A model-based approach to optimizing short rotation forestry management.

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Objective

Find an optimal management scenario for short rotation coppice (SRC) forestry.

Step 1: modify an existing model for SRC simulation

Management
- Periodic harvests
- Irrigation
- Start with cuttings

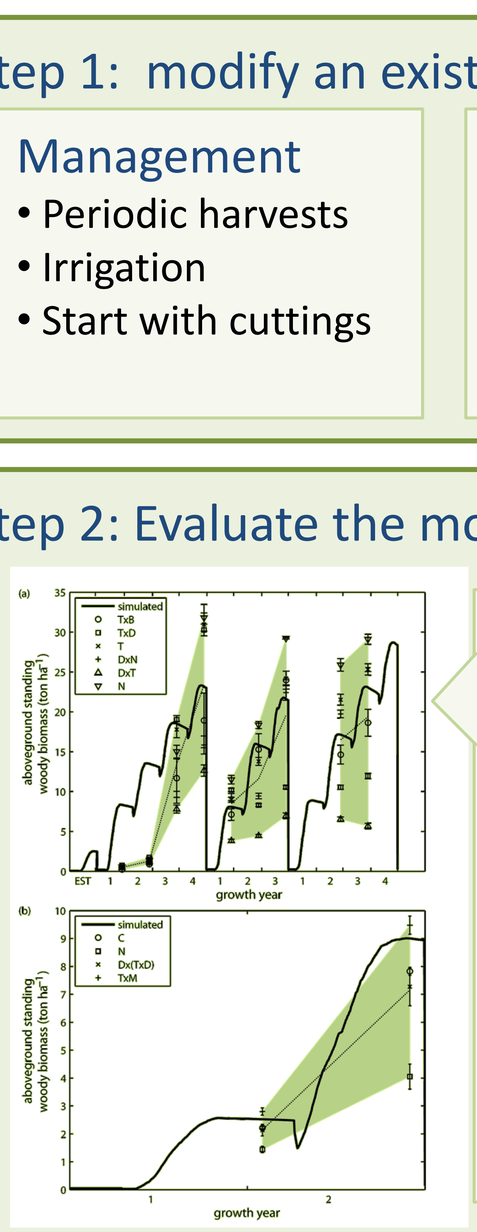
Growth
- # of stems increases after harvest
- fine root mortality decoupled from leaf mortality

Allocation
- No flowers
- No AB heartwood
- High allocation to leaves
- No root growth after harvest

Parameterization
- Allometric relations
- Vcmax & Jmax
- …

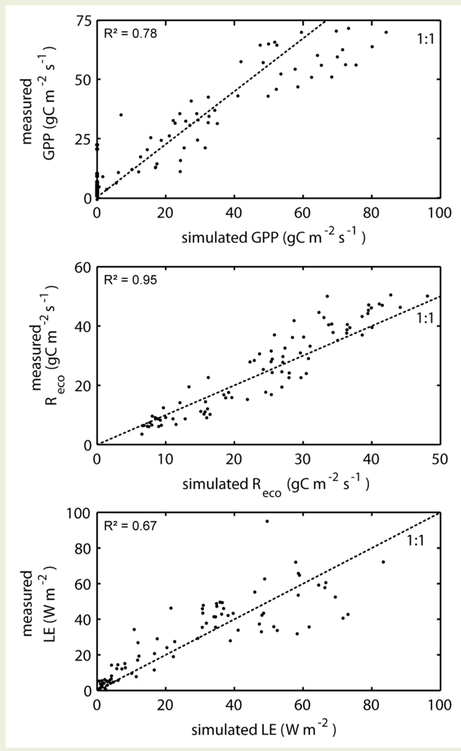
Step 2: Evaluate the model performance

Biomass



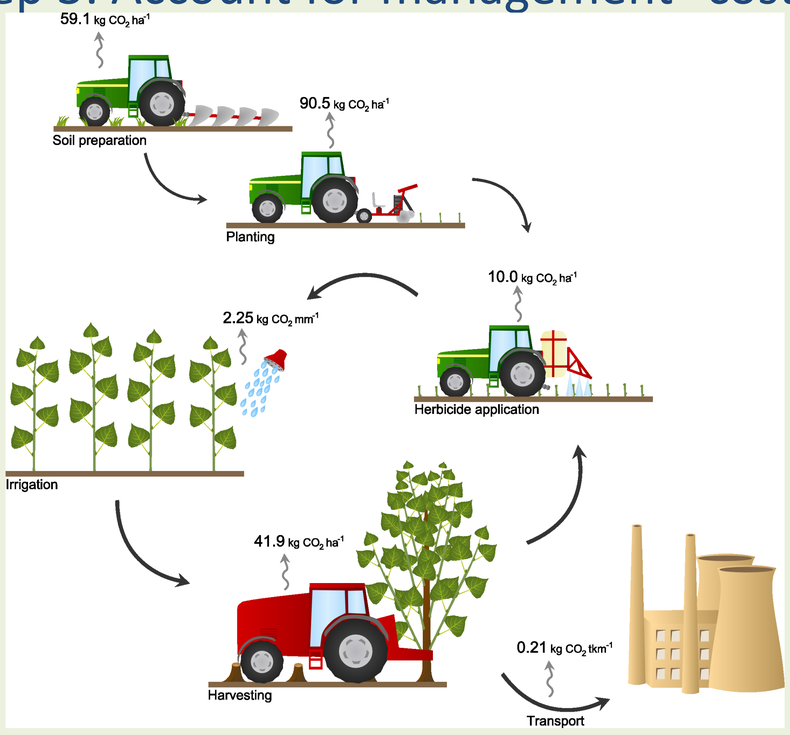
The simulated standing aboveground woody biomass (a) for the Boom site and (b) for the POPFULL site. The black line is the simulated biomass. The symbols are the different parentages of the poplars at that site and the green area is the range of measured biomasses.

Fluxes

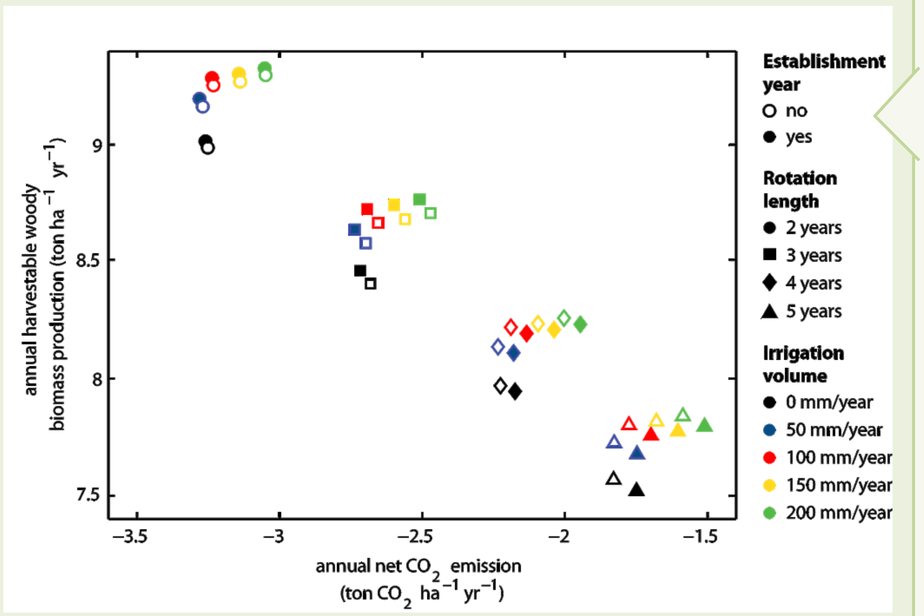


A 1-to-1 comparison of weekly averages of gross primary production (GPP), ecosystem respiration (R_{eco}) and latent heat (LE) for the POPFULL site, between the model outputs and the measured values. The dotted line is the 1:1 line.

Step 3: Account for management "costs"



Step 4: Simulate different management scenarios



20 year annual averages of CO_2 emission and harvestable biomass production for the Boom site for different management scenarios, including management CO_2-costs.

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