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TRANSFORMING ENERGY USE IN AGRICULTURE: PATHWAYS TO SUSTAINABILITY AND CLIMATE NEUTRALITY IN LATVIA

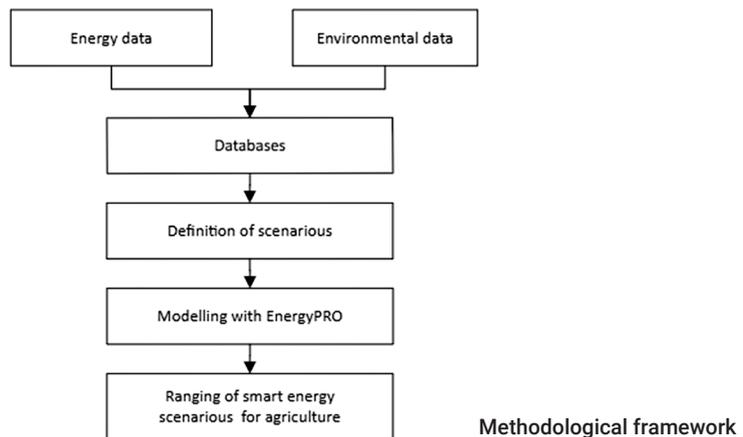
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Abstract – The agricultural sector plays an essential role in shifting to a low-carbon economy and climate neutrality. The modernization of the agriculture sector is closely linked to improvements in efficiency and productivity while maintaining sustainability. As one of the main sectors contributing to climate change due to greenhouse gas emissions, the agriculture sector is a crucial player in striving towards more sustainable agricultural systems. A critical challenge in agriculture is the sector's entrenched reliance on fossil fuels, which hinders its progress and prolongs the timeline for achieving climate neutrality. Sustainable agriculture should be implemented in common agricultural policies and payment schemes. The aim of this research is to analyze the potential of transforming energy use in Latvia's agricultural sector towards climate neutrality and energy sustainability. EnergyPRO modelling for the assessment of the energy sector and the possibilities of implementing an energy-sustainable approach were applied, and twenty-five scenarios were analyzed to assess the emissions generated and resources consumed to produce 10 MWh of heat and electricity in both individual and cogeneration systems. The results indicated that hydrogen from wind energy is the most energy-efficient resource for thermal or combined heat and power production; hydrogen from wind or solar energy has emerged as the most efficient for electricity production.

Keywords – Climate neutrality; EnergyPRO; GHG emissions; modelling; renewable energy



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