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MULTI-CRITERIA ASSESSMENT OF CARBON FARMING: EVALUATING KEY PERFORMANCE INDICATORS

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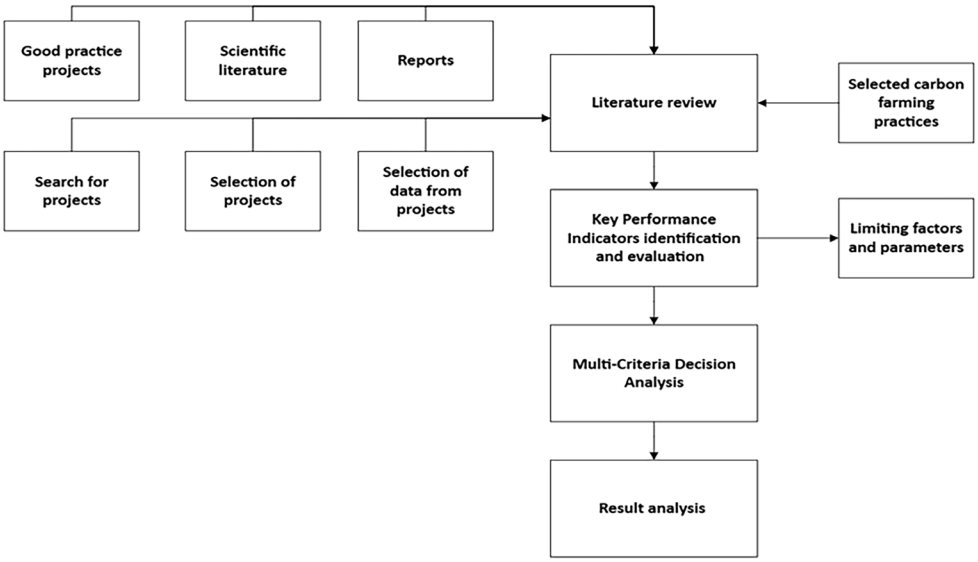
Abstract – Carbon farming represents a critical approach for mitigating greenhouse gas emissions within the agricultural sector, contributing to climate neutrality goals set by the European Green Deal. This study develops a systematic framework for multi-criteria decision analysis for the assessment of result-based carbon farming mechanisms. A structured set of key performance indicators has been analysed and adopted for Latvian conditions, incorporating CO_2-equivalent reduction metrics, sustainability indicators, and cobenefit evaluations to quantify the environmental and socio-economic impacts of carbon sequestration practices. The identified KPIs encompass agronomic, economic, environmental, and social dimensions, including crop yield, land availability, water use efficiency, energy efficiency, cost per ton of CO_2 sequestered, return on investment, economic value of carbon sequestration, labour productivity, N_2O and CH_4 emissions intensity, land use efficiency, infrastructure availability, adoption rates of methods, and total greenhouse gas emission sequestration potential. The study evaluates a range of carbon farming practices, including zero tillage, minimal tillage, cover crops, intercrops, biogas production, biomethane, soil carbon capture, perennial plants, agroforestry, organic fertilization, crop diversity, crop rotation, biochar application, grazing management, organic permaculture, and bio-tillage. The results contribute to a comprehensive decision-making framework for policymakers, land managers, and agricultural stakeholders.

Keywords – Carbon farming; indicators; key performance indicators, modelling; multicriteria assessment.



The methodological framework

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