Forest reference level under current management practice

Case study in Switzerland

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What is a forest reference level?

1. How to model forest development?
2. How to define current management practice?
Forest development model MASSIMO

Outputs
• Growing stock / Carbon
• Stem numbers
• Increment
• Harvest

Stadelmann et al. 2019, Forests
Thürig und Kaufmann 2010, Eur J For Res
Kaufmann 2001, LFI Methods, WSL
Definition of current management practice
Empirical estimation from NFI data

Default reflection of observed management practices
- Rotation length
- Thinning intervals
- Intervention intensity

→ Calculate all information from empirical NFI data
  - Terrestrial survey (repeated tree measurements)
  - Oral survey (when and what was the last intervention?)
Empirical estimation from NFI data

Definition of current management practice

Single tree probabilities of harvesting...
What explains single-tree harvesting probability?

- **Single-tree variables** → dbh, species
- **Economic accessibility** * → region, elevation, slope, closeness to road, harvesting methods
- **Stand variables** → NPH, BASFPH, DDOM, stand type, ownership
- **Site variables** → site index, growth of surviving trees, large-scale windthrow
  - Formulate full model
  - Backward model selection by BIC

* Bont et al 2018
Explanatory factors for single-tree harvesting

DBH - Tree species group

- Picea abies
- Abies alba
- Other coniferous
- Fagus silvatica
- Other broadleaves

Number of trees ha\(^{-1}\) - Basal area

Basal area

Number of trees ha\(^{-1}\)

Harvesting prob.
Explanatory factors for single-tree harvesting

Elevation - economic accessibility

- **Ground-based good**
- **Ground-based bad**
- **Cable-based good**
- **Cable-based bad**

Harvesting prob.

Elevation (m.a.s.l.)
Explanatory variables are ecologically and economical meaningful and plausible

Implementation of single tree harvesting probabilities in forest development model MASSIMO works

Validation of MASSIMIO simulations with measured harvesting amounts are ongoing

→ In highly structured environments and stands, single tree harvesting models are a valid alternative to formulate current management practice
Thank you for your attention

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