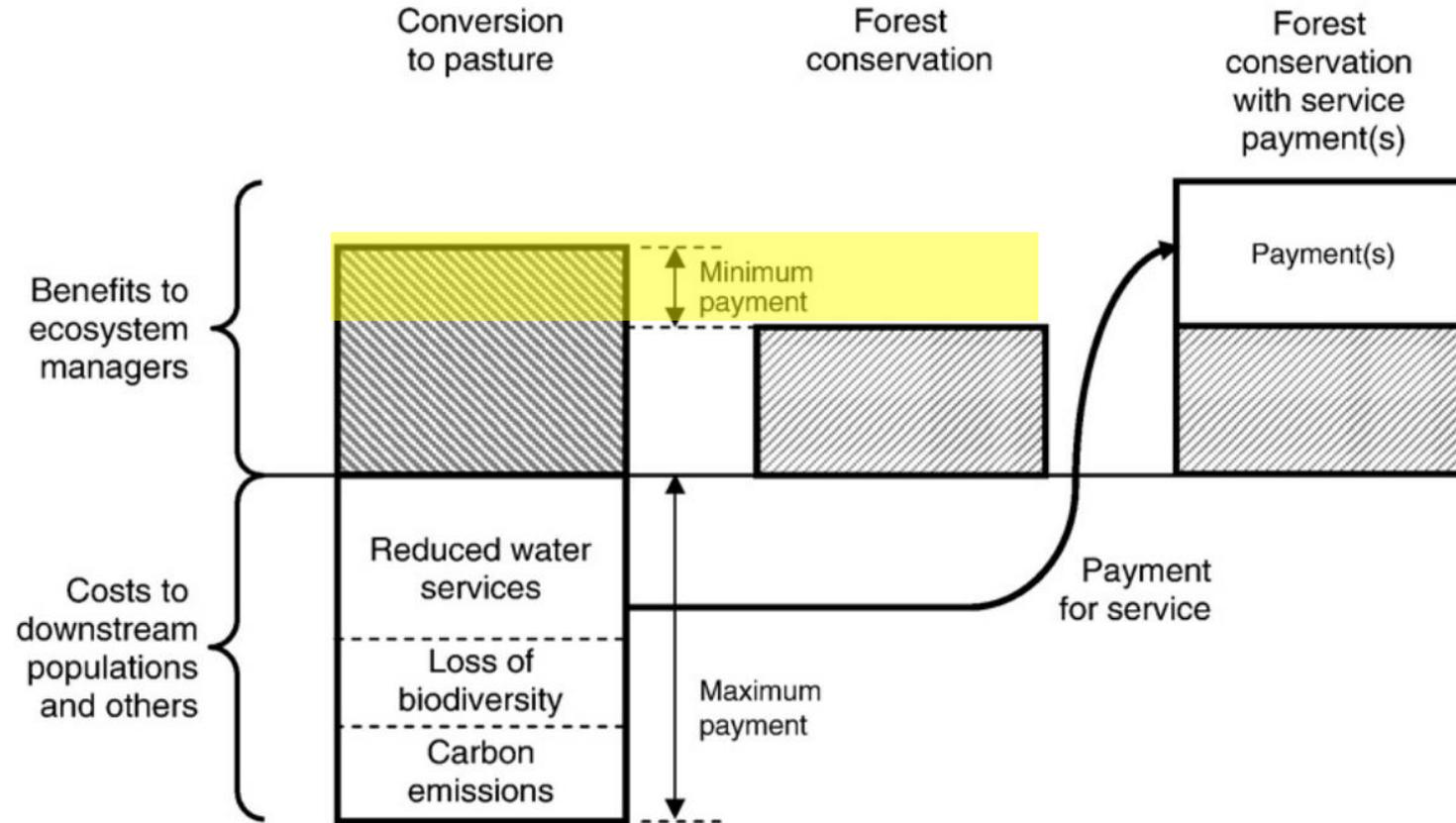
Reverse

- **Central purchaser**
- **ES providers** bid their **willingness to accept**
- If multiple criteria, **purchaser** makes trade-offs

Forward (here, ECOSEL¹)

- **Decentralized** financing (crowdfunding)
- **ES providers** bid their **willingness to accept**
- If multiple criteria, **stakeholders** make trade-offs

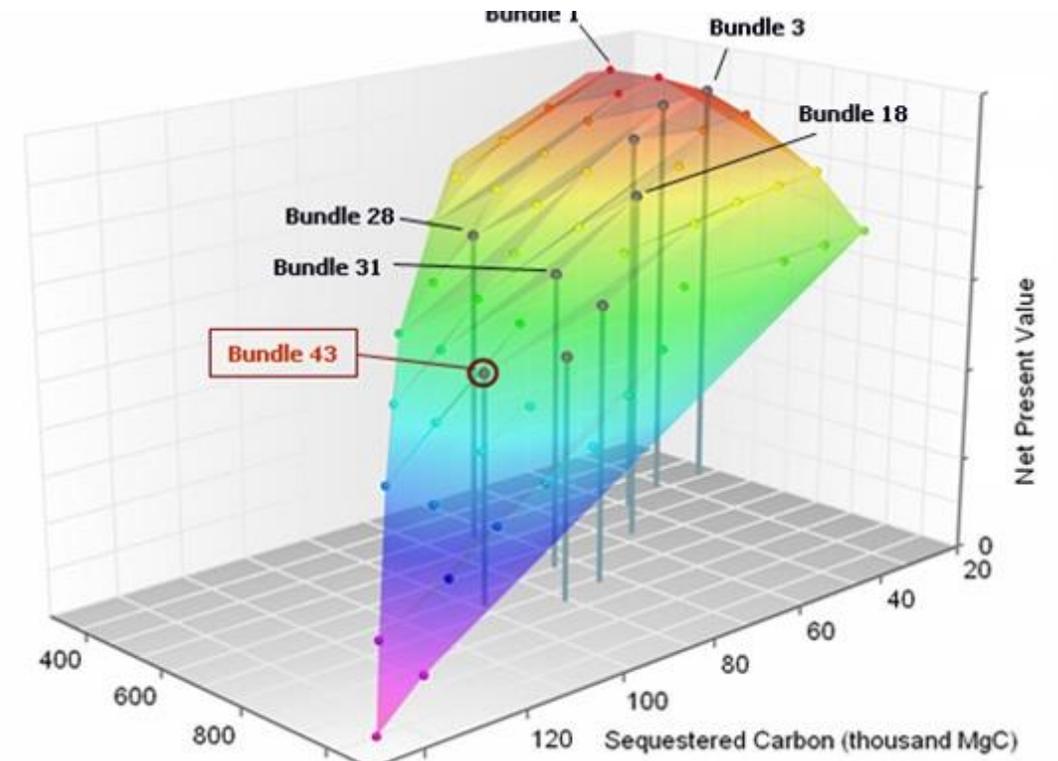
Auctions and PES



[2] Image: Engel, Pagiola, & Wunder 2008

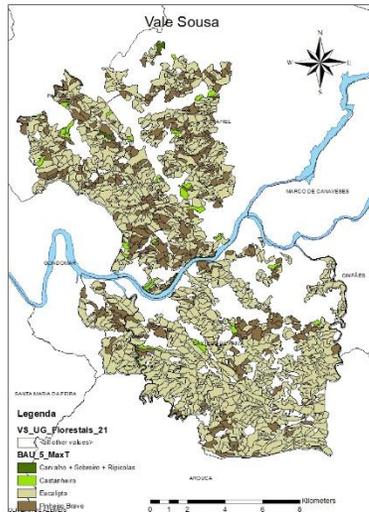
Step 1: Optimization and stakeholder consultation

- Model ecosystem services production (timber, erosion protection, carbon storage, fire protection, etc.)
- Generate possibility frontier of efficient combinations (*bundles*)
- Explore frontier with stakeholders to identify interesting bundles
- Auction: which bundle will stakeholders will pay the most for?

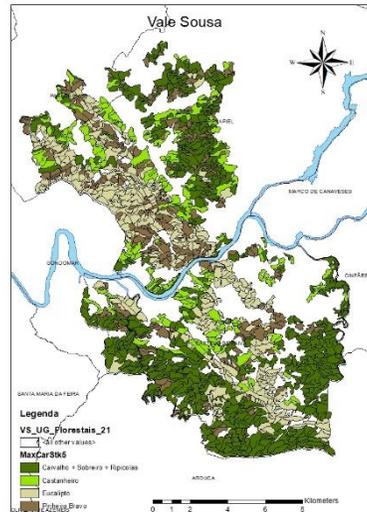


Step 1: Optimization and stakeholder consultation

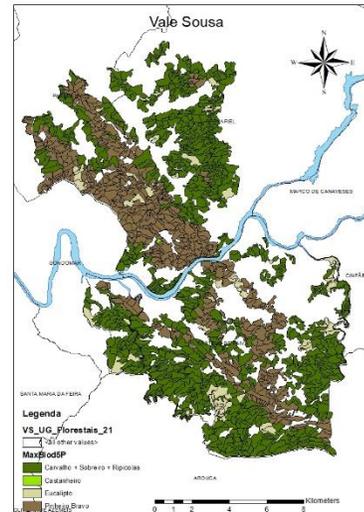
Default bundle



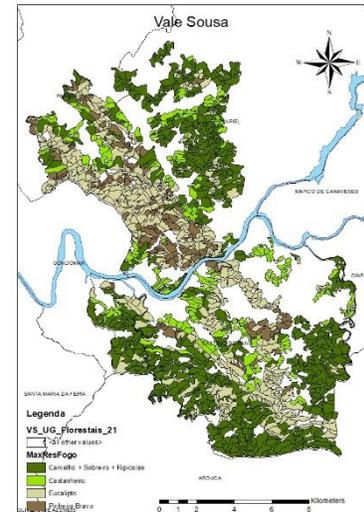
Bundle 1



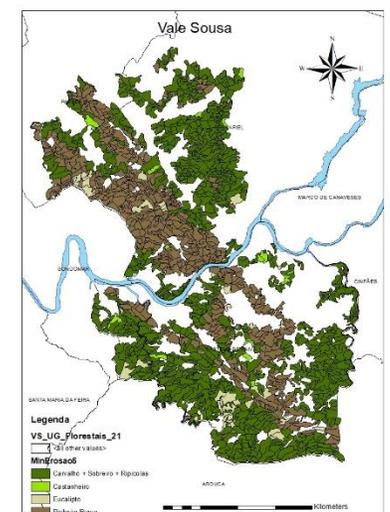
Bundle 2



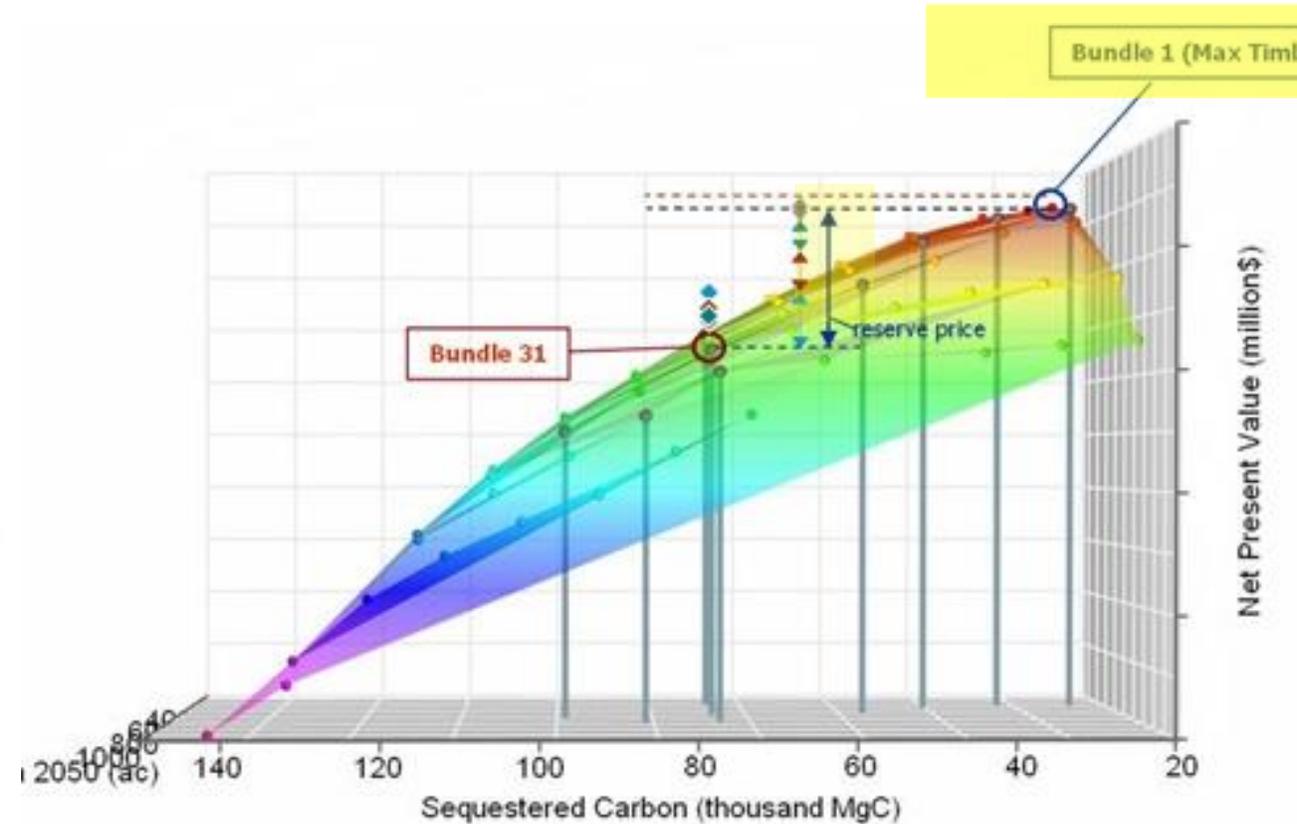
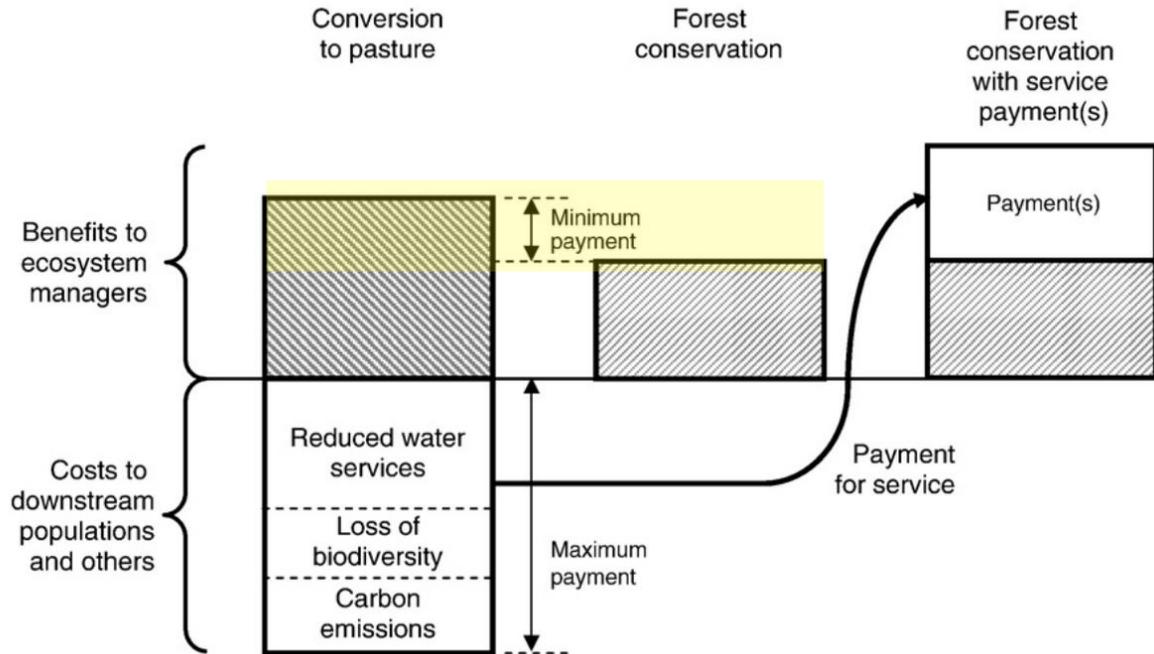
Bundle 3



Bundle 4



Step 1: Optimization and stakeholder consultation



After optimization, preparing for the auction:

Which ES matter?

→ Survey

Which bundles are attractive?

→ Pareto tool workshop

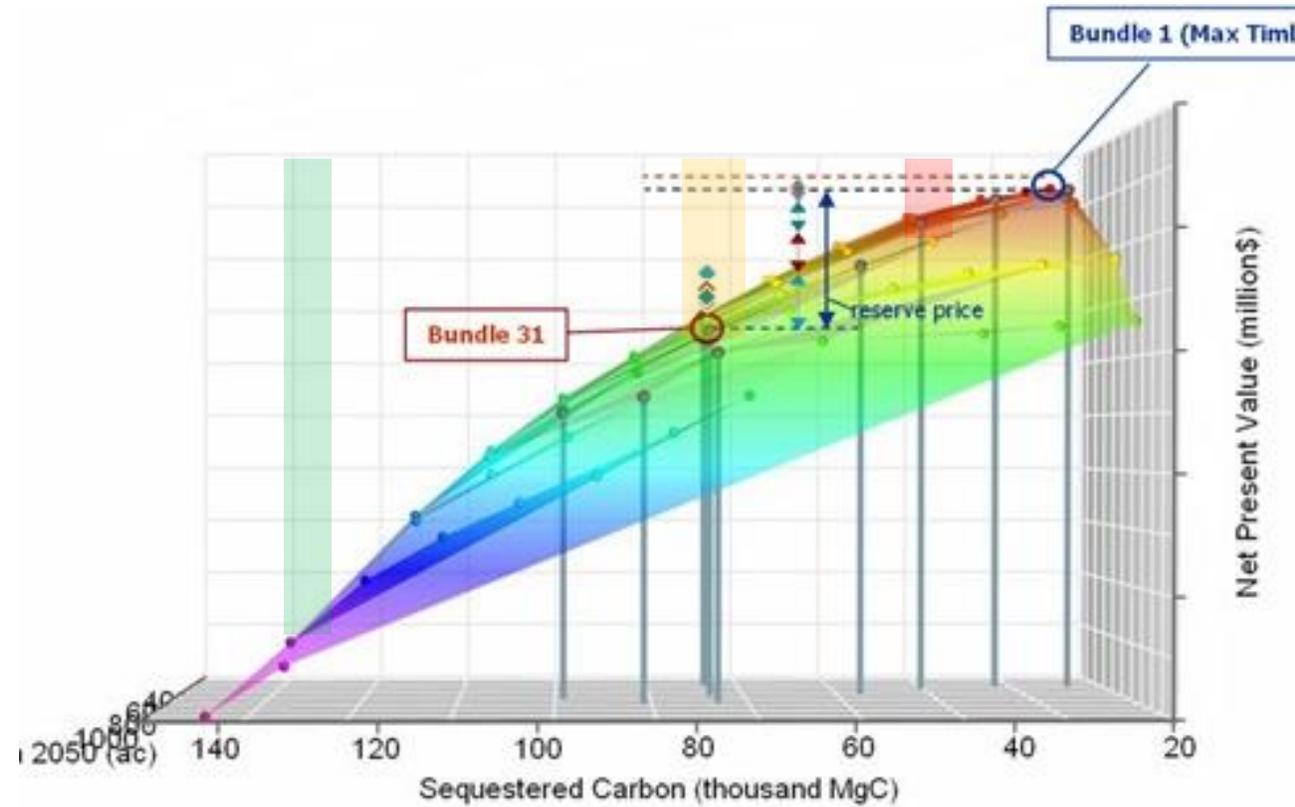
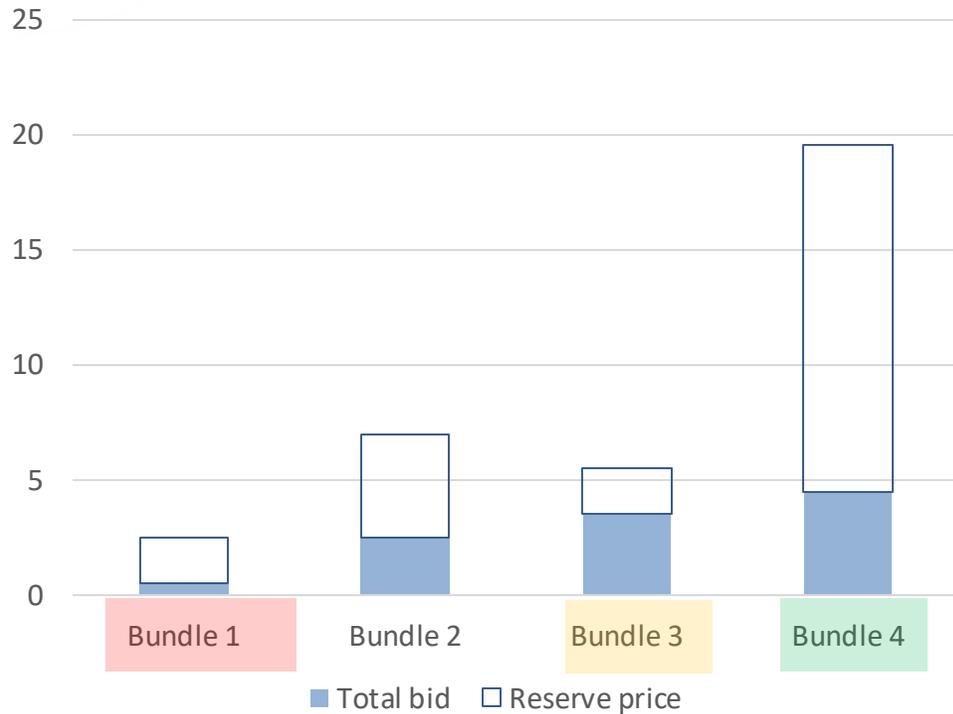
Is the auction platform understandable?

→ ECOSEL workshop

Step 2: Forward auction (ECOSEL)



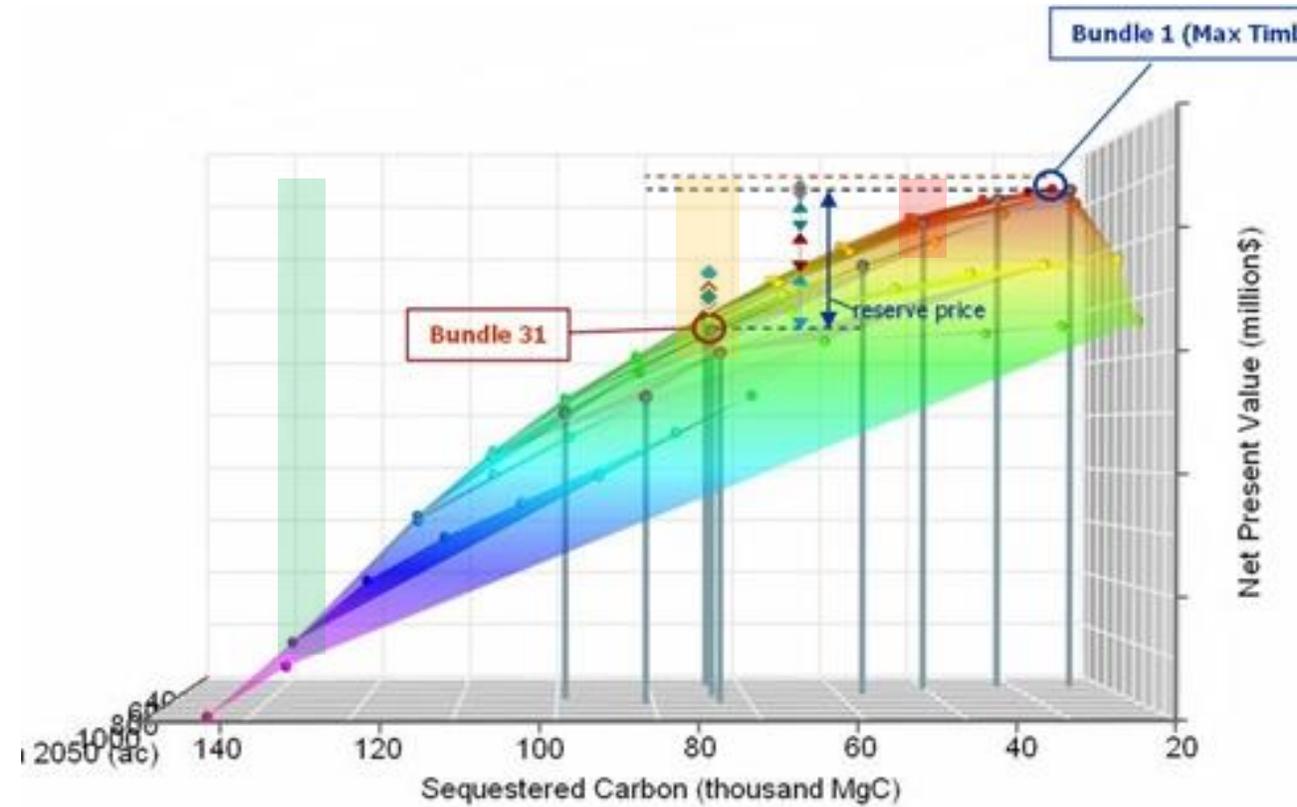
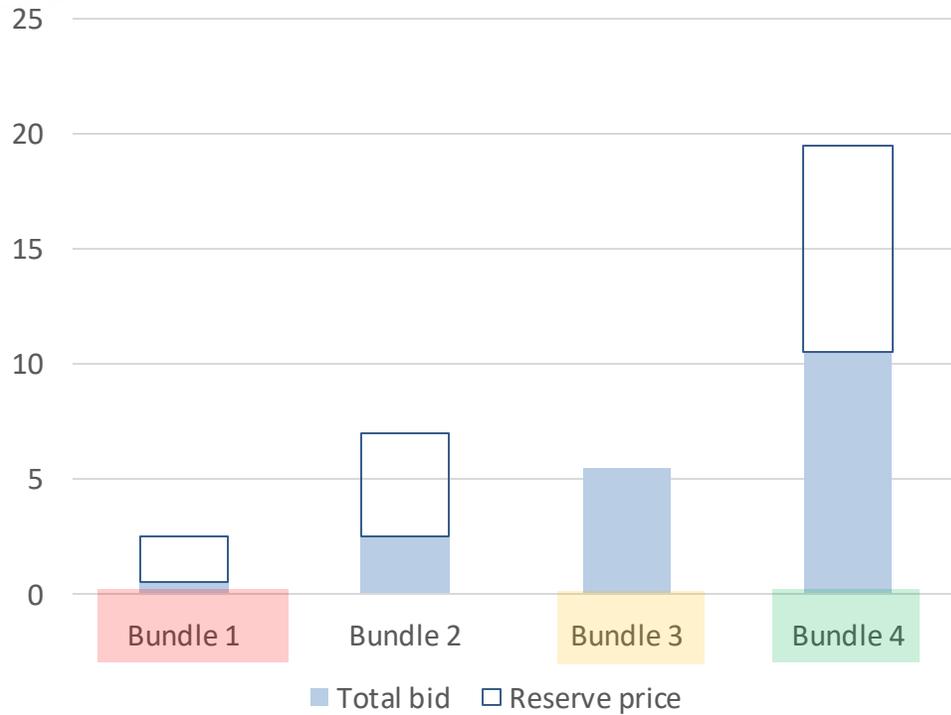
Bid totals and reserve prices



Step 2: Forward auction (ECOSEL)



Bid totals and reserve prices



Current status: stakeholder workshops and mock auctions in the lab, preparing for upscaled online trial



Learn more about the Floresta do Vale do Sousa V1 Cabaz 2 – Max. Biodiversidade

optima Campaigns - Campaign Details - Management Plan

Cabaz 1 – Max. Stock de Carbono

Cabaz 2 – Max. Biodiversidade

Cabaz 3 – Max. Resistência ao Fogo

Cabaz 4 – Min. Erosão do Solo

Option: Cabaz 2 – Max. Biodiversidade

Summary
Máxima biodiversidade

Description
O Cabaz 2 tem a Biodiversidade como Serviço de Ecossistema maximizado. Fornece maior quantidade deste serviço comparativamente com qualquer outro plano de gestão. Níveis de Serviços de Ecossistema do Cabaz 2

BID ON THIS OPTION

Additional Resources

Scenario	Erosão (Ton/ha/ano)	Carbono stock (Ton/ano)	Área carvalhos, sobroeiros e castanheiros (%)	Biodivers. floral (↑ 0-7)	Resist. fogo (↑ 1-5)
1	90,0	33,2	2,3	2,0	3,1
2	60,6	59,5	58,4	3,1	3,6
3	58,1	33,0	60,6	3,5	3,4
4	63,5	46,9	58,5	3,0	4,0
5	55,8	32,8	62,6	3,4	3,5

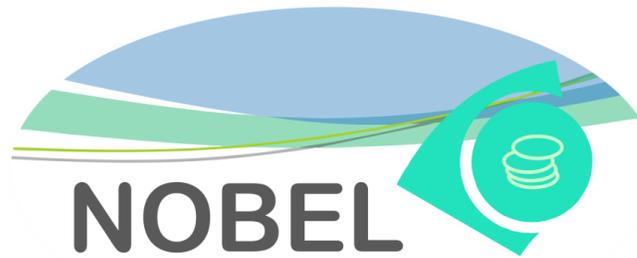
Option Comparisons

Plan	Summary	Reserve Price	Your Bid	All Bids
Cabaz 1 – Max. Stock de Carbono	Máximo stock de carbono	150,00 €	0,00 €	30,00 €
Cabaz 2 – Max. Biodiversidade	Máxima Biodiversidade	240,00 €	0,00 €	0,00 €
Cabaz 3 – Max. Resistência ao Fogo	Máxima Resistência ao Fogo	210,00 €	0,00 €	0,00 €
Cabaz 4 – Min. Erosão do Solo	Minimização da Erosão do Solo	275,00 €	0,00 €	0,00 €

This Auction is Open for Bidding

Quick comparison of Danish and Portuguese cases

	Denmark	Portugal
<i>Who bids what?</i>	Providers, WTA (lower is better)	Stakeholders, WTP (higher is better)
<i>Who makes trade-offs?</i>	Central purchaser (government)	Stakeholders (aggregate)
<i>Aim of mechanism</i>	Best value for money	Maximize ES price
<i>Study type</i>	Field experiment	Laboratory experiments



Thank you!



References

- [1] Tóth, S. F., Ettl, G. J., & Rabotyagov, S. S. (2010). ECOSEL: an auction mechanism for forest ecosystem services. *Mathematical & Computational Forestry & Natural Resource Sciences*, 2(2).
- [2] Engel, S., Pagiola, S., & Wunder, S. (2008). Designing payments for environmental services in theory and practice: An overview of the issues. *Ecological economics*, 65(4), 663-674.
- [3] “Pack example.” (2018). *Ecosel*. University of Washington. Available: <https://ecosel.cfr.washington.edu/campaigns/pack-forest-example>
- For comparisons of forward and reverse mechanisms:** Bingham, L. R., Da Re, R., & Borges, J. G. (2021). Ecosystem Services Auctions: The Last Decade of Research. *Forests*, 12(5), 578.
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- For methods for decomposing optimization solutions for joint management areas:** Marques, S., Bushenkov, V. A., Lotov, A. V., Marto, M., & Borges, J. G. (2020). Bi-Level Participatory Forest Management Planning Supported by Pareto Frontier Visualization. *Forest Science*, 66(4), 490-500.