

# Agroforestry adoption in Germany: using Decision Analysis to highlight the effects of institutional barriers and funding options on system profitability

Simon Swatek, Prajna Kasargodu Anebagilu, Marcos Jiménez Martínez, Eike Luedeling

## 1. Introduction

- Germany introduced a legal definition for agroforestry (AF) for the first time in 2023.
- Nationally available annual funding of 200 €/ha wooded area if requirements are met (**Eco Scheme 3**, via Pillar I of Common Agricultural Policy).
- 10 federal states introduced varying investment support or subsidised consultancy for AF.
- Low adoption rate of Eco Scheme 3 → Ambitious national AF targets (65,000 ha until 2027) might not be achievable.
- Inadequate funding is considered a major institutional barrier to the adoption of AF in Germany.
- The German AF Association (DeFAF<sup>1</sup>) proposed an alternative national-level funding scheme.

### Institutional Barriers

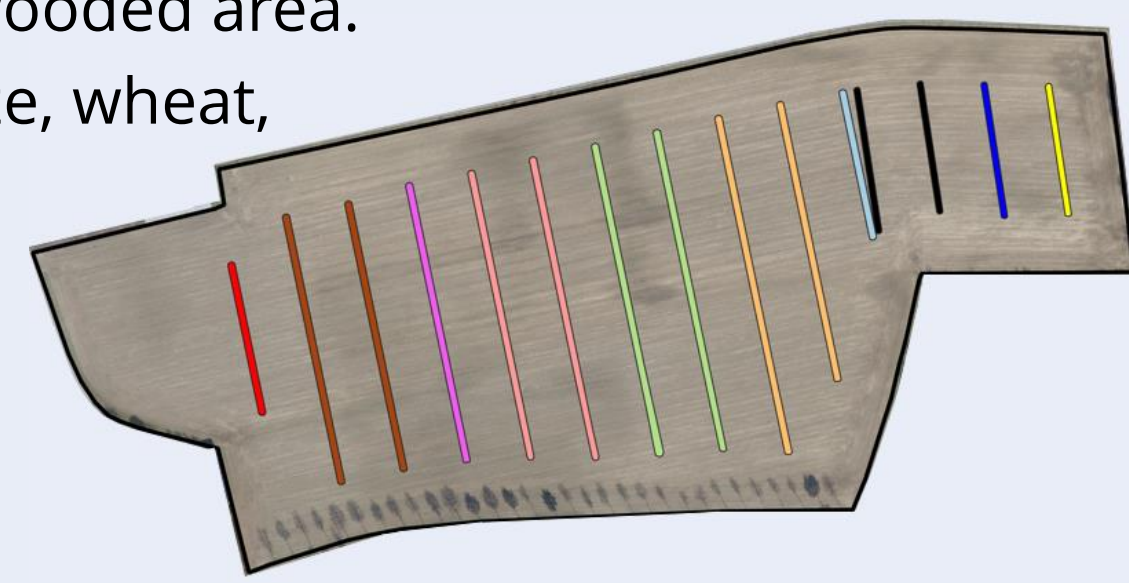
- Insufficient funding**
- Lack of (subsidised) consultancy**
- German AF definition is too restrictive
- Excessive bureaucracy
- Potential for conflict due to lack of consideration of AF in nature conservation law

### Main Goal

Test the effect of **existing** and **hypothetical** funding schemes on the **profitability** of an **AF system** using **probabilistic modelling** following a **Decision Analysis** approach.

### Exemplary AF system

- Existing silvoarable AF system with 10 apple varieties.
- 10.14 ha, 0.57 ha wooded area.
- Crop rotation: maize, wheat, barley, rapeseed.



## 2. Methodology

- Identify key decision variables using literature and expert estimations.
- Conceptualise decision with an overview of variables and impact pathways (Fig. 3).
- Parameterize the model with value ranges and probability distributions.
- Translate conceptual model into a mathematical one using R.
- Compute Net Present Value (NPV) using Monte Carlo simulation (Fig. 4). NPV = discounted value of net cash flows over time (here: 30 years).
- Integrate funding scenarios into the model.
- Examine the impact of funding schemes on profitability.

## Key Finding

**10 of 16 German states offer AF support or subsidised consultancy, yet the model shows that impacts on AF profitability are negligible.**

## 3. Results

### Lower Saxony (+Hamburg, Bremen)

- Eligible: planting & protection material, establishment labour (consulting excluded!)
- Silvoarable systems only
- Farmers to cooperate with University of Göttingen
- Highest-ranking AF system is funded preferentially

### Mecklenburg-Western pomerania

- Eligible: planting & protection material, establishment labour
- Staggered payment:
  - 1,566 €/ha\* SRC
  - 4,138 €/ha\* shrubs
  - 5,271 €/ha\* timber/food
- Tree strips only
- Min. investment: 2,500 €

### Brandenburg (+Berlin)

- Eligible: planning/consulting
- Other investment cost NOT funded
- Up to 18 h of consulting funded
- 25 % of consulting must take place at the farm

### Saxony

- AF funding integrated in directive for agr. investments
- Effective investment must exceed 50,000 €
- Silvoarable systems only

### Bavaria

- Eligible: planting & protection material, establishment labour
- Staggered payment:
  - 1,566 €/ha\* SRC
  - 4,138 €/ha\* shrubs
  - 5,271 €/ha\* timber/food
- Tree strips only
- Min. investment: 2,500 €

\*tree area

### DeFAF Suggestion

- Eligible: all investment costs
- 100 % for first 10 ha
- 80 % for additional 10 ha
- 50 % for subsequent ha
- 600 €/ha wooded area annually

### Thuringia

- Eligible: planning/consulting
- Other investment cost NOT funded
- 3 AF-related subsidised consulting options (2000 € each)

### Baden-Württemberg

- Eligible: planning/consulting
- Other investment cost NOT funded
- Min. 5 h of consulting
- 5 licensed consulting companies

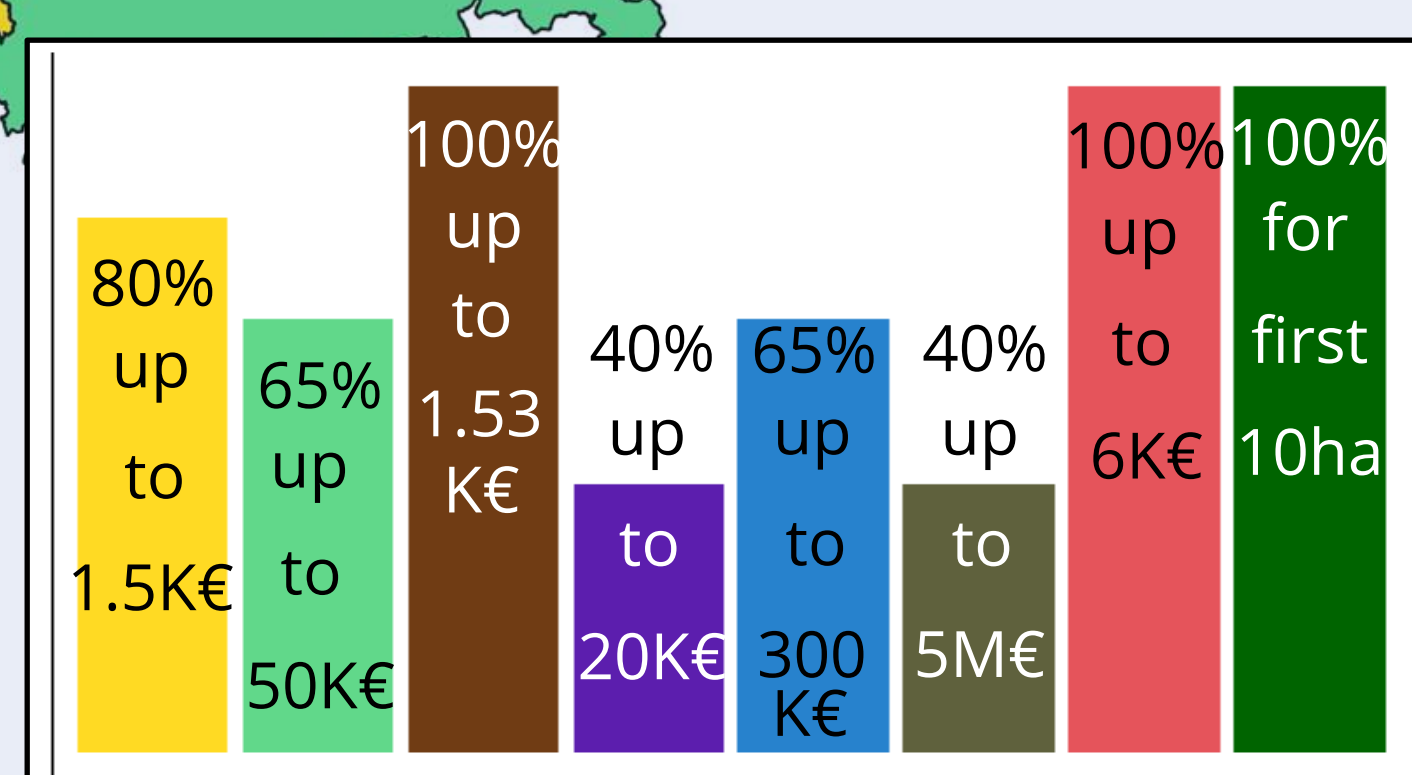
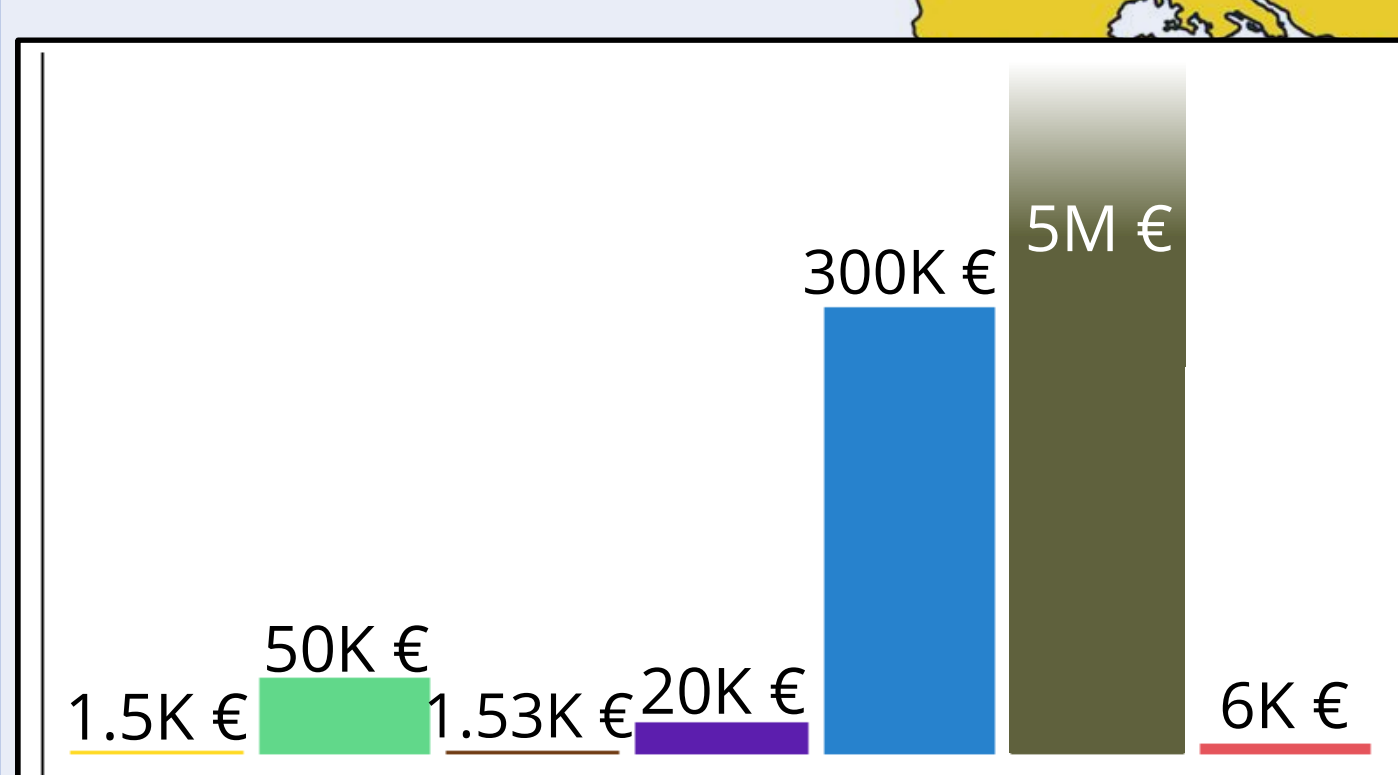


Fig. 1: Max. total funding per application across scenarios

Fig. 2: Max. percentage of total investment subsidised across scenarios

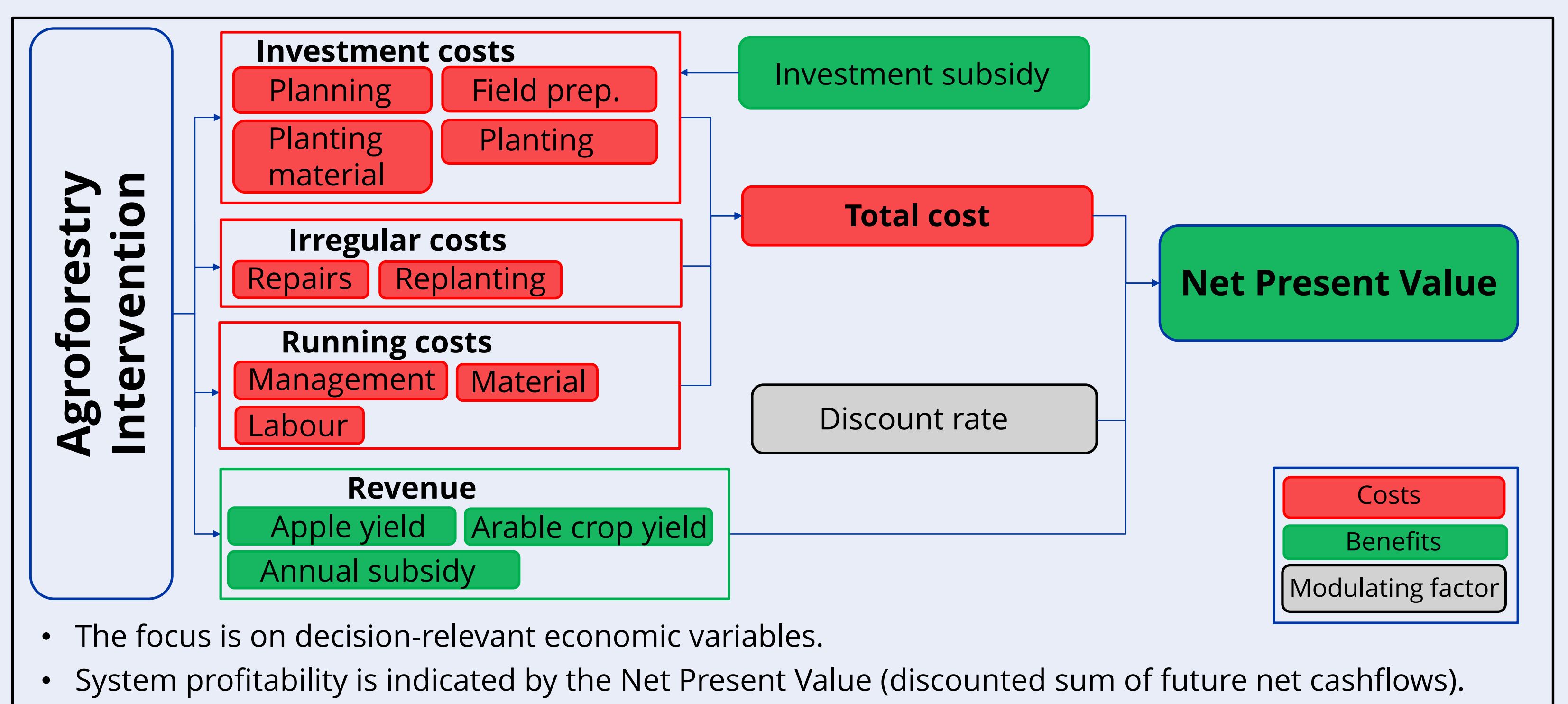


Fig. 3: Simplified conceptual model of the AF intervention.

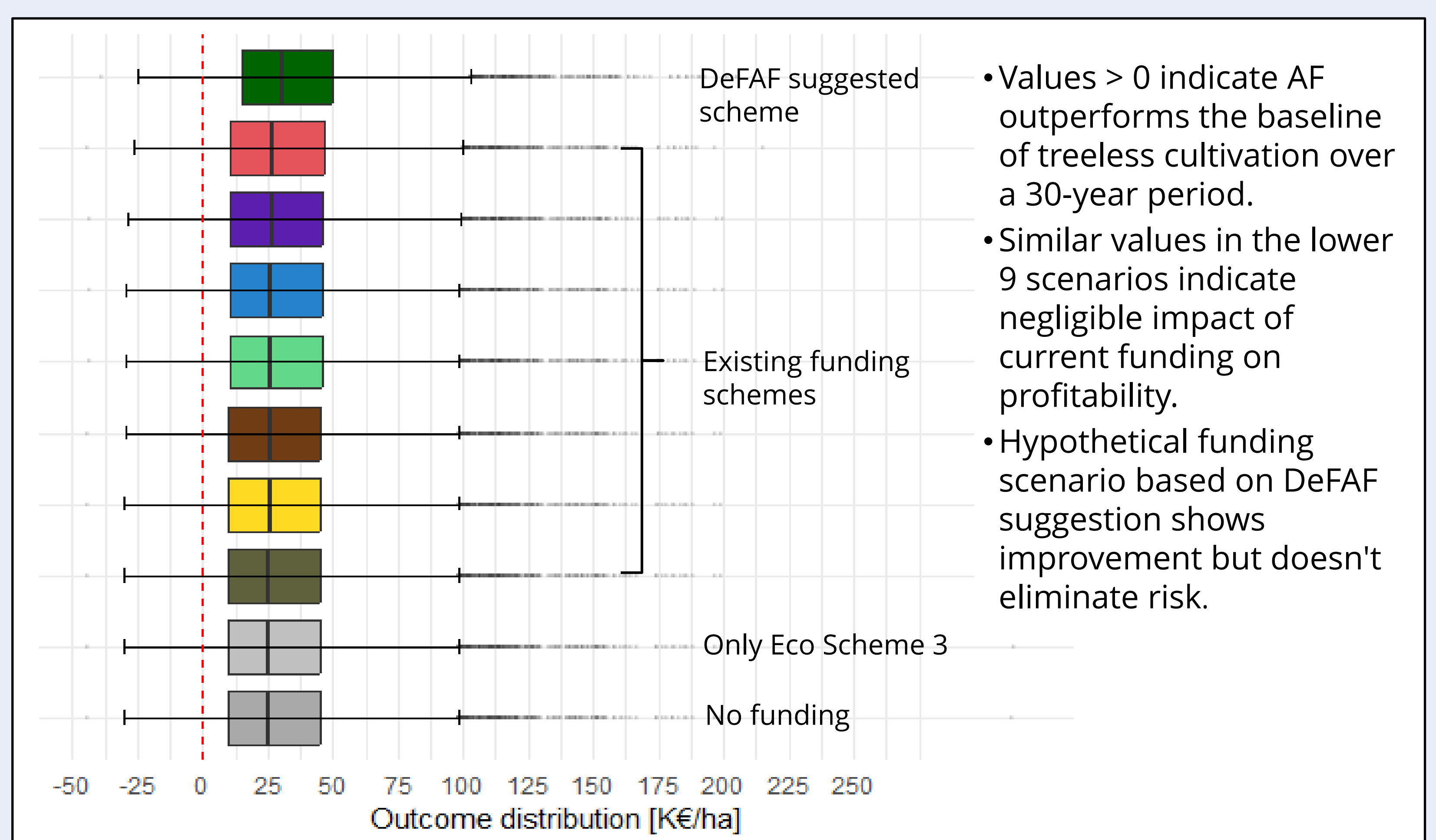


Fig. 4: Pairwise comparison of the NPV of treeless baseline and AF systems across scenarios.

## 4. Conclusions

- Model output supports statements made by DeFAF about the ineffectiveness of existing subsidies.
- Existing funding schemes do not strongly impact the NPV of the examined AF system.
- Policy-makers designing future funding schemes should consider suggestions from DeFAF.
- Inadequate funding remains one of several barriers to the adoption of AF in Germany post 2023.

<sup>1</sup>DeFAF: Deutscher Fachverband für Agroforstwirtschaft (= German Agroforestry Association)



ReForest



HortiBonn

