Bin2Bean

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Practice abstract 30

Digital Advisory Tool for end-users: ECOBIN – Empowering Farmers with Predictive Nutrient Modeling

ECOBIN is a dynamic digital advisory tool developed within the Bin2Bean project to help end-users, such as farmers and land managers, optimize the use of organic soil improvers. Deployed on the Farmmaps platform, the app bridges the gap between waste processing and agricultural application by predicting nitrogen (N) mineralization rates from various biowaste-derived products, including compost, digestate, and manure.

The Science Behind the App: the SNOMIN Model

The core of ECOBIN is the SNOMIN model (Berghuijs 2023), which simulates carbon and nitrogen dynamics in the soil. To provide accurate forecasts, the model integrates three essential input streams: local weather conditions, specific soil characteristics (carbon, nitrogen, and texture), and the analytical properties of the applied organic amendment. The model distinguishes between N mineralized from native soil organic matter and N released from the soil improver, enabling precise nutrient budgeting for the growing season.

Tailored Solutions and Data Integration

The app includes predefined categories representing Bin2Bean solutions, such as High-stability Compost (typical of decentralized systems in Hamburg and Egaleo) and Mid-stability Compost (typical of industrial systems in Amsterdam). To enhance global usability, developers are integrating soil data from sources like SoilGrids . Current evaluations comparing SoilGrids with LUCAS 2018 data have identified challenges, such as the correlation between predicted and observed C:N ratios, which are being addressed in the app's roadmap to ensure a robust local performance through the transition to a global soil grid.

Practical Benefits for Soil Health

By visualizing N availability over time, ECOBIN allows users to make data-driven decisions that reduce reliance on synthetic fertilizers and minimize nutrient leaching. This supports the transition toward circular agriculture by ensuring organic amendments are used effectively to maintain long-term soil health and productivity.

Project partners

Consorzio Italbiotec · Wageningen University & Research · N3 Nachhaltigkeitsberatung Dr. Friege & Partner · Ruokavirasto Livsmedelsverket Finnish Food Authority · euroquality A Warrant Hub Company · HiCE Shaping the Circular Economy · Stadtreinigung Hamburg · etaflorence renewableenergies · AMS Amsterdam Institute for Advanced Metropolitan Solutions

Get in touch

bin2bean.eu · info@bin2bean.eu · Bin2Bean

originally published on

Co-funded by the European Union

EU CAP NETWORK

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