

Animal welfare on organic mixed livestock farms across seven European countries

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Key words: animal welfare, mixed, livestock, Europe

Abstract

Over the last decades, farms have become more specialised. This creates challenges on different levels - for example, nutrient deficiencies in the soil or financial instability due to market price fluctuations. As the call for more sustainable farming has become louder alternatives have been explored, such as more diversified farming by keeping several livestock species and thereby for example increasing financial stability. Keeping several livestock species on one farm may impact the welfare of the animals, which is one dimension of sustainable farming - for example, in terms of animal health or social acceptance of animal products for sale.

To gain a more thorough understanding of the benefits, challenges and management practises on organic mixed livestock farms we conducted interviews with 119 farmers in seven European countries. Various topics were broached to characterise each farm, by asking qualitative and quantitative questions, thereby producing answers to a total of more than 100 items per farm. Our animal welfare data includes housing conditions, pasture management, veterinary treatments and costs, mortality rate, time that farmers spend with their animals and farmers' perception of their animals' welfare. For this contribution, we make a comparison between countries and focus on farms with two combinations of animals, i.e. beef cattle with meat sheep (in France and Sweden) and beef cattle with poultry (in France and Germany). Preliminary descriptive analysis revealed some differences between countries in both combinations for various parameters of animal welfare. However, variation may mostly be explained by climatic differences and farming types (e.g. intensive vs. extensive grazing strategies) and therefore it is not possible to form firm conclusions regarding the animals' welfare in mixed livestock farms.

Introduction

Intensive livestock farming has raised issues about environmental and social impacts over the last 20 years. Consequently, there is a strong social demand for livestock systems that are environmentally friendly, economically viable and socially acceptable, notably with regard to animal welfare. Diversified farming with several livestock species can be an option to meet these challenges (Martin et al. 2020). In the frame of animal welfare, existing literature indicates that co-grazing and mixed livestock farming in general may provide some benefits in regard to for example pasture usage, weight gain, predation reduction and parasite management (D'Alexis et al. 2014; Kremen et al. 2012; Anderson et al. 2011).

For this paper, we have surveyed organic mixed livestock farms in Europe. Using an array of quantitative and qualitative questions, we compared aspects of animal welfare between countries and livestock combinations.

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Material and methods

We conducted interviews with 119 farmers in seven European countries, namely Austria (16), Belgium (16), France (31), Italy (7), Germany (21), Sweden (15) and Switzerland (13). All participating farms were organic farms with two or three livestock species or enterprises, each contributing at least 10 % to the farm income. Any combination of species (cattle, goats, horses, pigs, poultry and sheep) and enterprise type (e.g. dairy, meat, laying hens, broilers) provided eligibility to participate in the interview. Using quantitative and qualitative questions, farmers produced answers to more than 100 items per farm. Out of these items, seven are linked with animal welfare (housing situation, pasture management, veterinary treatments and costs, mortality rate, time that farmers spend with their animals and farmers' perception of their animals' welfare), while others provide insights into the farmer's perceptions (i.e. of their animals' welfare).

For this contribution, we are focusing on two combinations of livestock species with at least four surveyed farms in two countries. One combination we explored was beef cattle and meat sheep in France (9) and Sweden (11). The other combination was beef cattle and poultry in France (6) and Germany (4). For poultry any type of poultry was included in this analysis, i.e. laying hens, broilers or turkeys. A characterisation of both samples can be found in Table 1.

Table 1: Characterisation of the sample of beef cattle and meat sheep farms and beef cattle and poultry farms

	beef cattle + meat sheep			beef cattle + poultry		
	mean	min.	max.	mean	min.	max.
UAA ³⁰ (ha)	96	17	267	99	11	300
pasture (ha)	81	10	257	63	7	166
arable land (ha)	67	0	190	49	0	150
beef cattle (n)	62	5	127	84	19	180
meat sheep (n)	190	24	500	-	-	-
poultry (n)	-	-	-	7730	60	30000

Mortality, vaccination and treatment rate were calculated as percentages of all, adult and young animals, respectively. The farmers scored the perceived status of animal welfare on their farms using a four-point categorical scale: highly satisfied; satisfied; poorly satisfied; not satisfied. Only descriptive statistical analysis was performed.

Results

Beef cattle and meat sheep

Across all 20 farms, beef cattle were housed similarly in straw bedded pens, with one exception in France, where the cattle were housed in straw-bedded cubicles and one farm in Sweden, which used straw bedding and a scraped alley. All farms used straw-bedded pens for their meat sheep. In France, both beef cattle (mean \pm SD: 201 \pm 98) and meat sheep (216 \pm 73) spent more days on pasture than beef cattle (151 \pm 18) and meat sheep (156 \pm 14) in Sweden and had access to more pasture (in ha) per livestock unit (France: 2.3 \pm 1.5, Sweden: 2.2 \pm 2.5).

Vaccination rates (in %) for both beef cattle and meat sheep were zero for most farms, with one exception for beef cattle (20 %) in France and one for meat sheep (36 %) in Sweden.

³⁰ utilised agricultural area

Treatment rates (in %) were generally low, with some outlier farms (beef cattle: France: 5 ± 10 , Sweden: 12 ± 25 ; meat sheep: France: 1 ± 2 , Sweden: 13 ± 25). **Veterinary costs** per animal (in EUR) were higher in France than in Sweden for beef cattle and low for meat sheep in both countries (Figure 1, A and D). The **mortality rate** of beef cattle was lower in Sweden when compared to France, especially in young animals (Figure 1, B and C). For meat sheep, mortality rate was lower in Sweden for adult animals when compared to France, but similar when it came to young animals (Figure 1, E and F). There was a high variety in time spent with animals per day (in h) in both countries and both species (beef cattle: France: 2 ± 1.3 ; Sweden: 2 ± 1.3), with a slightly higher amount of time spent with meat sheep in France (2.3 ± 1) compared to Sweden (1 ± 0.8).

The overall **welfare** perception of the farmers was generally high; only the two top categories (out of four) were used in both countries. More farmers in Sweden were highly satisfied ($n = 9$) with their animals' welfare than in France ($n = 2$), where most farmers were satisfied (France: $n = 6$; Sweden: $n = 2$).

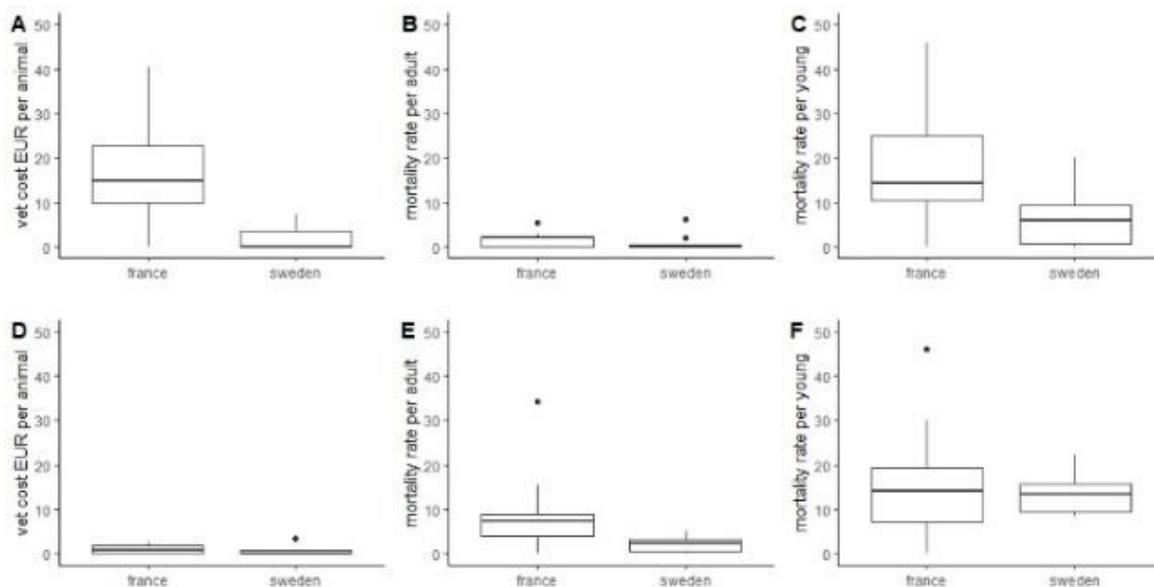


Figure 1. Veterinary costs per animal (A, D), mortality rate per adult (B, E) and mortality rate per young (C, F) for beef cattle (A-C) and meat sheep (D-F)

Beef cattle and poultry

Beef cattle in France (6) were mostly housed in straw-bedded pens and, on one farm, on straw bedding with a scraped alley; whereas in Germany (4), housing conditions were more diverse (straw-bedded cubicles, straw-bedded pen, straw bedding and scraped alley, straw bedding and slatted floors). Poultry was housed in floor barns on all farms. In France, beef cattle spent slightly more days on pasture (256 ± 58) compared to Germany (211 ± 8), whereas no data was available for the days that poultry spent on pasture in either country (but access mandatory when conditions allow for it). The pasture area (in ha) used per livestock unit was higher in France (1.1 ± 0.5) than in Germany (0.3 ± 0.3) for beef cattle and the opposite for poultry (France: 0.02 ± 0.04 , Germany: 0.1 ± 0.1).

No vaccination was done on either beef cattle or poultry. Additionally, no treatment was performed on poultry in both countries. For beef cattle, the treatment rate (in %) in France (0.4 ± 0.6) and Germany (6 ± 10) was low. Veterinary costs per animal were higher in France than in Germany for beef cattle and close to zero for poultry in both countries (Figure 2, A and D). The mortality rate for beef cattle was very low for adult animals in both countries, but higher in France for young animals when compared to Germany (Figure 2, B and C). Similarly, the

mortality rate for poultry was lower in Germany than in France (Figure 2, E). The time spent with both beef cattle and poultry was mostly similar for both countries.

The overall welfare perception was high as for the other combination; only the top two categories (out of four) were used. In France, most farmers were highly satisfied (n = 3) with their animals' welfare (satisfied: n = 2), compared to Germany where most farmers were satisfied (n = 3) and only one highly satisfied.

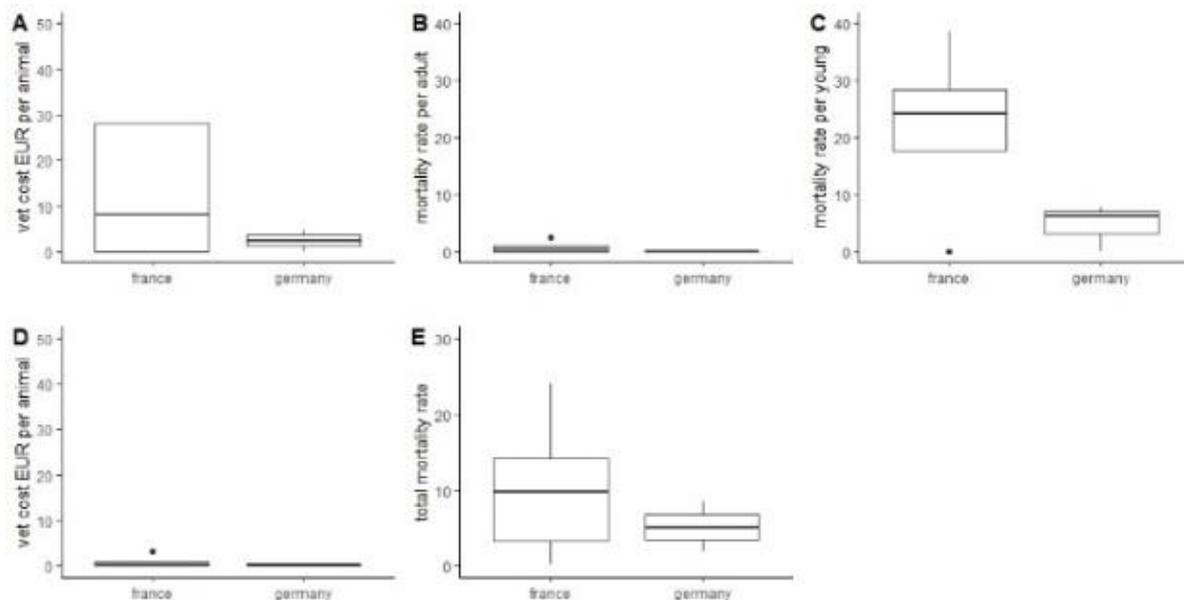


Figure 2. Veterinary costs per animal (A, D), mortality rate per adult (B), mortality rate per young (C) and total mortality rate (E) for beef cattle (A-C) and poultry (D-E)

Discussion

Our preliminary analysis revealed some differences in the assessed parameters between countries for animal combinations of beef cattle with meat sheep (FR, SWE) and beef cattle with poultry (FR, GER). However, it does not allow for firm conclusions on the welfare state in those mixed livestock farms. For example, the comparison of veterinary cost between countries is difficult, as it is unclear whether similar procedures are priced similarly. The low vaccination and treatment rates may indicate rare health problems in the countries and livestock combinations studied. This is in line with the farmers' self-reported perception of their animals' welfare, which was at least high across all farms. In conclusion, differences between countries might have largely been driven by variation in climatic conditions or farming type. It would be interesting to deepen the analysis to study the effect of other factors (e.g. farmer's welfare and satisfaction) on animal health and welfare, thus accounting for the One Welfare concept.

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