

Estimating climate service value in forestry: the case of climate information on drought for maritime pine in Southwestern France

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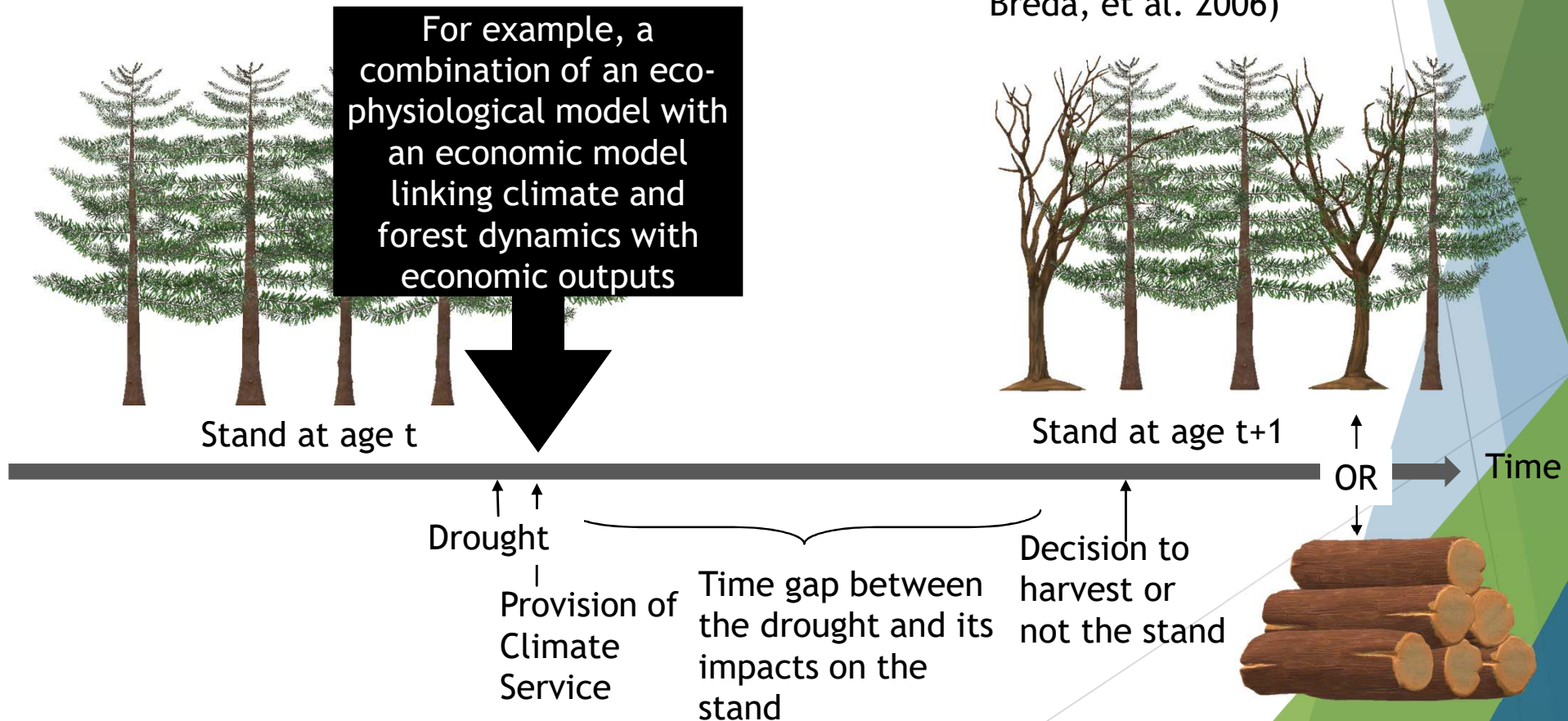
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What are climate services?

*“Climate services involve the production, translation, transfer, and use of climate knowledge and information in climate-informed decision making and climate-smart policy and planning”
(Climate Services Partnerships)*

Defining our climate service

- Tree growth decline
 - Premature mortality
- (Battaglia et al., 1998; Le Dantec et al., 2000; Bréda, et al. 2006)



Looking for the value of this climate service

► Why?

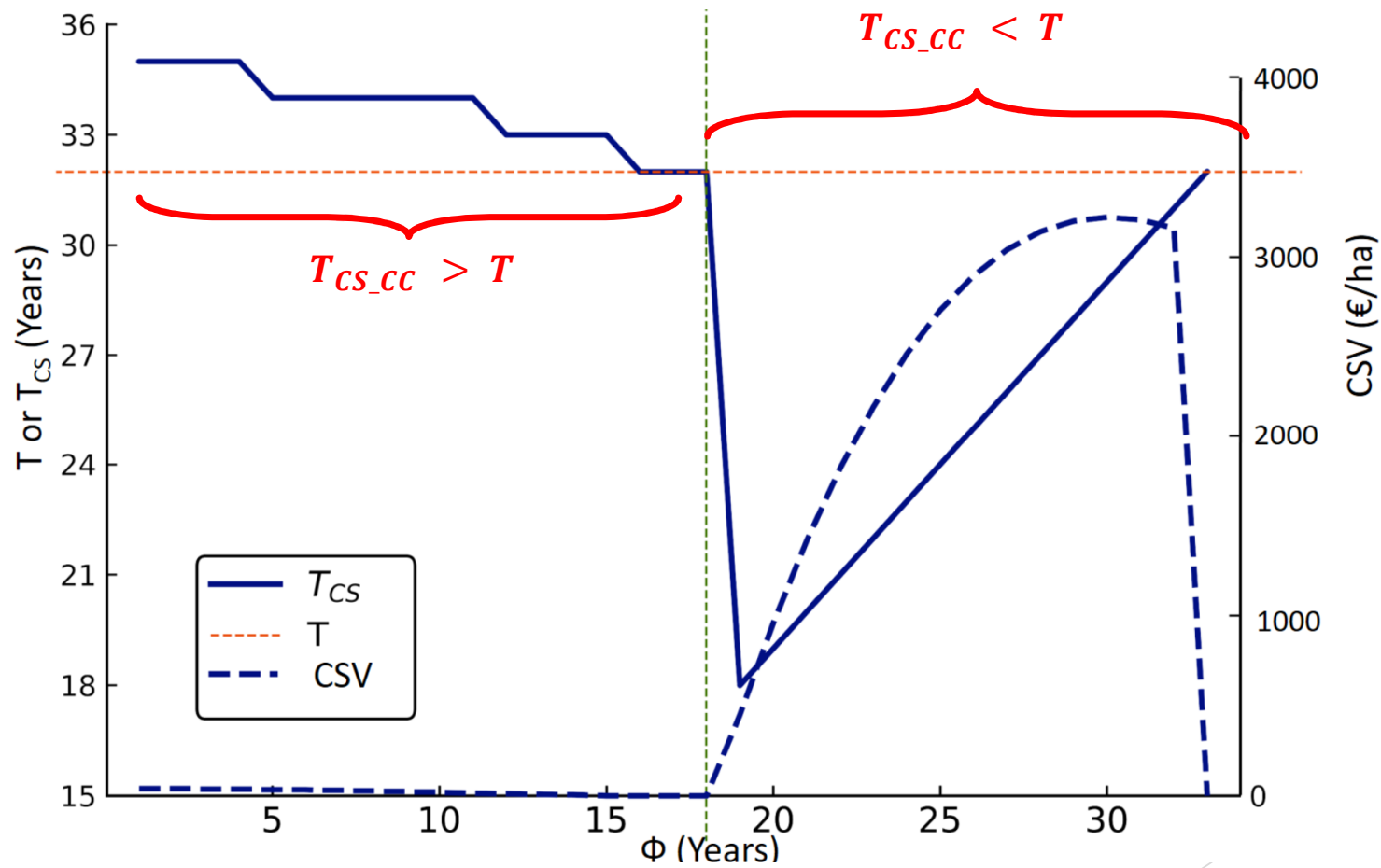
- Provide public institutions and decision-makers with an instrument that would allow them to better calibrate their investments in the supply of CS for the forest sector

► How?

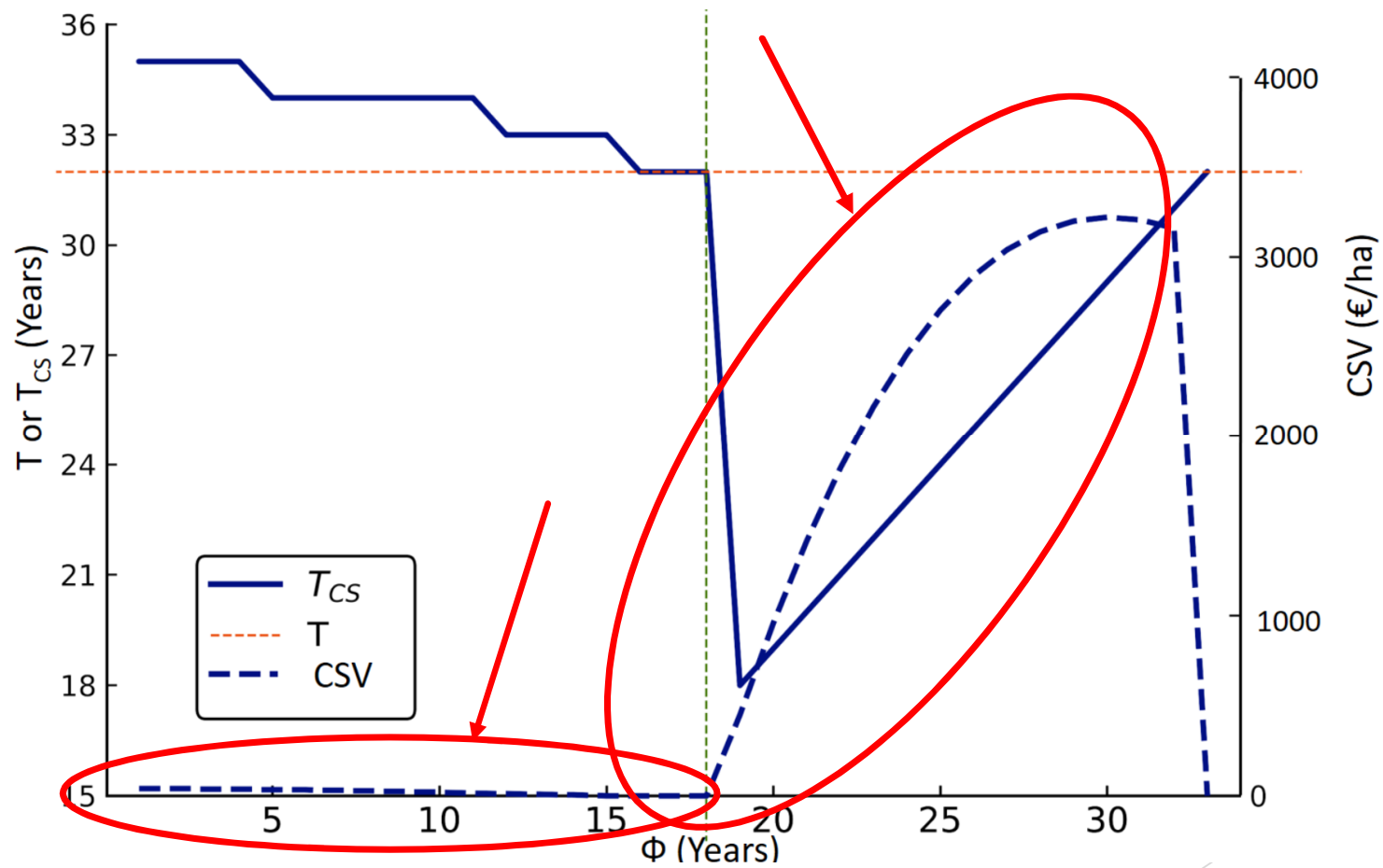
- Comparison of Land Expected Values (LEV) for two scenarios with and without climate services;
- the climate services value is the difference in LEV:
 - $CSV = LEV_{CS} - LEV_{noCS}$
- Varying: **the intensity of the drought** (rate of growth decline h and mortality increase s), the **date of occurrence** of the drought φ and the **discount rate** r
- Case study: Pine monospecific forest in South-West France

Scenario with drought and climate service	Scenario with drought and without climate service
• A drought takes place • Forest owner has no information about the incidence of a drought at the beginning of the rotation • Forest owner has information about the impacts of the drought, just after the incidence • Optimal rotation age $T_{CS_{CC}}$ is modified	• A drought takes place • Forest owner has no information about the incidence at the beginning of the rotation • Forest owner has no information about the impacts of the drought • Optimal rotation age T remains the same as without a drought incidence

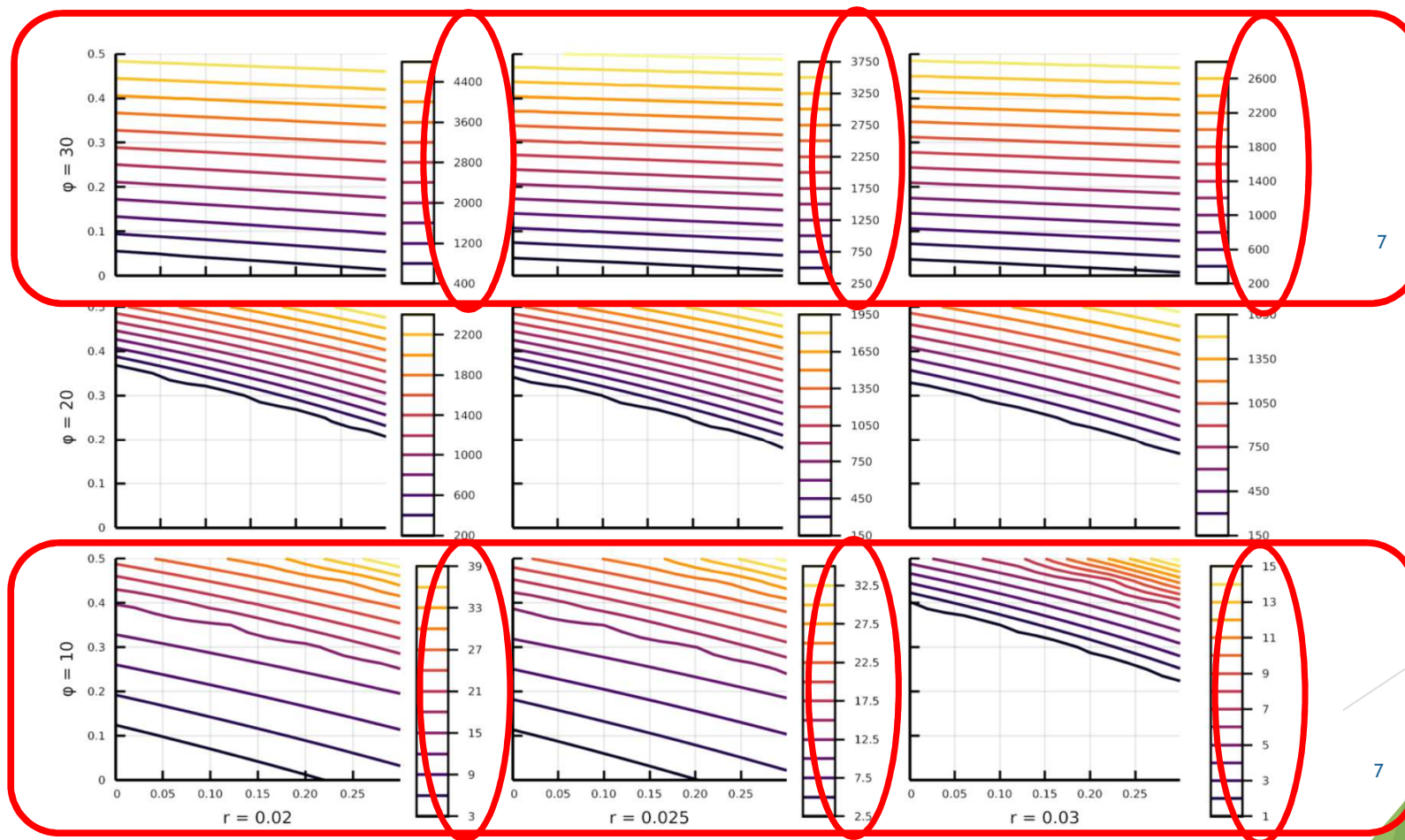
Results: optimal age of rotation



Results: CSV



Sensitivity Analysis



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Discussion & take home messages

- ▶ The agricultural economics literature suggests CSV for coffee at \$17-28/ha (Lechthaler and Vinogradova, 2017) and for maize at \$20-30/ha (Bert et al. 2006).
- ▶ The annuity corresponding to a LEV of €4,900 using a discount rate of 2% is $4900 \times 0.02 = €98/\text{ha}/\text{year}$ → higher than the values given in the agricultural economics literature.
- ▶ Our results suggest that a potential market for CS provision in the forest sector exists.
 - ▶ In the case of drought, the main challenge for CS providers is to better assess the impacts of drought in terms of additional mortality and tree growth reduction.
- ▶ Methodology could apply to other climate relative events with time gaps between occurrence and impacts (pathogens invasion)