

Decision support system for sustainable and GHG optimized milk production in key European areas (MilKey)

Amon, B.^{a,*}, Díaz de Otálora Aguirre, X.^a, Dragoni, F.^a, Janke, D.^a, Hansen, A.^a, Winiwarter, W.^b, Suchowska-Kisielewicz, M.^b, Rychla, A.^b, Bartzanas, T.^c, Anestis, V.^c, Demeyer, P.^d, van Overbeke, P., Krol, D.^e, Buckley, C.^e, Wilfart, A.^f, Mittenzwei, K.^g, Jørgensen, G.^g, Dolle, J.B.^h, Castellan, E.^h, Breen, J.^j, Mazurkiewicz, J.^k, Pulka, J.^k, Dach, J.^k

^a Leibniz-Institut für Agrartechnik und Bioökonomie (ATB), Germany; ^b University of Zielona Góra, Poland; ^c Agricultural University of Athens, Greece; ^d Flanders Research Institute for Agriculture, Fisheries and Food, Belgium; ^e Teagasc, Environment, Soils and Land-Use Department, Ireland; ^f Institut national de Recherche en Sciences et Technologies pour l'Env. et l'Agriculture, France; ^g Norwegian Institute of Bioeconomy Research, Norway; ^h Institute De L'Elevage, France; ^j University College Dublin, Ireland; ^k Poznań University of Life Sciences, Poland. * Corresponding author, email: bamon@atb-potsdam.de

Introduction

The global demand for livestock products is expected to increase by 70% by 2050 (Opio et al., 2013), undermining the efforts to minimize the environmental impacts incurred during livestock production. Livestock supply chains account for 14.5% of global anthropogenic greenhouse gas emissions (GHG) (FAO, 2016) and 70% to the total anthropogenic emission of ammonia (NH₃). FAO estimates that available improved husbandry practices can reduce emissions by 20 to 30%, across all production systems, proposing solutions of improved productivity, soil carbon sequestration and integration to circular economy field (FAO, 2017). If these suggestions could be enhanced with ICT tools they could support better resilience to climate change.

Dairy production systems (DPS) are an essential backbone of European agriculture. DPS produce high quality protein essential for humans, based on fibrous feed resources that could not be utilized by humans or converted to human food by monogastric animals. DPS create employment in rural communities, contributing to the conservation and the maintenance of agricultural landscapes, but they face many challenges across economic, environmental and social pillars of sustainability (3P), and owing to increased globalization and high price volatility. The competitiveness and economic viability of DPS are essential to the overall resilience of the European DP sector. This is the agricultural sector where region-specific concepts are most prominently required. European regions are highly diverse, farmed within a wide range of different extensive, semi-intensive and intensive production systems, using multiple resources to produce a diverse range of animal products and other services: no "one size fits all"-solution is available. Strong region-specific approaches are required, taking into account region-specific conditions and responding to region-specific foci within 3P sustainability. Likewise, DP is the sector in animal agriculture where conflicts between the three pillars of sustainability are most evident. It is essential that holistic concepts are developed to 3P sustainability for future dairy production systems.

Methodology

MilKey will (i) Analyse the drivers and the sustainability aspects of DPS across Europe; (ii) Identify key priorities for sustainability in key European regions; (iii) assess 3P sustainability on case study farms across Europe; (iv) assess sustainability interactions and emission mitigation potentials for key European areas; (v) identify key GHG mitigation techniques for respective DPS/regions; (vi) develop and demonstrate an online monitoring tool to control barn climate and emissions; (vii) develop the MilKey platform for information and communication on key sustainability parameters. The platform will integrate region-specific input variables and will deliver outputs to promote the sustainability of a range of DPS across Europe, showing the effect of giving contrast impetus to 3P sustainability in key European regions. The platform will integrate a decision support system to assist on 3P sustainability as a basis for flexible concepts of sustainable milk production.

Results & Discussion

MilKey is an EraNet project funded under the Joint Call 2018. It started in January 2020. First results on model comparison, online barn monitoring tool and case study farms across Europe will be presented at the RAMIRAN conference.

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