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A - Papers appearing in refereed journals

Hassall, K. L., Coleman, K., Dixit, P., Granger, S. J., Zhang, Y., Sharp, R., Wu, L., Whitmore, A. P., Richter, G. M., Collins, A. L. and Milne, A. E. 2022. Exploring the effects of land management change on productivity, carbon and nutrient balance: Application of an Ensemble Modelling Approach to the upper River Taw observatory, UK. *Science of the Total Environment.* 824, p. 153824. https://doi.org/10.1016/j.scitotenv.2022.153824
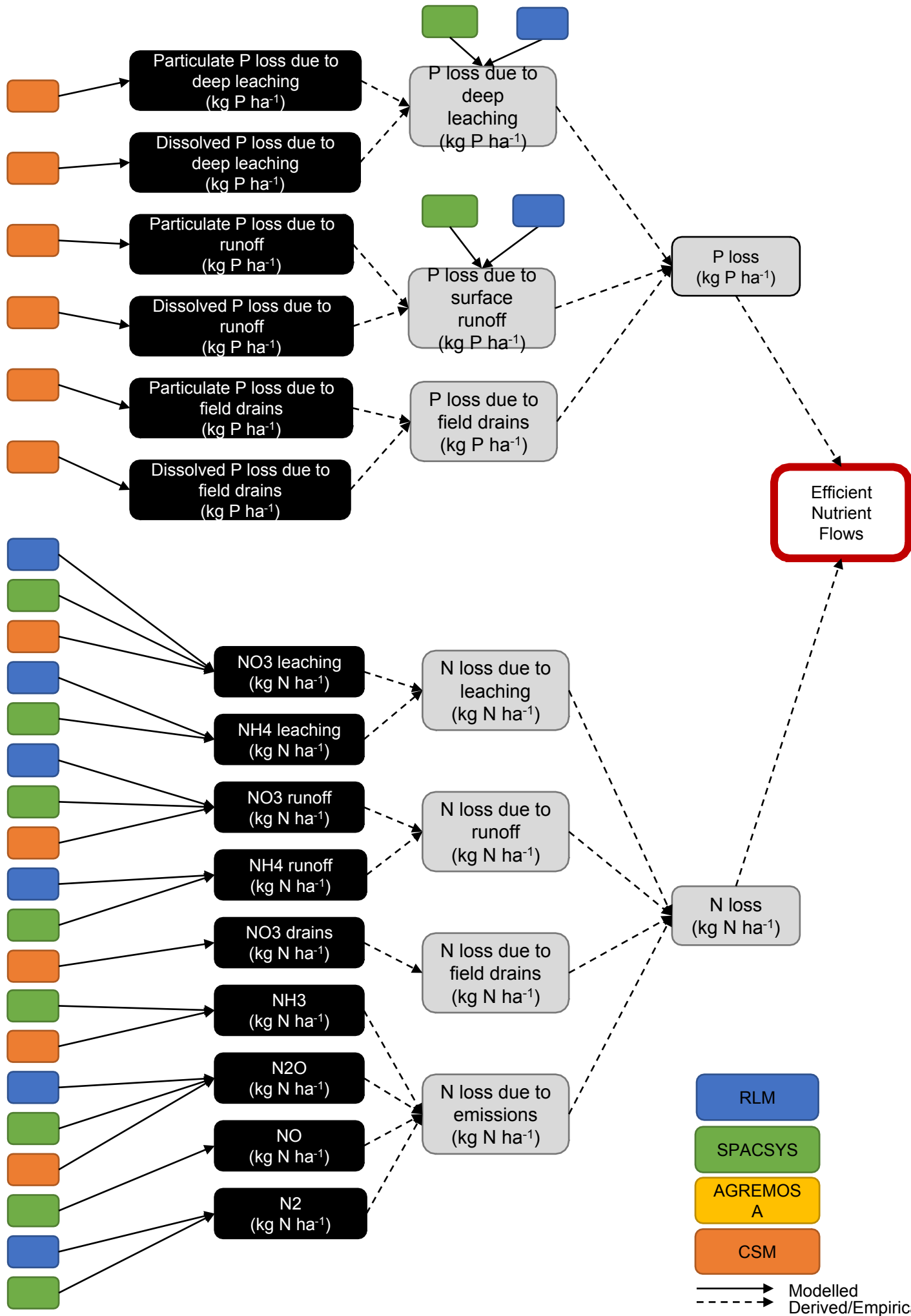
The publisher's version can be accessed at:

- https://doi.org/10.1016/j.scitotenv.2022.153824
- https://doi.org/10.1016/j.scitotenv.2022.153824

The output can be accessed at:

https://repository.rothamsted.ac.uk/item/987zz/exploring-the-effects-of-land-management-change-on-productivity-carbon-and-nutrient-balance-application-of-an-ensemble-modelling-approach-to-the-upper-river-taw-observatory-uk.

Particulate P loss due to deep leaching (kg P ha^{-1})

Dissolved P loss due to deep leaching (kg P ha^{-1})

Particulate P loss due to runoff (kg P ha^{-1})

Dissolved P loss due to runoff (kg P ha^{-1})

Particulate P loss due to field drains (kg P ha^{-1})

Dissolved P loss due to field drains (kg P ha^{-1})

P loss due to deep leaching (kg P ha^{-1})

P loss due to surface runoff (kg P ha^{-1})

P loss due to field drains (kg P ha^{-1})

P loss (kg P ha^{-1})

Efficient Nutrient Flows

NO3 leaching (kg N ha^{-1})

NH4 leaching (kg N ha^{-1})

NO3 runoff (kg N ha^{-1})

NH4 runoff (kg N ha^{-1})

NO3 drains (kg N ha^{-1})

NH3 (kg N ha^{-1})

N2O (kg N ha^{-1})

NO (kg N ha^{-1})

N2 (kg N ha^{-1})

N loss due to leaching (kg N ha^{-1})

N loss due to runoff (kg N ha^{-1})

N loss due to field drains (kg N ha^{-1})

N loss due to emissions (kg N ha^{-1})

N loss (kg N ha^{-1})

RLM

SPACSYS
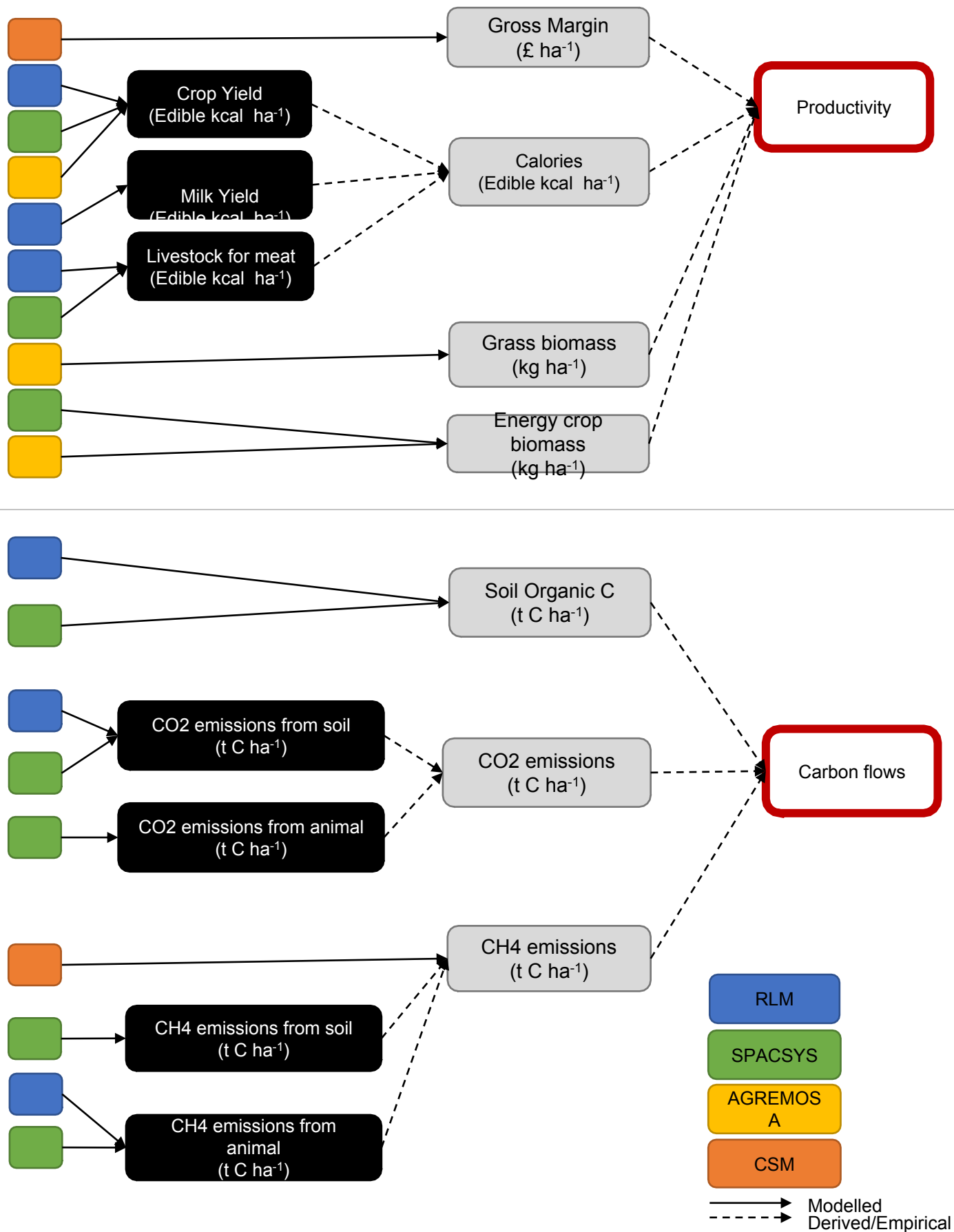
AGREMOSA

CSM

Modelled

Derived/Empirical

Figure S1: Flow diagrams illustrating the pathway partitioning of a) nutrient flows (N and P), b) productivity metrics and c) carbon flows from the four different agroecosystems models
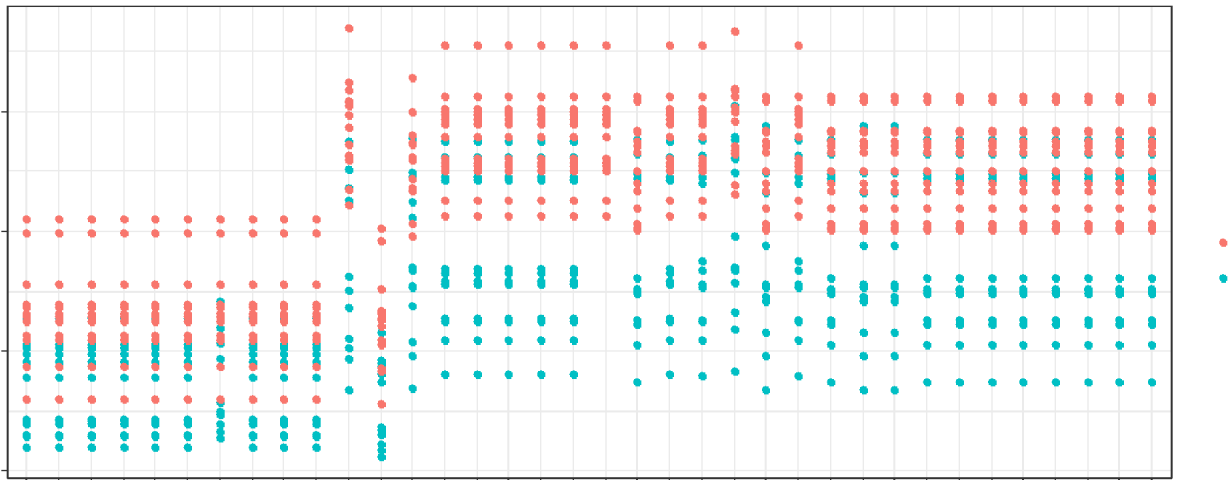
Figure S2: Comparison of miscanthus yields between AGREMOSA and SPACSYS over both time (each point) and space (x-axis)

Figure S3: N and P losses as simulated by SPACSYS. Each point represents the annual average at each grid cell with error bars giving the temporal variation (shown as ± standard deviation)
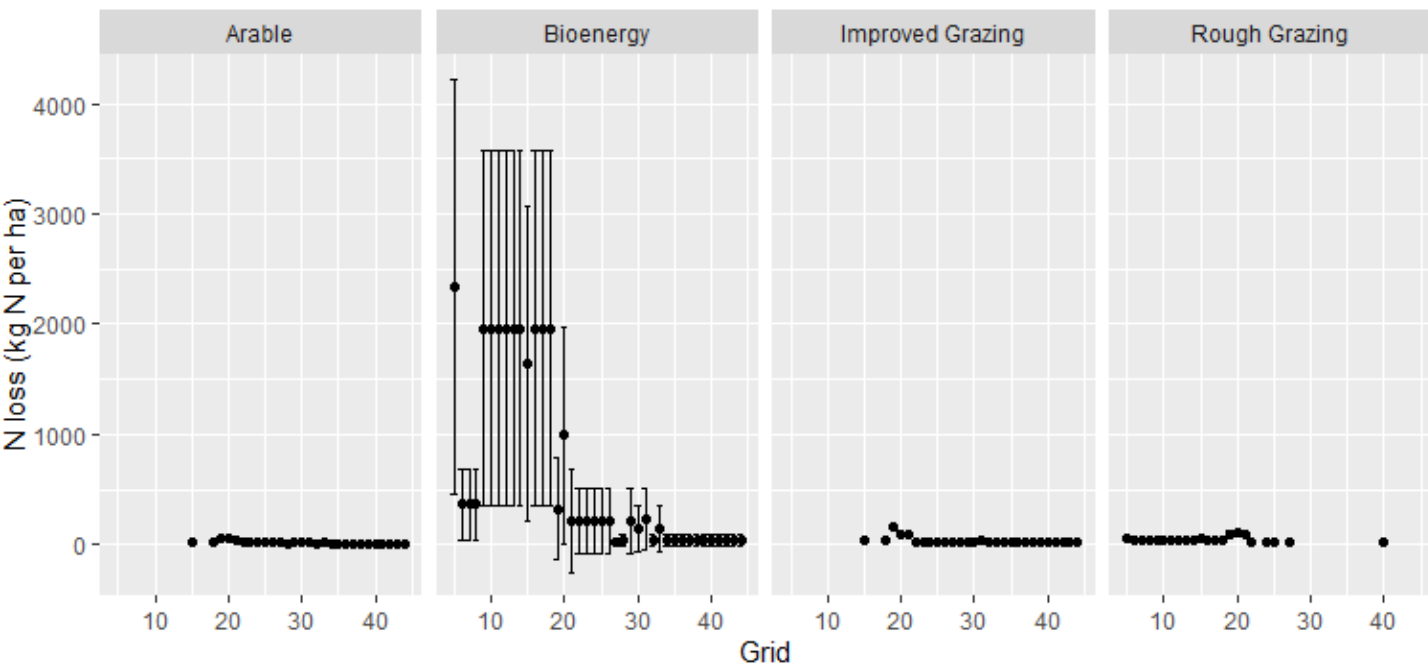
Figure S4: Biomass of all crops as simulated by AGREMOSA. Boxplots are of the annual biomass for each grid cell.