

## Pre-congress workshop: Multifunctionality of livestock grazing systems, a lever to envision its possible futures

Title of the proposed contribution: Exploring relationships among different sustainability aspects in innovative livestock systems in Europe

Presented by: E. Diaz Vicuna<sup>1\*</sup>, N. Adams<sup>2,3</sup>, L.G. Smith<sup>2,4</sup>, M. Durand<sup>2</sup>, C. van Wagenberg<sup>5</sup>, E. Caron<sup>6</sup>, A. van den Pol-van Dasselaar<sup>7</sup>, L. Baumgart<sup>8</sup>, S. Schetelat<sup>9</sup>, M. Sandor<sup>10</sup>, A. Gliga<sup>10</sup>, S. Espagnol<sup>11</sup>, H. M-L. Andersen<sup>12</sup>, R. Borek<sup>13</sup>, P. Jurga<sup>14</sup>, N. van Leuffen<sup>7</sup>, J.L.T. Heerkens<sup>7</sup>, J. Yngvesson<sup>15</sup>, A. Oosterwijk<sup>5</sup>, J. Stokes<sup>16</sup>, C. Forte<sup>1</sup>, A. Hesse<sup>15</sup>

<sup>1</sup> University of Turin, Veterinary Sciences, Largo Paolo Braccini 2, 10095 Grugliasco (TO), Italy,

<sup>2</sup> University of Reading, School of Agriculture, Policy and Development, Whiteknights, Box 237, RG6 6AR Reading, United Kingdom,

<sup>3</sup> Ökomodell-Region Landkreis Waldeck-Frankenberg, Kreisausschuss, Fachdienst, Landwirtschaft, Auf Lülingskreuz 60, 34497 Korbach, Germany

<sup>4</sup> Swedish University of Agricultural Sciences, Biosystems and Technology, Lomma, Box 190, SE-234 22 Lomma, Sweden,

<sup>5</sup> Wageningen Social & Economic Research, part of Wageningen University & Research, Box 88, 6700 AA, Wageningen, the Netherlands.

<sup>6</sup> ITAVI, Rue Maurice le Lannou, 35000 Rennes, France

<sup>7</sup> Aeres University of Applied Sciences, De Drieslag 4, 8251 JZ Dronten, the Netherlands

<sup>8</sup> Research Institute of Organic Agriculture FiBL, Ackerstrasse 113, 5070 Frick, Switzerland

<sup>9</sup> French Livestock Institute, Idele, 35 650 Le Rheu, France

<sup>10</sup> University of Agricultural Sciences and Veterinary Medicine Cluj-Napoca, Faculty of Agriculture, Calea Măñăstur 3-5, 400372 Cluj-Napoca, Romania

<sup>11</sup> French institute for pig and pork industry, 9 bd du Trieux, 35740 Pacé, France

<sup>12</sup> Innovation Centre for Organic Farming, Livestock, Agro Food Park 26, 8200 Aarhus N, Denmark

<sup>13</sup> Institute of Soil Science and Plant Cultivation – State Research Institute (IUNG-PIB), Department of Bioeconomics and Agrometeorology, Czartoryskich Str. 8, 24-100 Puławy, Poland

<sup>14</sup> Institute of Soil Science and Plant Cultivation – State Research Institute (IUNG-PIB), Department of Geomatics, Czartoryskich Str. 8, 24-100 Puławy, Poland

<sup>15</sup> Swedish University of Agricultural Sciences, Applied Animal Science and Welfare, Skara, Box 234, SE-532 23 Skara, Sweden

<sup>16</sup> Royal Agricultural University, Cirencester, Gloucestershire, GL7 6JS, United Kingdom

contact details: [elena.diazvicuna@unito.it](mailto:elena.diazvicuna@unito.it), [ninaroehrig@live.de](mailto:ninaroehrig@live.de), [l.g.smith@reading.ac.uk](mailto:l.g.smith@reading.ac.uk), [magdalena.durand@etu.u-bordeaux.fr](mailto:magdalena.durand@etu.u-bordeaux.fr), [coen.vanwagenberg@wur.nl](mailto:coen.vanwagenberg@wur.nl), [caron@itavi.asso.fr](mailto:caron@itavi.asso.fr), [a.van.den.pol@aeres.nl](mailto:a.van.den.pol@aeres.nl), [lukas.baumgart@frib.org](mailto:lukas.baumgart@frib.org), [soline.schetelat@idele.fr](mailto:soline.schetelat@idele.fr), [sandor.mignon@usamvcluj.ro](mailto:sandor.mignon@usamvcluj.ro), [adrian.gliga@usamvcluj.ro](mailto:adrian.gliga@usamvcluj.ro), [sandrine.espagnol@ifip.asso.fr](mailto:sandrine.espagnol@ifip.asso.fr), [hmla@icoel.dk](mailto:hmla@icoel.dk), [rborek@iung.pulawy.pl](mailto:rborek@iung.pulawy.pl), [pjurga@iung.pulawy.pl](mailto:pjurga@iung.pulawy.pl), [n.van.leuffen@aeres.nl](mailto:n.van.leuffen@aeres.nl), [j.heerkens@aeres.nl](mailto:j.heerkens@aeres.nl), [jenny.yngvesson@slu.se](mailto:jenny.yngvesson@slu.se), [annabel.oosterwijk@wur.nl](mailto:annabel.oosterwijk@wur.nl), [dr.jessica.e.stokes@gmail.com](mailto:dr.jessica.e.stokes@gmail.com), [claudio.forte@unito.it](mailto:claudio.forte@unito.it)

The European livestock sector encompasses a variety of innovative systems. This study, conducted within the Pathways project, aimed to provide sustainability assessments of such systems, exploring relationships among sustainability dimensions. Through the employment of a modified version of the Excel-based questionnaire Public Goods (PG) tool, data was retrieved from 106 farms differing per animal species (dairy cattle, beef cattle, pigs, and poultry) and management system, with operations ranging from extensive grazing ruminants to intensive monogastrics production. Each farm received scores for 12 sustainability indicators (spurs), used to classify farms into five clusters. Correlation analyses revealed contrasting results: across all farms, several environmental spurs correlated positively among each other, but negatively with profitability, underscoring the financial challenges of transitioning to sustainable practice. Cluster-wise analyses identified commonalities and discrepancies among farms with different production scales, specializations, and management approaches, as well as within units sharing similar traits. Extensive ruminant systems were split among three clusters, each with a unique correlations' set. Our results suggest that, rather than the type of breeding system or animal species, livestock's sustainability might rely more on farm management, size, and geographic location. PG tool's unique approach can contribute to developing tailored strategies among diverse systems and regions.

*This research has been developed within the PATHWAYS project, funded by the European Union's Horizon 2020 Research and Innovation Programme under grant agreement No 101000395.*