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Resource management in the innovation of the agri-food systems

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Sustainable biomass potential resources and availability in Europe and in Italy, for bioenergy and new biofuels.

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The revised European Renewable Energy Directive (RED III) updates its list (Annex IX) of approved raw materials and biowaste for bioenergy processes, including biofuels and other energy derivatives. To support the development of local biofuel and bioenergy supply chains, a comprehensive GIS-based database is essential for identifying the most promising biomass-based processes in each region. This requires collecting both qualitative and quantitative data on significant feedstocks. Currently, there is no comprehensive information repository for managing specific feedstocks and other bio-waste (such as biomass and biowaste, or crops grown on severely degraded land). Determining the harvesting potential and seasonality of these resources is crucial. The enhancement and expansion of the Biomass Atlas issued by ENEA is the first step towards defining, analyzing, and optimizing bioenergy supply chains with a regional focus. The goal is to create an implementation framework for the bioenergy processes addressed in Spoke 3 (Bioenergy and New Biofuels for Sustainable Future) Network 4 Energy Sustainable Transition (NEST) within the PNRR. The proposed methodology aims to map crops grown on marginal land and assess bio-waste availability relevant to achieve RED III goals, with the objective of establishing a detailed list of promising industrial crops for marginal lands. The core activity involves data collection and analysis from research projects or direct surveys/interviews. Regarding marginal land crops mapping, the methodology relies on information/results from national, European, and international projects on energy crops grown on degraded/marginal lands. A key result is a database for marginal land crops in Italy and EU. This database identifies the most suitable crops for marginal/degraded lands, aiming to define agronomic techniques and innovative processes for obtaining low ILUC (Indirect Land Use Change) risk agri-feedstocks, ensuring no competition with the food supply chain. The selection of biomasses promotes circular, efficient, and sustainable production chains from both economic and social perspectives. The database is composed by: I) a table including 28 industrial crops belonging to different plant categories (oilseed, fiber crop, lignocellulosic,

and woody crops) selected for their suitability to be grown on marginal lands. The table includes name, origin, potential European cultivation sites, reasons for cultivation on marginal lands, crop category, and market products), along with bibliographic references; II) a dataset related to non-EU projects on innovative cropping systems for marginal lands. This comprehensive approach supports and enhances bioenergy supply chains, contributing to a sustainable energy future as envisioned by RED III and the PNRR. Acknowledgment. Project funded under the National Recovery and Resilience Plan (NRRP), Mission 4 Component 2 Investment 1.3 - Call for tender No. 1561 of 11.10.2022 of Ministero dell'Università e della Ricerca (MUR); funded by the European Union - NextGenerationEU, Project code PE0000021, Concession Decree No. 1561 of 11.10.2022 adopted by Ministero dell'Università e della Ricerca (MUR), CUP - I53C22001450006, Project title "Network 4 Energy Sustainable Transition - NEST".