

Development of an Integrative GIS-based Sustainability Analysis Tool as a Field-specific Decision-making Approach for Implementing C Sequestration Measures

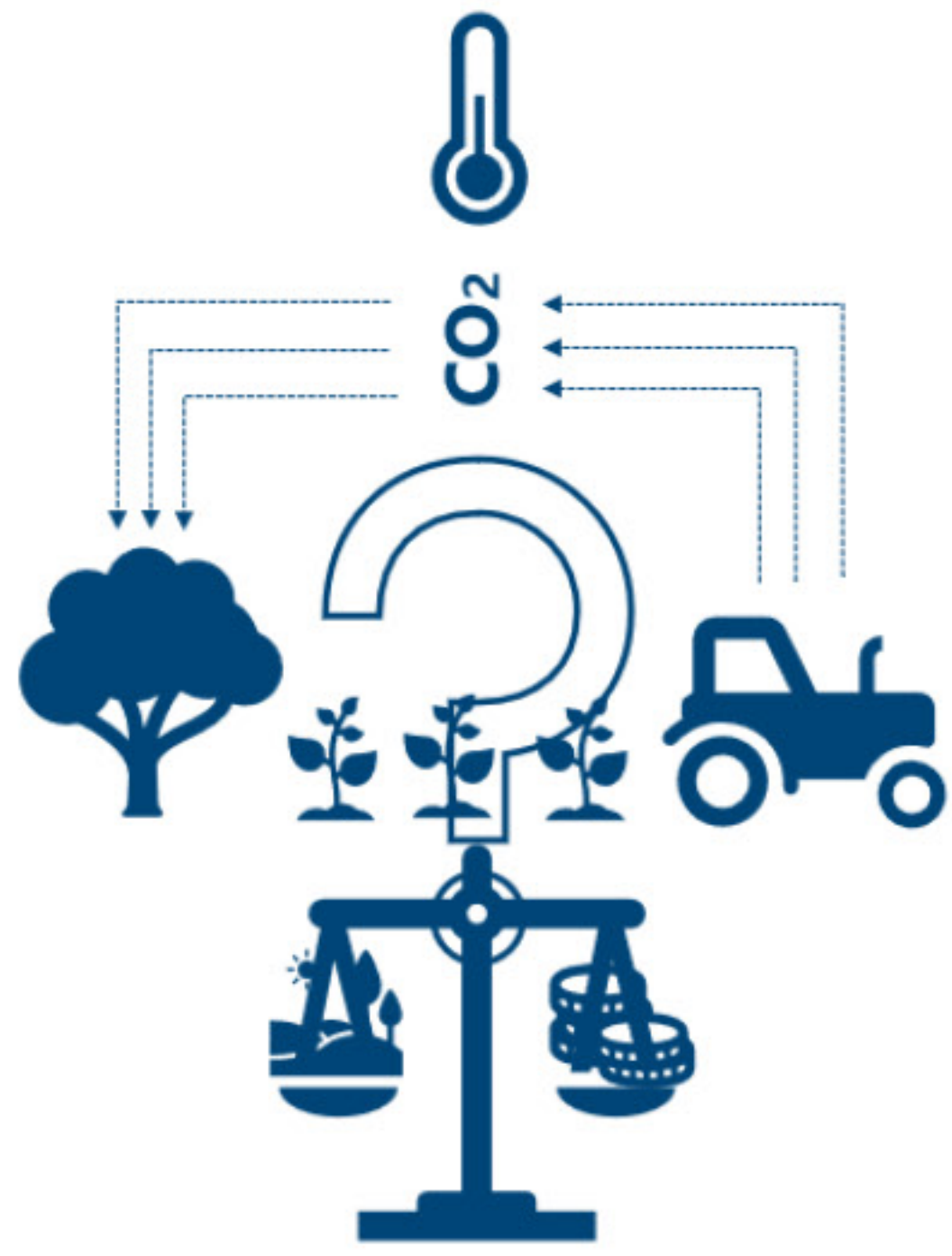
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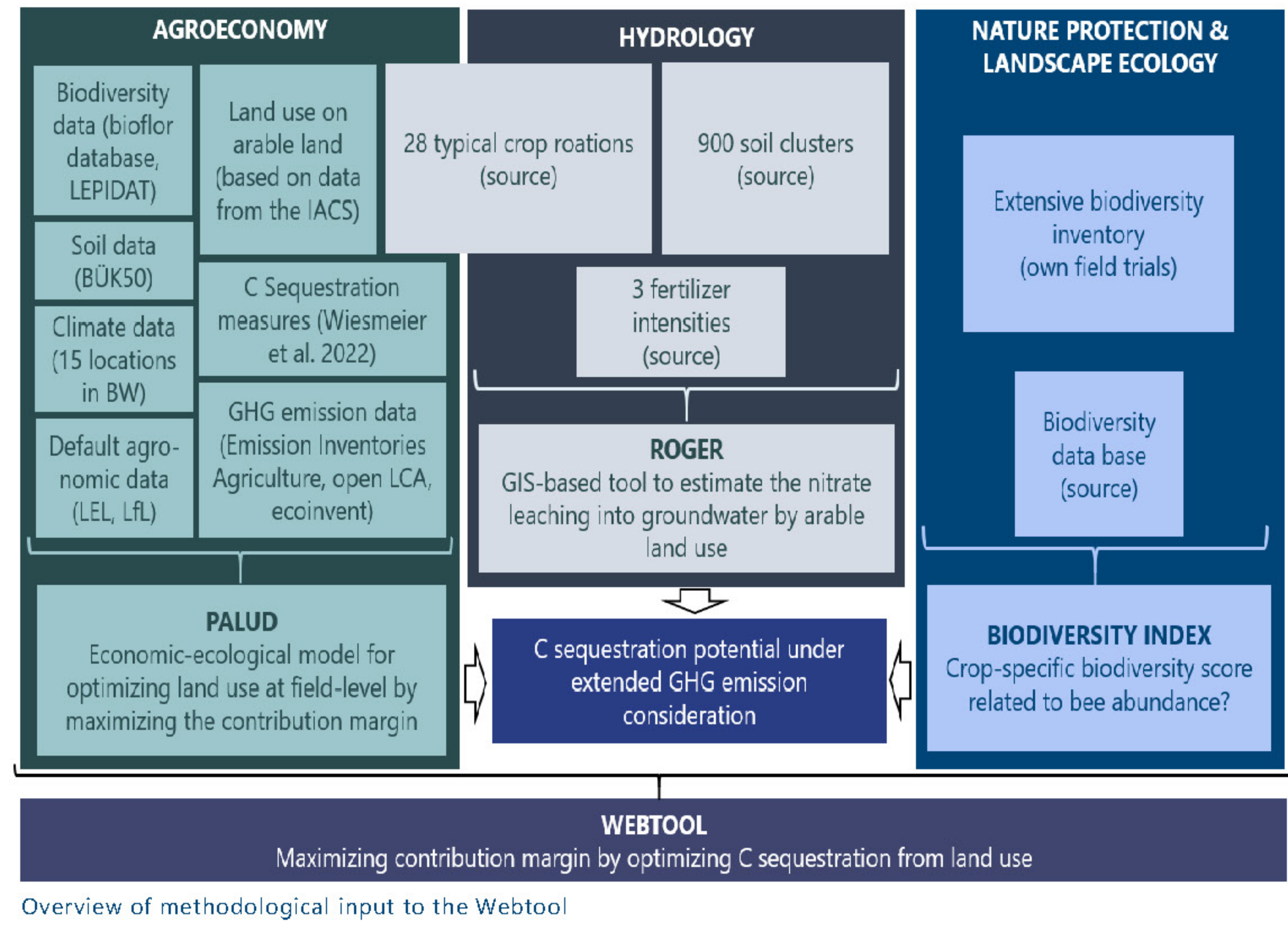
I. INTRODUCTION



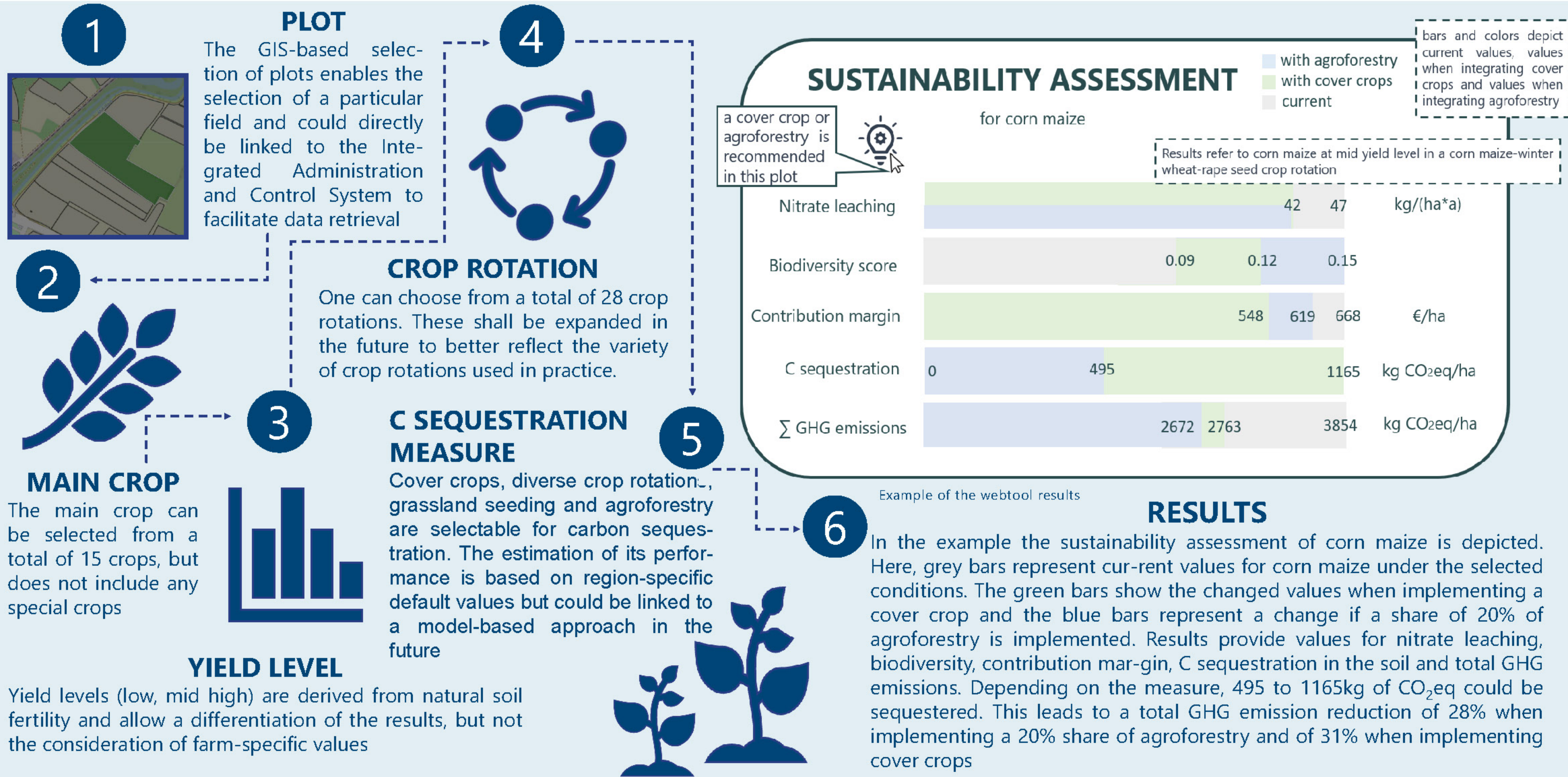
The rise in greenhouse gas concentrations in the atmosphere and the resulting global warming underscore the urgent need to drastically reduce anthropogenic emissions. Agricultural soils are particularly significant due to their absorption of CO₂ from the atmosphere via plants and its storage as soil organic carbon. Implementing C sequestration measures can enhance soil carbon storage and could provide additional co-benefits, but may also unintentionally reduce food production. Farmers' acceptance and willingness of implementation is dependent on their economic viability and the opportunity costs of not using conventional

crops or cultivation methods. Thus, integrating C sequestration measures into arable farming involves weighing opportunity costs but also an enhanced sustainability assessment, often at the field level. Therefore, we developed an integrative GIS-based sustainability analysis web-tool.

II. METHODS



III. RESULTS AND DISCUSSION



IV. CONCLUSION

Our method shows a possible approach to integrate carbon sequestration measures to reduce GHG emissions and enhance sustainability at farm level by possibly low opportunity costs. The tool is based on region-specific and available standard data that can be used to derive field-based recommendations for action with regard to nitrate leaching, biodiversity, carbon sequestration and profit. Although it must be borne in mind that the implementation of the recommendations ultimately also depends on the willingness of farmers to accept them, the tool could be a helpful instrument for improving the sink function of soils and thus combating global warming.

V. REFERENCES

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