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P u b l i s h e r s

Quantifying the land displacement of the french livestock sector

M. Tichit, B. Silva Barboza, T. Bonaudo, J. Domingues Santos and F. Accatino
INRA, Science for Action and Development, Université Paris-Saclay, 75005 Paris, France; muriel.tichit@agroparistech.fr

In Europe, soy meal is an important source of protein in feed. A large share of soy meal is imported from outside Europe leading to land displacement. A key area for innovation is to develop feeding systems based on local feed protein. Objective of this study was to quantify the spatial variation of land displacement due to livestock production and its link other environmental impacts. The method combines different data source (data from agricultural statistics and data from industries and extension services) to calculate five indicators describing: land displacement, nitrogen surplus, nitrogen emission, animal source food, nitrogen conversion efficiency. Indicators were computed for 571 livestock farming regions (LFR). A principal component analysis (PCA) was performed on the five indicators followed by hierarchical ascendant clustering based on the coordinates of 571 LFR in PCA dimensions. Results showed three groups of LFR corresponding to a gradient of land displacement intensity. The first group corresponded to LFR (n=347) where land displacement achieved 6.5 ha /100 livestock units (LU). The second group corresponded to LFR (n=12) showing a doubling of land displacement (12 ha / 100 LU). The third group (n=212) corresponded to LFR with the lowest level of land displacement (5.7 ha / 100 LU). The relationship between land displacement and local nitrogen surplus was strongly positive. The dependency to soy meal import made it possible the development of livestock densities beyond reasonable boundaries for the sustainability of some livestock regions. Beyond 1.5 LU/ ha, livestock production was based on transforming imported feedstuff into the LFR rather than locally produced feedstuff. Nearly 40% of LFR may require targeted adjustments of feeding systems and livestock densities in order to enhance local and global sustainability.

Methane emission and performance of steers in pasture and integrated crop-livestock-forest systems

A. Berndt[1], P. Meo Filho[2], A.P. Lemos[1], L.S. Sakamoto[2], A.F. Pedroso[1], J.R. Pezzopane[1] and P.P.A. Oliveira[1]
[1]Embrapa, Rod. Washington Luiz, km 234, P.O. Box 339, 13560-970, Sao Carlos, Brazil, [2]USP–FZEA, Av Duque de Caxias Norte, 13633-900, Pirassununga, Brazil; alexandre.berndt@embrapa.br

Farmers are increasingly using integrated crop-livestock-forest systems due to environmental and economic benefits, including product diversification, better use of the area throughout the year and recovery of degraded areas. These systems can ensure animal welfare by providing shade and superior quality feed, resulting in improved feed efficiency compared to traditional systems. Another benefit relates to environmental sustainability since cattle in integrated systems tend to display lower GHG emissions intensities. The aim of this study was to measure methane emissions from Canchim cattle (5/8 Charolais) in integrated crop-livestock-forest systems. The experiment took place at Embrapa Southeast Livestock, using 30 Canchim steers with an average age of 15±2 months and weight of 245±26 kg, distributed between 5 pasture systems: intensive grazing (IGS), silvopastoral (SPS), integrated crop-livestock (ICL), integrated crop-livestock-forest (ICLF) and extensive grazing (EXT) systems. Paddocks were grazed for 6 days followed by a 28-day recovery period, except for the extensive pasture which was grazed continuously. Enteric methane was measured using the SF_6 technique over five consecutive days, 24 hours per day. Data were analysed using the MIXED procedure of SAS (version 9.3) and averages were compared using Tukey's test with significant differences at $P<0.05$. Differences were observed in the average live weight, with animals in the IGS system weighing more than those in the SPS (286.4 vs 269.2 kg); IGS and ICLF steers gained more weight per day than animals in the ICL system (0.652; 0.647 vs 0.349 g). No differences in daily enteric methane emissions were observed between the systems assessed. However, there were differences in the intensity of methane emissions in relation to daily weight gain, with the ICL animals emitting more methane in comparison to SPS and ICLF animals (415.4 vs 208.4; 205.3 gCH_4/kg DWG). Other studies are required to monitor these systems for a number of years and identify the factors that cause these differences between the integrated systems.