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Exploring the Knowledge Bases of Green Technologies: insights into Decarbonisation in the Agriculture Sector

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The effects of climate change are felt across all economic activities, but it is in agriculture where the impacts are most recurrent and irreparable. Namely, the increasing frequency of extreme weather events, as well as the excess or scarcity of water availability, have led to disappointing harvests and heightened concerns about food security. Other sensitive aspects include CO₂ emissions from livestock farming, soil management practices, and the use of non-renewable energy for irrigation. Beyond these effects, the FAO/United Nations draws attention to the persistence of hunger (which affects 10% of the global population) and the rise in urbanisation. This situation underscores the need to promote significant changes in the agri-food system. Therefore, providing the right technologies to ensure economic, social, and environmental sustainability is a crucial step towards structuring a new model of agri-food system. In this context, our study aimed to conduct an exploratory analysis of the knowledge base configuration encompassing green technologies and innovations in decarbonising the agricultural sector, particularly in the agri-food segment. For this analysis, we examined data from scientific publications (Scopus database) and technological patents (USPTO database) associated with agricultural production, period 2010-2023, employing network indicators and cluster analysis. Specifically, we identified thematic structures, the extent of integration of green technologies and eco-innovations, and the pervasiveness and complementarity of various technologies. The results provide valuable insights for better understanding the formation of the knowledge bases that support dual transition actions (decarbonisation and



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