Submission of a research topic carried out at the Institute of Agrophysics

Polish Academy of Sciences

during the training in the Doctoral School of Quantitative and Natural Sciences

in the discipline agriculture and horticulture

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Research topic	Assessment of grassland soils in terms of greenhouse gas
	emissions and factors regulating gas exchange
words)	methane (CH ₄) and nitrous oxide (N ₂ O). The contribution of the agricultural sector to national GHG emissions is estimated at 8.8% (KOBiZE, 2024) with a significant contribution of the soil environment. Agricultural soils are a source of N ₂ O and CO ₂ , although, with proper use, they may have the capacity to oxidize CH ₄ through the activity of methanotrophic bacteria. The aim of the proposed research theme is to evaluate grassland soils, which at the farm scale are often used as meadows and pastures, and globally cover more than 40% of the land. They are distinguished by their exceptional biodiversity, the high capacity of soils to sequester carbon and absorb atmospheric CH ₄ , thus demonstrating climate change mitigation potential. However, these capacities are often degraded by intensive agricultural practices. Taking this into account, the planned scope of work will include the capture of new research data and the
Additional requirements for	of work will include the capture of new research data and the analysis of existing data on emissions/adsorption of key greenhouse gases and the wide range of edaphic factors regulating gas exchange in the soil-atmosphere system. The study material will be soils under natural and mown meadows, and under pasture, which are part of a mixed farm typical in Poland. In addition, components of agroforestry will be included in the study. Recognition of the soil conditions (physical, chemical and microbiological parameters) accompanying gas exchange, will make it possible to identify the factors that significantly regulate it. The results obtained will allow the quantification of greenhouse gas emissions, the estimation of their balance and the calculation of the greenhouse potential. This will make it possible to assess the agricultural practices implemented on grasslands in terms of their contribution to the greenhouse effect, indicating the parameters that significantly regulate soil gas exchange.
the candidate	protection or a similar subject
	 willingness to conduct of lab and field research

	✓ knowledge of English sufficient for scientific work
An indication of the sources	-
and extent of funding for the	
scholarship from outside the	
subsidy	
Bibliography	KOBiZE – National Inventory Report 2024. Inventory of
	greenhouse gas emissions and removals in Poland for 1988-2022
The topic was submitted within a separate admissions limit for externally funded research	
projects. YES /NO*.	
*Select inappropriate	