Decision Support Systems Based on Gaseous Emissions and Their Impact on the Sustainability Assessment at the Livestock Farm Level: An Evaluation from the User's Side

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Supplementary Materials

Table S1. General information about the GHG-based DS tools assessed.

DS tool	Developer	Year released	Language (user interface)	Short description	Scope of application	Stated purpose	References for additional information
Cool Farm Tool v2.0	University of Aberdeen and Cool Farm Alliance	2013	English	Started as an excel-based tool. Now, an intermediate level tool with simple environment that avoids high level data inputs.	Livestock and crop production	Assessment of mitigation, Market access, Monitoring progress, Benchmarking, Reporting, Knowledge transfer	[1,2]
FarmAC v1.8	Aarhus University	2015	English	Developed as part of the EU AnimalChange project.	Livestock and crop production	Assessment of mitigation measures at the farm scale	[3,4]
Overseer v5.4	Overseer Ltd	1996	English	Overseer uses scienctific models to analyse the impact of farm management on the flow of key nutrients through the farm system	Calculation of the nutrients that crops and pasture will use to grow	Assistance of farmers with nutrient flow management.	[5,6]
Carbon Navigator – Dairy/Beef*	Teagasc, Bord Bia	2013-14	English	Online farm-scale decision support tools that assist producers sustainably reduce the greenhouse gas emission intensity of primary milk production and beef.. It quantifies the relative impact mitigation practices have on a farm's GHG emission intensity and profitability	Agri-food sector, specifically dairy and beef cattle production	Knowledge transfer, Benchmarking, Market access, Monitoring progress	[7–10]
KSNL - Kriteriensystem Nachhaltige Landwirtschaft	KTBL and others (TLL)	2008	German	It enables agricultural businesses to undergo a comprehensive sustainability analysis in order to identify weaknesses and to derive recommendations for action.	Agri-food sector in general	Knowledge transfer, Assessment, Market access, Monitoring progress, Certification	[11–13]
SAFA v2.2.41	FAO	2014	English	It refers to Sustainability Assessment of Food and Agriculture Systems (based on FAO's guidance for sustainable systems)	Agri-food sector in general	Assessment, Market access, Benchmarking, Reporting	[14,15]
RISE v3.0 - Response-Inducing Sustainability Evaluation	HAFL - University of Agricultural, Forestry and Food Sciences (Switzerland)	2015	English, German, French, Spanish, Turkish, Indonesian, Danish,	Computer-based method by which the sustainability of agricultural holdings can be assessed holistically. Based on ten indicators, takes ecological, economic and social aspects into account	Agri-food sector in general	Assessment, Market access, Monitoring progress, Benchmarking, Reporting, Knowledge transfer, Certification	[16,17]

			Portuguese, Polish				
BEK v1.0 - Berechnungsstandard für einzelbetriebliche Klimabilanzen in der Landwirtschaft	LWK Lower Saxony Thuenen-Institut, KTBL, ATB and others	2016	German, English version to be released soon	Standard for carbon footprints at farm level in Germany, consists of (a) methodology description, (b) OA standard parameter list, (c) example xlsx files	Agri-food sector in general (mostly animal production, biogas and crop production)	Knowledge transfer, Benchmarking, Assessment, Monitoring progress, Certification	[11,12]
DLG-Nachhaltigkeitsstandard (based on REPRO)	DLG	2013	German	Farm-scale assessment in the food and non-food sector, providing a uniform method for certifying and assessing sustainability in agriculture	Agri-food sector in general	Knowledge transfer, Assessment, Market access, Monitoring progress, Certification	[18,19]
HOLOS v4.0	Agricultural and Agrifood Canada	2008 (as HOLOS v 1.1). The methodology was published in 2006	English	This tool was designed to encourage users to explore possible ways of reducing greenhouse gas emissions from farms	Agri-food sector in general- Especially livestock and crop production	Exploratory tool, Reporting, Knowledge transfer, Monitoring progress, Assessment	[20]
EX-ACT v9.0	FAO	2009 (9th version in 2022)	English	The EX-ACT providing estimates of the impact of agricultural and forestry sectors on carbon footprint.	Agri-Food sector. Livestock and crop production	Benchmarking, Reporting, Knowledge transfer, Monitoring progress, Assessment	[21,22]
GLEAM v2.0 (GLEAM-I)	FAO	2009 first version of GLEAM.	English	GLEAM-i is the first open and livestock specific tool designed to stakeholders to calculate greenhouse gas emissions using IPCC Tier 2 methods.	Agri-Food sector. Livestock and crop production	Benchmarking, Reporting, Knowledge transfer, Monitoring progress, Assessment	[23,24]

* The Carbon Navigator (Dairy, Beef) tools are considered as one in the evaluation process, since their functions are similar.

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