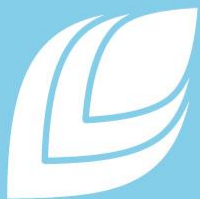


Soil Organic Carbon in farm level economic models: data needs for considering local specific contextual factors

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Overview

- FarmDyn simulates farmers investment and management decisions impacting the economic performance of farms;
- The model contains agronomic elements, but the models` goal (economic optimization) hampers the interaction agro-ecological and management factors, which normally contain high spatio-temporal variability and crucial for the economic performance;
- BioCASH seeks to bridge scales across models in order to address complex research questions (e.g. environmental and economic impact of policy targets);
 - Soil Health Indicators Soil fertility and the outcomes on plant growth;
 - Cost-benefit and environmental footprint analysis of waste stream supply chains is included;
 - Should allow scenario and policy assessment as e.g. resulting from EU Green Deal;
- This presentation show how we are developing / mimicking SOC dynamics in FarmDyn;

BioCASH: modelling toolbox

GTAP/MAGNET: macro-economic modeling



Global

MiterraEurope: soil health modeling

WP4 – Policy scenarios



Regional

WP2 - Database

upscaling
?

Lab studies providing soil health/safety indicators

Farmdyn: Farm-level economic models

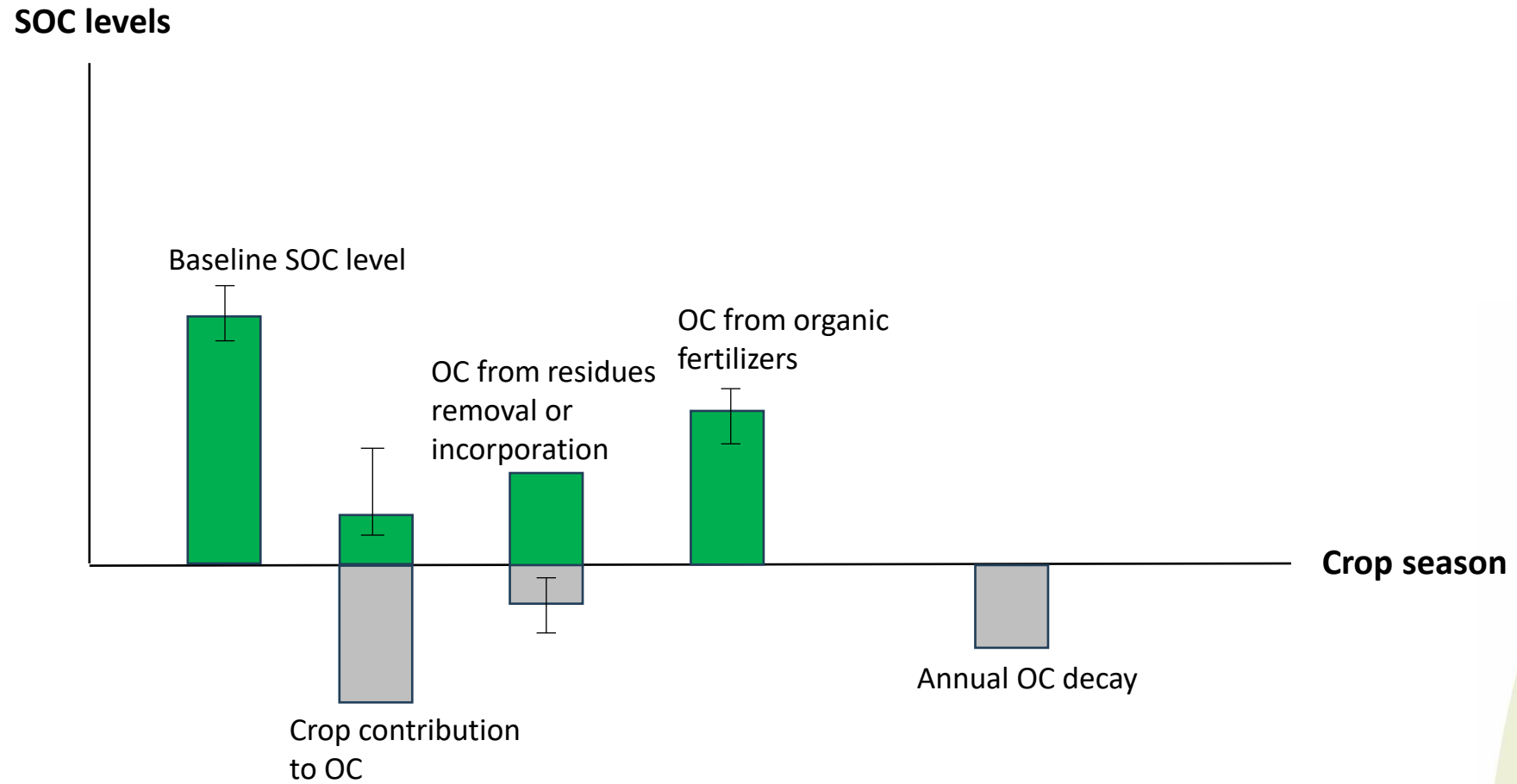


Local

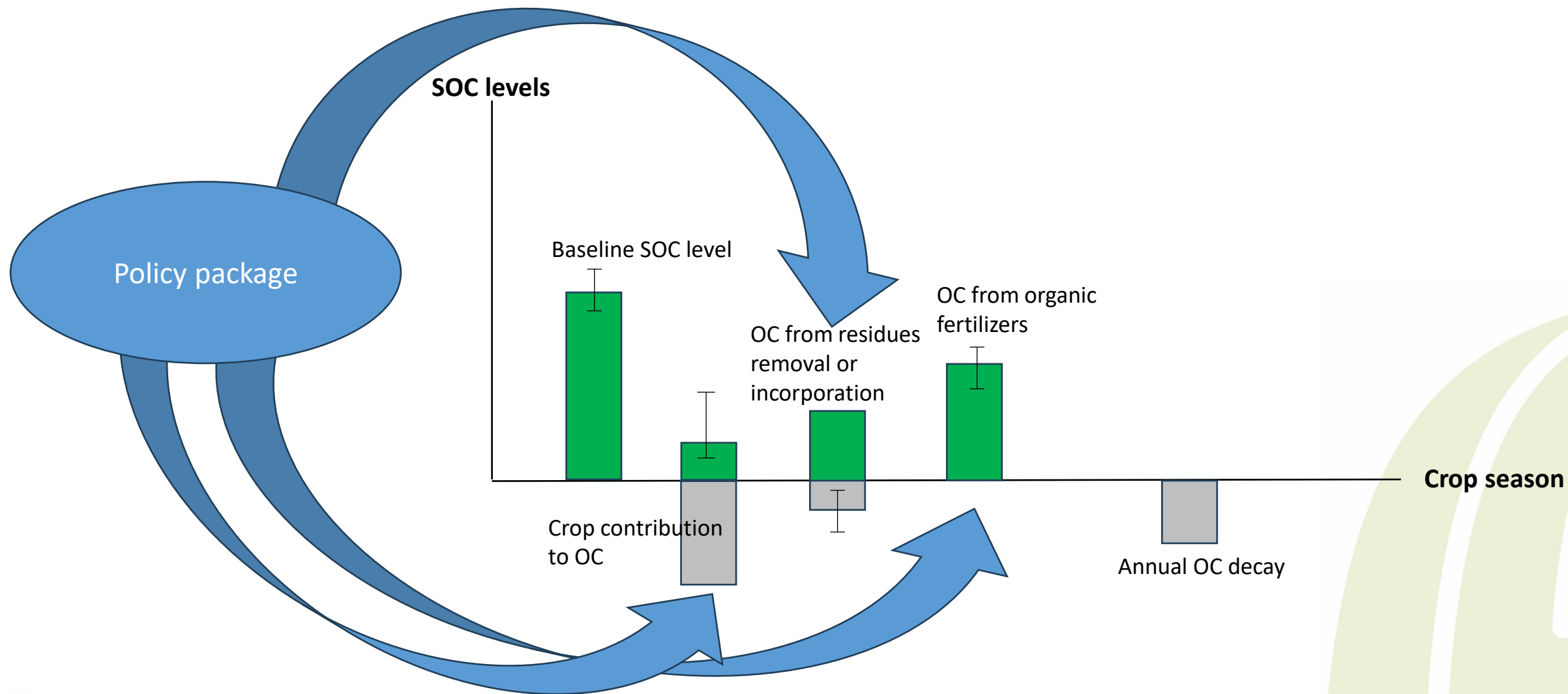
FARMDYN: General description

- Template based bio-economic model for farm simulation;
- Maximising net-income over arbitrary number of years under constraints:
 - Financial-economic (costs, revenues, income, depreciation, investments, taxes, etc.);
 - Agronomic (e.g. feeding, crop rotation, plant nutrition and fertilisation);
 - Policy (EU CAP, environmental policies e.g. manure application);
 - Farm endowments (land, labour, financial assets (liquidity, credits), machinery and buildings);
 - **Environmental accounting;**

SOC balance modeling



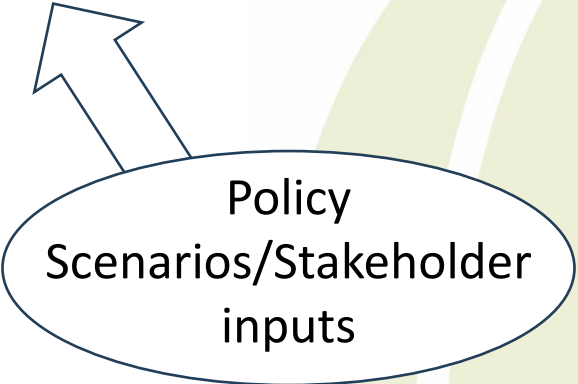
SOC balance modeling + economic policy scenarios



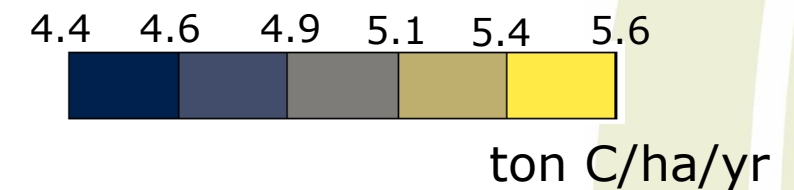
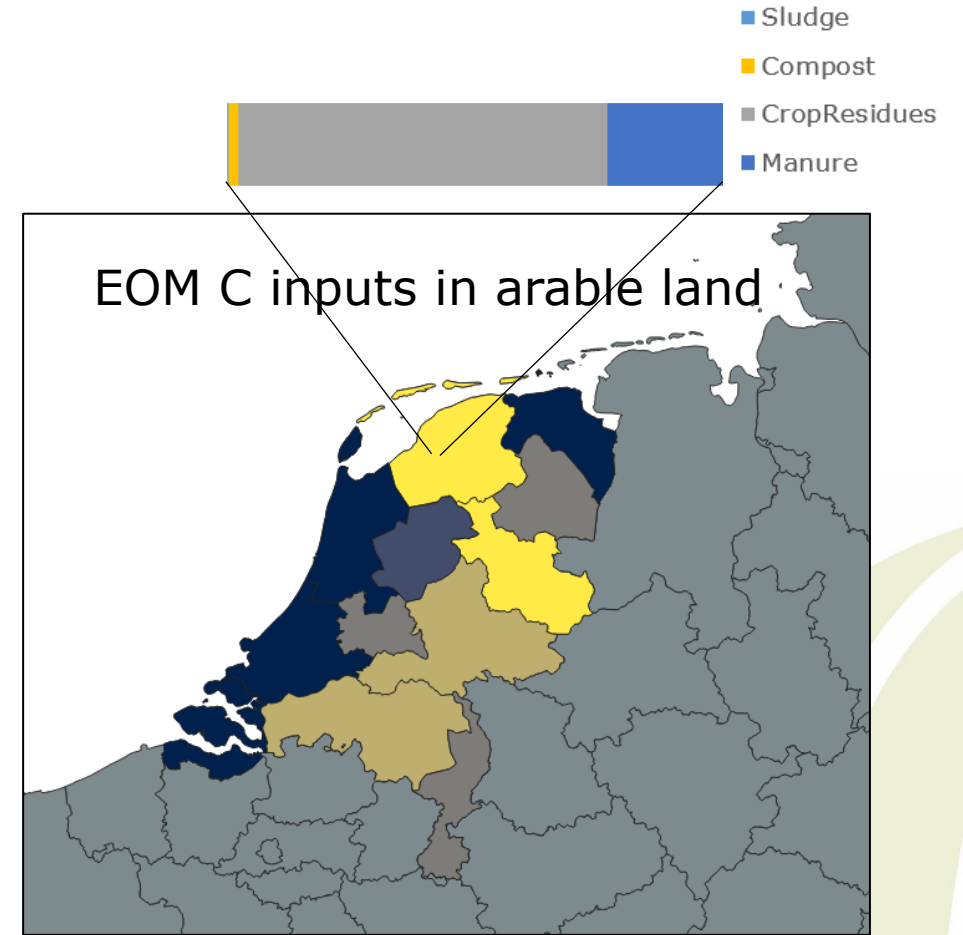
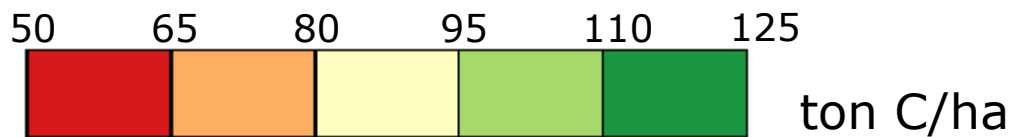
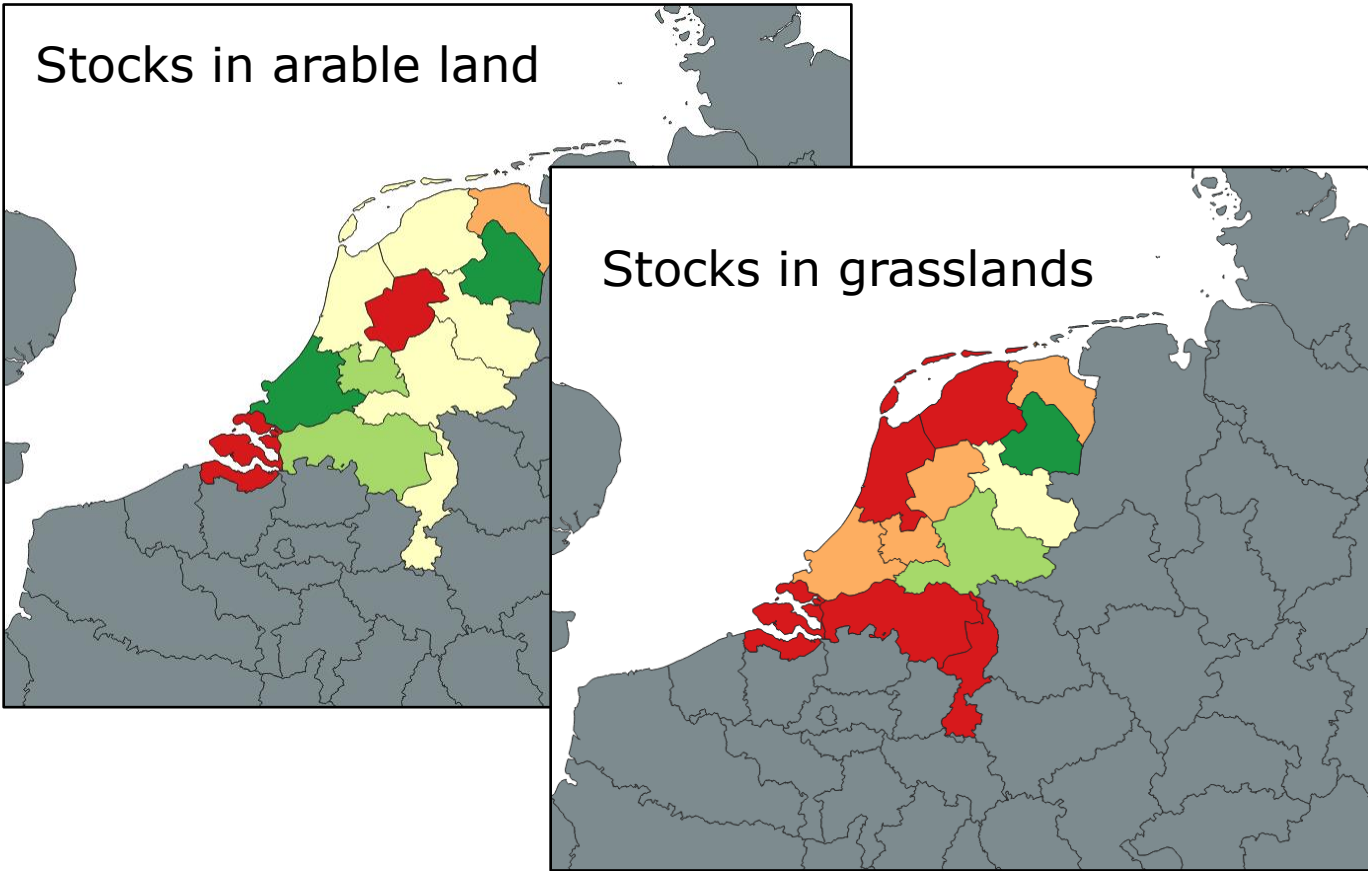
SOC balance in FarmDyn

Variables	Baseline SOC	Crop Contribution	Addition of crop residues (CR)	Organic ferti. (OF)	Annual decay
Original/Current setup in FarmDyn	Not available	Available (Exogenous)	Available (Exogenous)	Available (Exogenous)	Not available
BioCASH setup in FarmDyn	Available (Exogenous)	Available (Exogenous)	Available (Endogenous)	Available (Endogenous)	Available (Exogenous)

- Miterra/RothC model
- CAPRI model
- MAGNET model
- Literature data



Results derived from Miterra model (elements of SOC balance)



Next and final steps

- Post processing of Miterra, CAPRI and RothC model results to adapt into FarmDyn modeling framework;
- Policy scenario selection (discussion with stakeholders);
 - Increasing mineral fertilizer prices, e.g. tax on nitrogen chemical fertilizer;
 - Scenarios on straw removal;
 - Mandatory cover-crops after summer crops harvest;
 - Subsidies for carbon sequestration;
- Preliminary results for Netherlands in baseline context;