

Modelling agroforestry systems with Web-EcoYieldSAFE

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Introduction

Agroforestry is a promising land use which delivers greater socio-economic and environmental externalities than conventional agricultural and forestry systems. Models may help improve our understanding of land use systems, by being more cost and time-efficient than experiments. This was one of the motivations for the Yield-SAFE model development (van der Werf et al. 2007, Palma et al 2016). It is a parameter-sparse, process-based dynamic model that has been used to estimate long term productivity of agroforestry systems.

However, it is currently lacking the ability for stakeholders to directly use and understand this model and a mechanism for the modelling experts to effectively communicate obtained results and interpretations with such stakeholders. For this reason, we propose the use of the model as a web application, i.e. a web service together with an interface for ease of use. Any potentially interested person with an internet-connected device can make use of it, which in turn leads to more informed decision making and wider model acceptance (Walker and Chapra 2014).

Web implementation



Access Web-EcoYieldSAFE

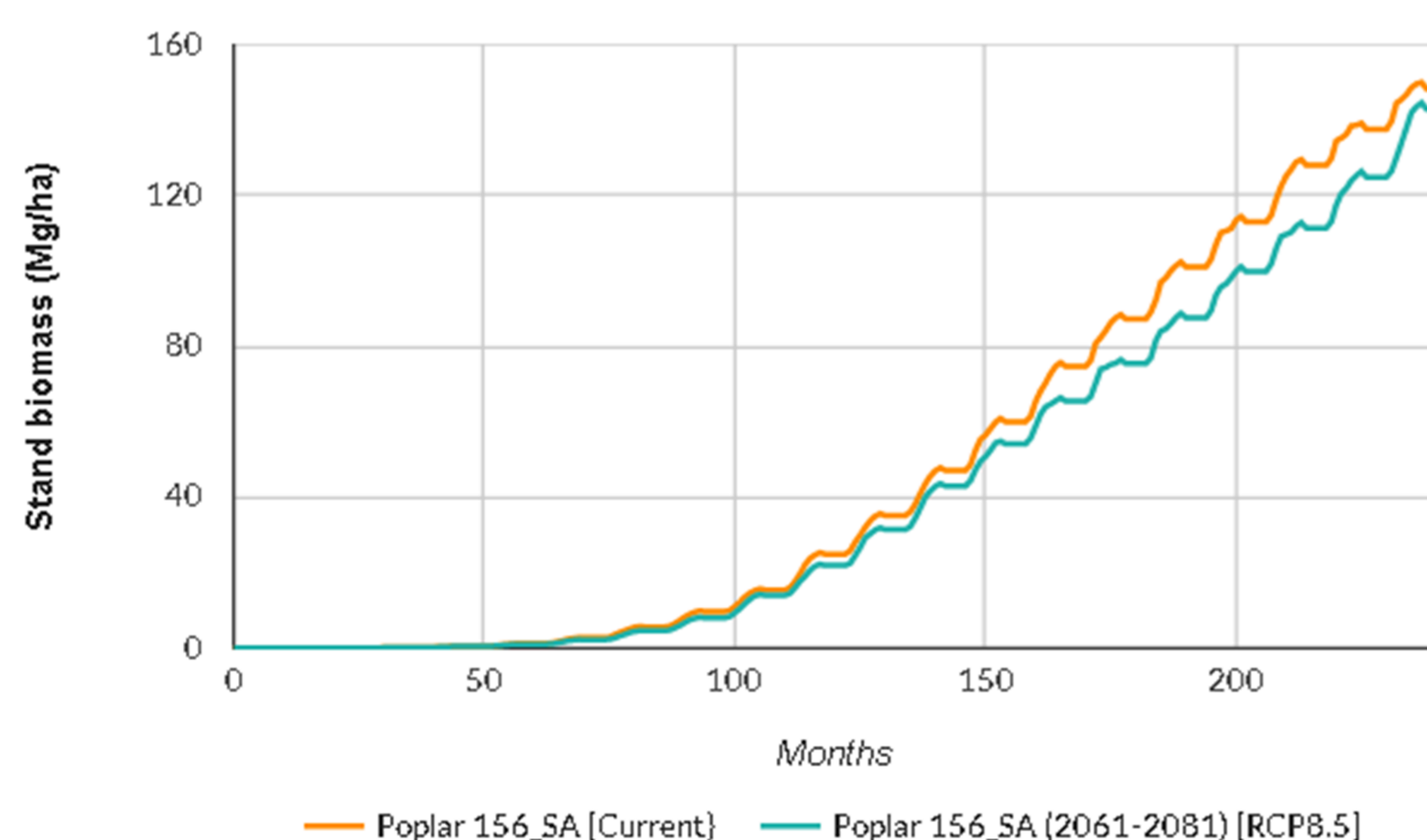
The screenshot displays the Web-EcoYieldSAFE interface with several key components:

- Home - entry section:** Features the 'EcoYield-SAFE' logo and navigation tabs for Home, Dashboard, and Docs.
- Dashboard:** A 'model control section' showing the current scenario and options.
- Docs - documentation:** Provides 'model information', 'related articles', and 'details about inputs and outputs'.
- Multiple scenario setup:** Allows users to select scenarios from a database (e.g., 'Poplar (156 trees/ha) with arable crops').
- Options:** Includes settings for 'Model' (may2018), 'Start year' (1981), and 'Years to model' (20).
- Inputs manipulation:** Offers 'Three options for climate data: current climate or one of two future climate datasets (optimistic RCP 4.5 and pessimistic RCP 8.5)'. A 'Climatic dataset' dropdown is set to 'Current climate'.
- Other variables:** A graph showing 'Yield per cropped area (Mg/ha)' and 'Stand biomass (Mg/ha)' over time (1985-2000).
- Make comparisons between multiple scenarios:** A dialog box to compare scenarios like 'SAUK_156_Agroforestry' and 'SAUK_0_Arable'.
- Add new graphs and edit the existing ones:** A configuration panel for 'Plotted variables' and 'Has secondary axis?'. It includes fields for axis labels and titles.
- Download data as CSV file:** A 'Download data' dialog box with options for 'Biophysical data' and 'Biophysical data (for Farm-SAFE Excel)'. A 'Save As' dialog shows the file name 'sauk_156_agroforestry_biophysical.csv'.

www.isa.ulisboa.pt/proj/ecoyieldsafe

Climate change assessments

EcoYieldSAFE runs over climate data retrieved from the tool CliPick, providing datasets used by the International Panel On Climate Change (Palma 2017). By using this tool, the user may not only simulate the current climate but also for future climate changes. CliPick adopted two datasets, the Representative Concentrations Pathways (RCP): an optimistic scenario, the RCP 4.5, and a pessimistic scenario, the RCP 8.5.



Example of scenarios comparison in Web-EcoYieldSAFE, evaluating stand biomass, in a poplar silvoarable system under current and future

References

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