

Compensation payments for alternative forest management supporting nature conservation

A case study for Kysuce region, Slovakia, based on single-tree simulator and silvicultural cost model

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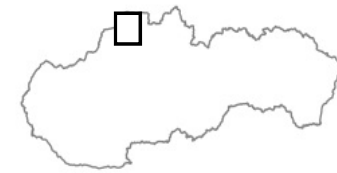
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Compensation payments according to Slovakian Forest Act

- Example region: Research Demonstration Area Kysuce
- Mainly old mature even-aged spruce stands, 114 ha, 845-1025 m



Simulated management options, 50 years, 25 stands

- Conventional Management (baseline):
102 ha “Shelterwood”, 12 ha “Clearcut”
- Alternative Management:
Transition towards “Selective” forests
- No Management: “Doing Nothing” in all stands
- Forest Reserve: 47 ha “Doing Nothing” (Reserve),
67 ha transition towards “Selective”
forests (Buffer zone)



Financial method to estimate opportunity costs for time-limited conservation contracts

- Method adopted from:
 - Net present value (interest rate 2%)
 - Holding value (stands already existing)
- Value calculation for each treatment based on:
 - Sum of discounted net cash flows of single periods
 - Change of discounted stumpage value of remaining stand during contract period
- Limitations of method:
 - Expectation value not considered (no fixed rotation period)
 - Limited time horizon of simulation (maximum 50 years)
 - No risk of stand failure considered

Combination of two models for financial evaluation

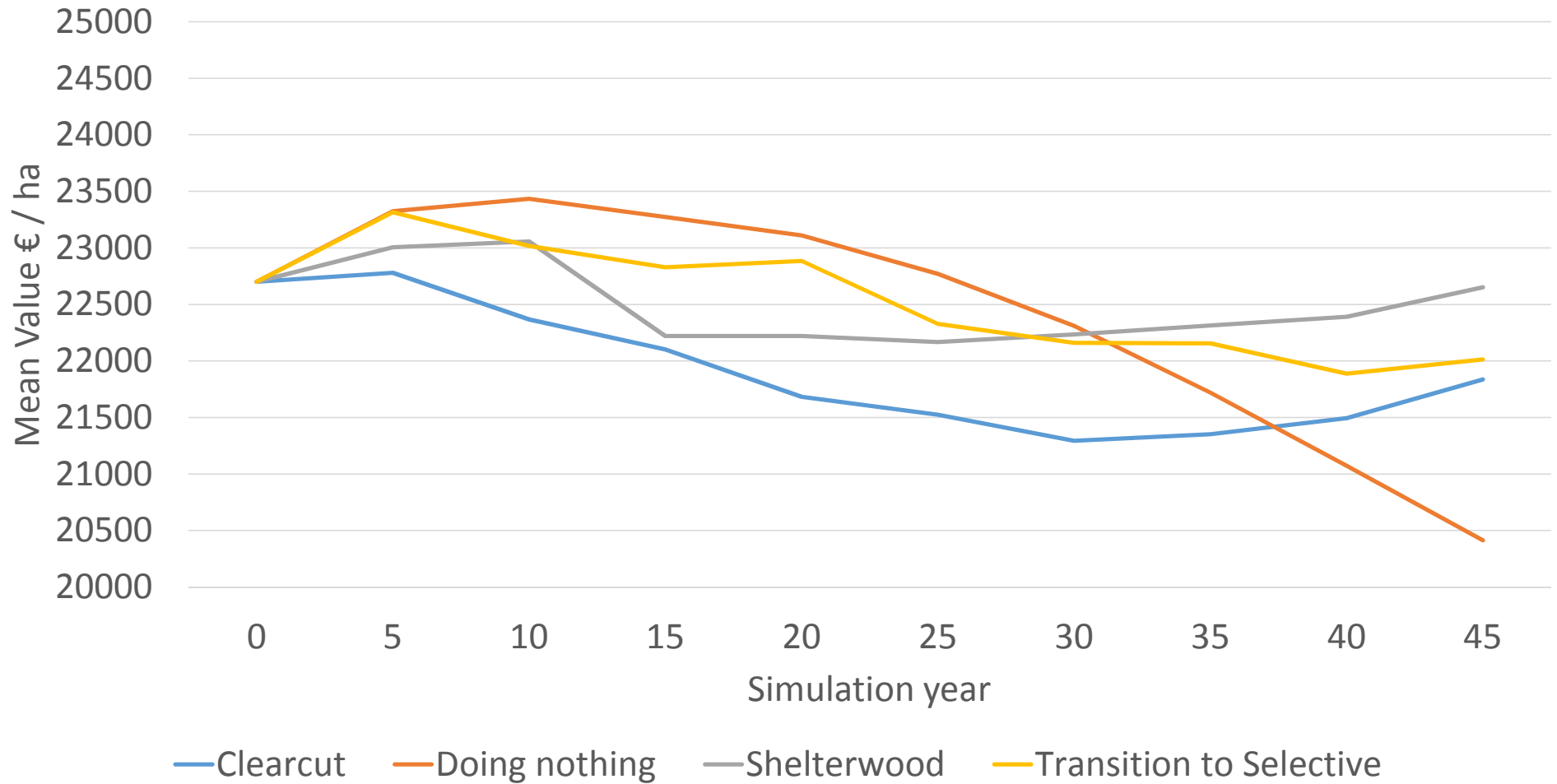
Silvicultural costs model

- Stands with less than 10 cm mean dbh
- Costs and time schedule of silvicultural operations specific for site, region, tree species and management alternative
- Two phases:
 - 1: Planting, pruning, protection
 - 2: Tendings

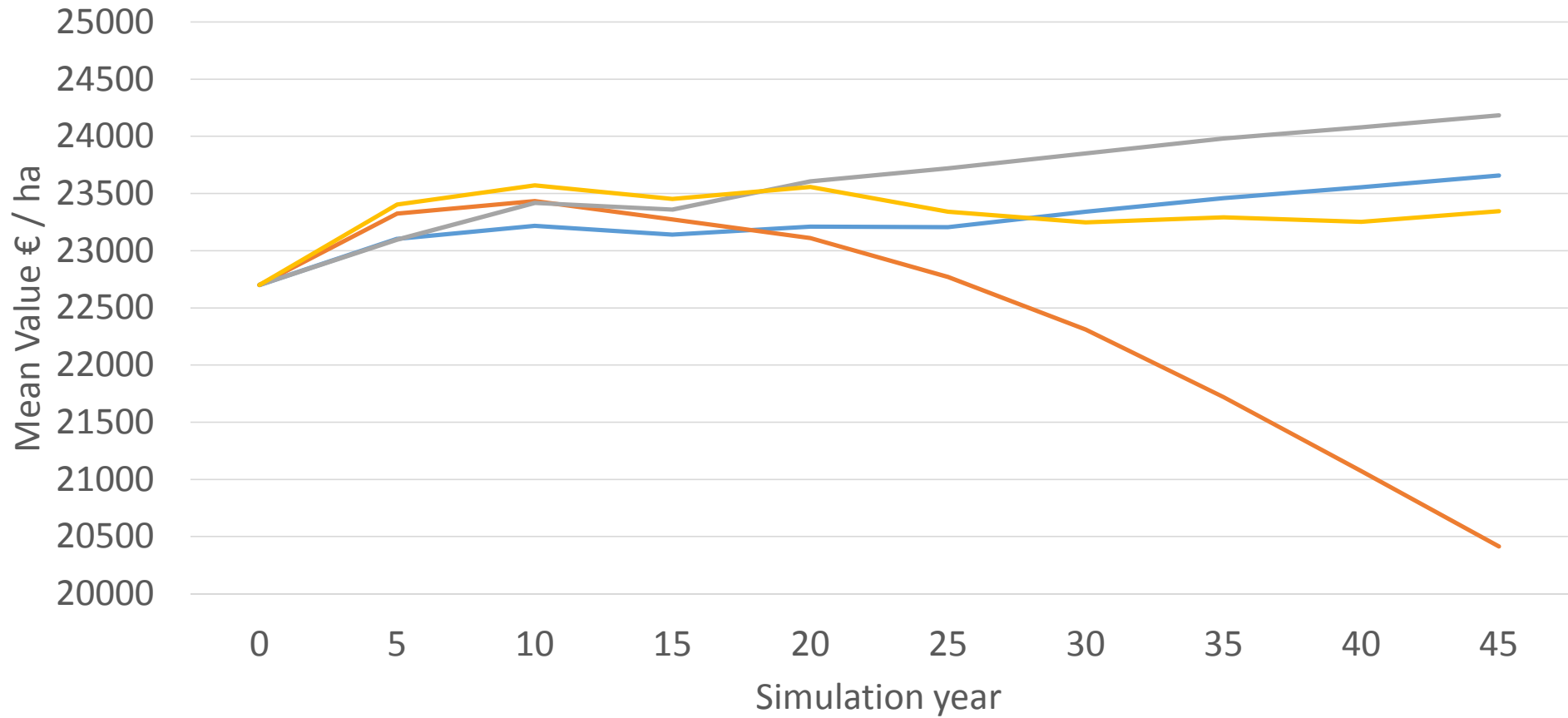
Single-tree growth simulator Sibyla

- Stands with more than 10 cm mean dbh
- Evaluation considered dbh, height, stand age, volume, damage, quality and dbh variability specific for tree species, region and site index
- Thinning (percentage dependent on age) and final harvest (specific for regeneration units within stands)
- Timber prices and harvest costs implemented and adjusted in Sibyla

First and second stand generation with silvicultural costs

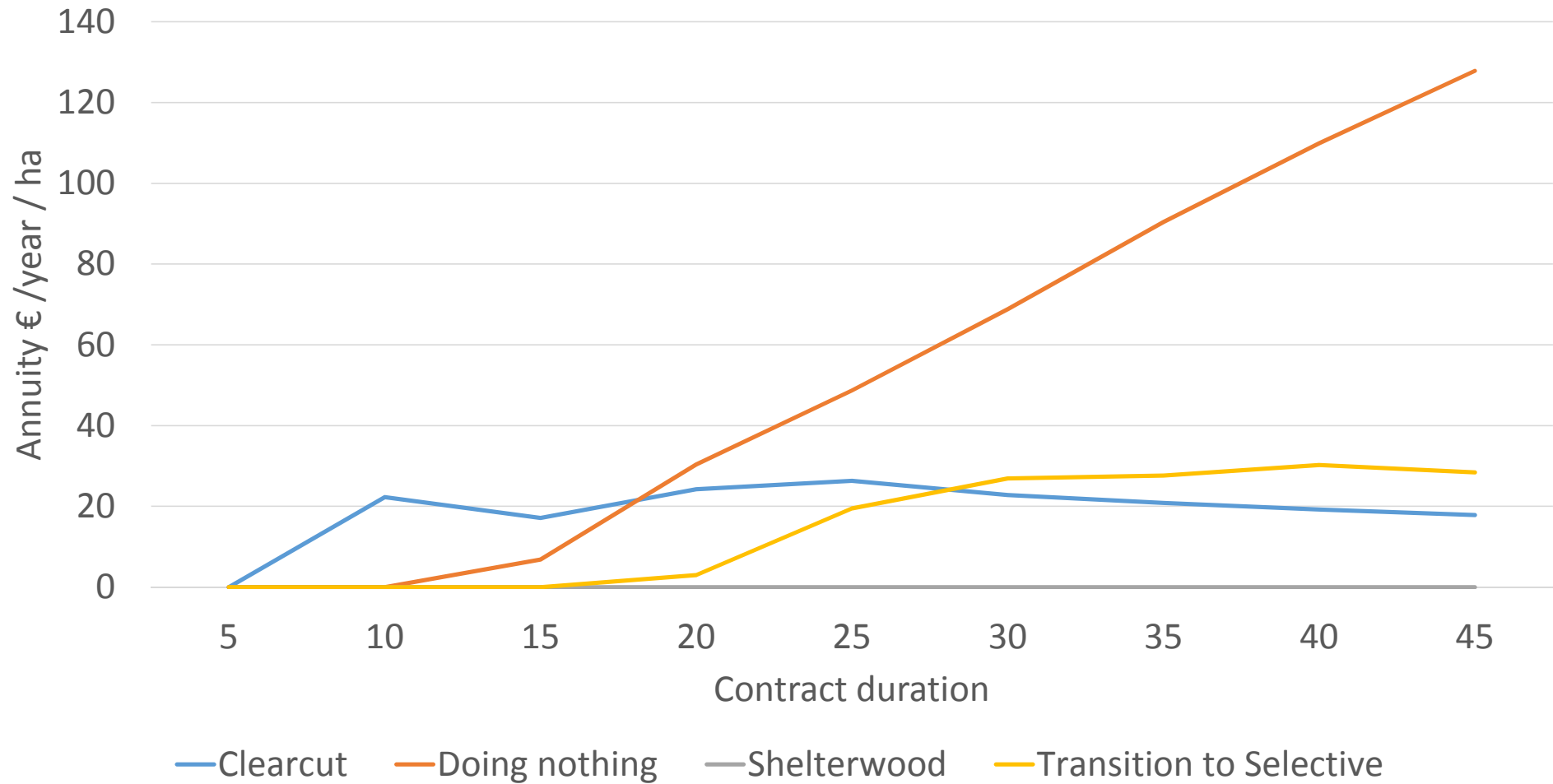


Only existing stand generation, ignoring costs/ revenues of second generation

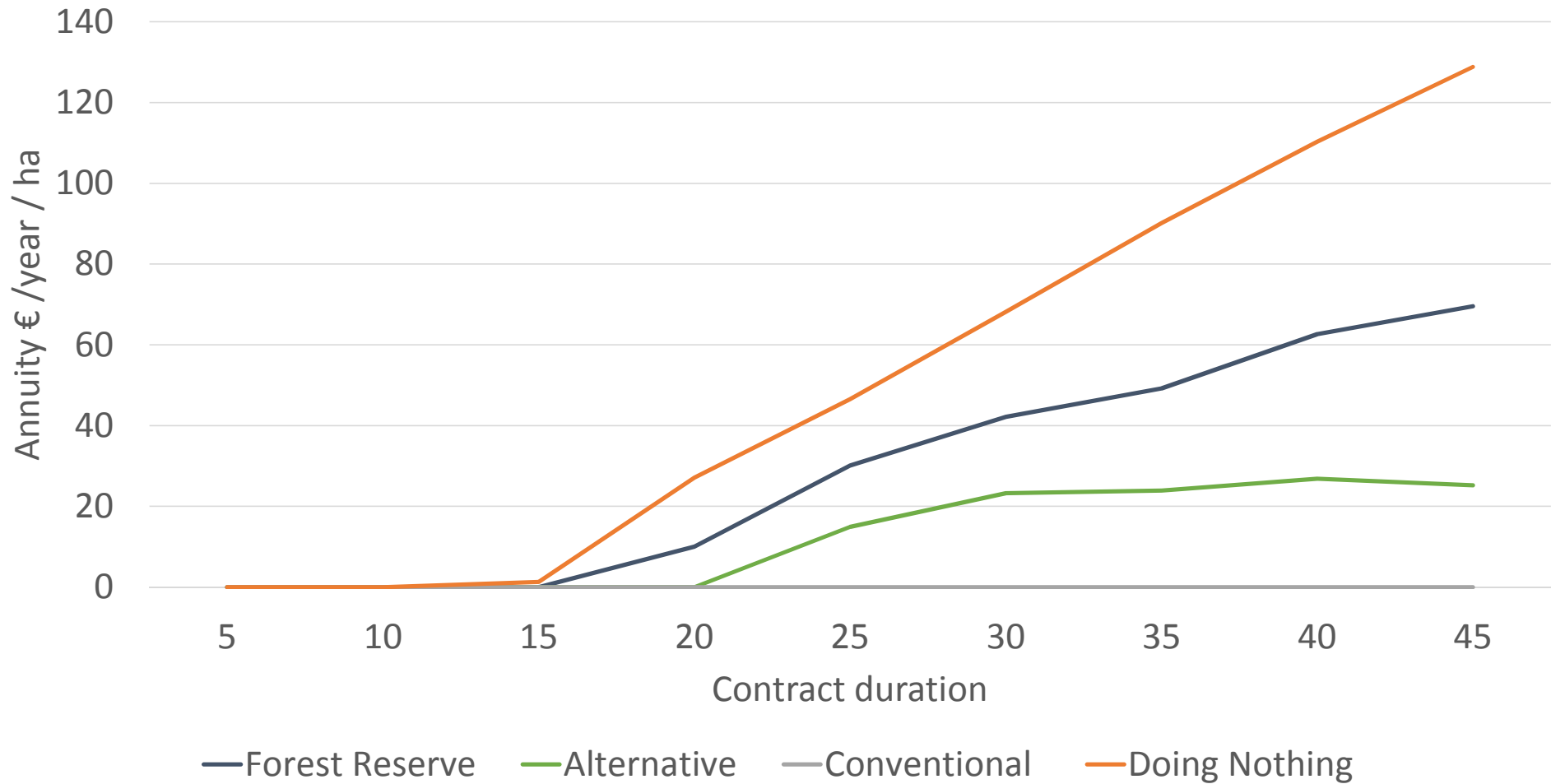


— Clearcut — Doing nothing — Shelterwood — Transition to Selective

Only old stand, annual compensation payment for management treatment



Only old stand, annual compensation payment for management option



Conclusion for opportunity cost method

- In growth simulator cutting operations limit stand growth potential within 10 years (suboptimal stand density), benefits of higher productivity of remaining trees can be reached after 20 years
- Compensation payments for short time trends are misleading and cannot be calculated with method for opportunity costs
- Objective estimation for compensation payment only is possible after time periods longer than 30 years
- Regeneration costs should only be considered when long time benefits of investment are also possible to be considered



References

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