Sustainable production: transporting animals or meat?

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Abstract

For the EU the impact of a ban on international transport of pigs and horses is assessed, based on three sustainability criteria. The paper concludes that the risks of welfare problems will be reduced, the CO_2 emission and transport costs will be lowered but that there will be substantial shifts in regional production, slaughtering and employment within the EU. Transporting meat instead of live animals is more sustainable for these species.

1. Introduction

The international transport of animals alive is a subject that is debated heatedly in the EU, by national governments of EU member states and by non governmental organization (NGO's). Discussions about the quality of animal transport started in the early 1960s and led to the European Treaty on the welfare of animals during international transport in 1965. In 1995, the current regulation was set up (Directive 95/29/EC). This directive was evaluated by the former Scientific Committee on Animal Health and Animal Welfare (SCAHAW, 2002). Their study formed the basis of a Commission proposal that contained a revision of travel times and space allowances. The Council finally adopted Regulation (EC) No 1/2005 which did not modify the existing requirements on these topics. In addition to this, the current situation is still heavily criticised by NGO's because not all transporters comply fully with the existing rules. At present, many among the European Institutions (European Parliament and Council Ministers) and NGOs advocate a maximum travel time of eight hours for any animal transported for slaughter.

It is often argued that transport of meat instead of animals is cheaper, better for animal welfare, lowers risks of spread of diseases and will lead to less pollution.

The aim of this paper is to provide insights into the question: is it more sustainable to transport meat rather than live animals? To answer this, sustainability first needs to be defined. Brundtland (1987) suggests it is the ability to "meet the need of the present without compromising the ability of future generations to meet their own needs". It can be translated into indicators for people (human and animal welfare), profit (economy) and planet (environment and nature). For the purpose of this paper, we simplify this to mean that the change in animal welfare represents 'people', the transport costs represents 'profit' and CO_2 emission 'planet'. Also for the sake of simplicity, the case of complete replacement of international transport of live animals by the transport of meat is studied, for two species of livestock only: horses for slaughter and pigs (slaughter pigs and piglets). Only intra–EU trade is considered. The calculations have been made for pigs and horses because

- → weight of live animals per consignment is high for pigs and low for horses;
- → Distance: most of the pigs travel less than 8 hours, most of the horses more than 24 hours;
- → regional difference: Pigs travel from north west of Europe to south of Europe or Germany; horses travel from Poland, Romania, Spain to Italy.

2. Intra EU- transport of animals and meat

To put the trade of horses and pigs in a wider European perspective, Table 1 shows the intra EU trade of live animals in comparison with total production and total intra EU trade. In 2007, trade with third countries consisted almost entirely of meat. Until 2006, there were significant imports of live sheep from New Zealand but this transport has now stopped. Besides, the entrance of new member States into the EU reduced trade with third countries because, after joining, this became part of the intra EU trade.

Table 1: Production, consumption, trade with third countries and intra EU-27 trade in sheep, pigs, cattle and horses in 2007 (all expressed in 1,000 tonnes of meat)

Specie	Sheep	Pigs	Cattle	Horses
Consumption EU-27	1,256	21,065	8,548	111
Production EU-27	1,039	22,854	8,262	56
Net trade third countries (+ = import, - = export)	217	-1.789	268	56
Intra EU trade	248	6,525	2,316	67
Animals alive	40	1,144	350	18
Meat	208	5,381	1,966	49

Source: ZMP, 2008 for sheep, pigs and cattle and le Marche des produits laitieres, carnes et avicoles en 2007 for horses (p 287-294).

From Table 1, it can be concluded that for sheep, pigs and cattle, only 4 to 5% of the total production and 15 to 18% of total intra EU-trade consisted of trade of live animals. For horses these percentages are 32% and 27%. This may appear marginal but in reality involves 18 million animals and 200,000 consignments per year of the species above. In Table 2 these figures are listed per species and per distance (in hours).

Table 2: Number of animals (in 1,000s) and number of consignments per species and for different travel times in 2007.

Specie	< 8 hours[1]		8-24 hours		> 24 hours		Total	
	Anim.	Cons.	Anim.	Cons.	Anim.	Cons.	Anim.	Cons.
Sheep	1,300	4,553	999	2,669	321	667	2,620	7,889
Pigs[2]	7,553	52,943	3,566	22,163	57	710	11,176	75,816
Cattle[3]								
Fattening	1,455	48,823	1,518	36,385	749	12,219	3,723	97,427
Slaughter	347	21,976	171	5,382	21	973	539	28,331
Horses	8	655	25	1,296	33	1,518	67	3,469
Total	10,633	128,950	6,279	67,895	1,181	16,087	18,125	212,932

Source: TRACES, 2008, see section 3.

[1]including transports with missing values for distance

[2]only pigs for slaughter; piglets and pigs for breeding are excluded

[3]only cattle for further fattening and for slaughter; cattle for breeding is excluded

There is a huge variation in distance travelled for the different kind of species. About 12 % of the sheep travel more than 24 hours, but only 1% of the pigs, 20% of the cattle for further fattening, 4% of the cattle for slaughter as are almost 50% of the horses (see Table 2). In most cases, the number of animals per consignment increases with distance.

Several reasons for the transport of live animals rather than as carcasses or meat have been suggested. These are:

1. Cutting/preparation of carcasses;
2. Preference for fresh meat;
3. "Local production";
4. Opportunity to add value;
5. Added value of fifth quarter;
6. Overcapacity of abattoirs;
7. Local competitive pressure on abattoirs;
8. Too few abattoirs available within a certain radius;
9. Impact of the Common Agricultural Policy (subsidizing rearing or slaughtering of calves);
10. Fluctuation in trade;
11. Fluctuations in prices.

These factors vary according to species and their impact on the volume of international transport is difficult to estimate. Some of them even may be myths.

3. Method and data

For the calculations of the impact on animal welfare, environment and costs of transports, Excel sheets were used. In 2009, a linear programming model to estimate the possible impacts of new policies on the production, consumption, international trade of animals alive and international trade of meat will be built.

Most of the data used were from TRACES (TRade Control and Expert System), a database of certificates required from transporters for international transport of live animals in EU-27. TRACES was set up in 2004 and involves all data being gathered in a central database in Brussel (DG SANCO). For this research, only data from the year 2007 were used. There were three reasons for this: these are the most recent figures, they are after the accession of Romania and Bulgaria to the

EU and there are fewer starting problems (such as missing and incomplete data) with the TRACES system. Data taken from TRACES to estimate the impacts were (per consignment): loading and unloading locations, the species, number of animals and transport time.

There has been considerable research into international transport of animals alive in relation to animal welfare. The SCAHAW report (2002) lists 22 pages of references. However, little is available on the international transport of animals which considers the economic, environmental or social aspects. The calculations performed make a number of assumptions, including

- Transport costs for live animals depends only on distance and drivers' wages which vary between country of origin of the consignment;
- Transport costs for meat: 20 tonnes of carcasses or meat can be transported per consignment of meat. The additional variable costs increase because of 20% more fuel use compared to transport of live animals;
- 22 horses and 200 slaughter pigs can be transported per consignment. The mean number of head per consignment derived from Table 2 underestimates the maximum number that can be transported per consignment because there are many consignments with few heads.

4. Results

4.1 Horses within Europe

As shown in Table 2, about 67,000 animals horses were transported in 3,569 consignments in 2007. Figure 1 shows the most important routes.

From Figure 1, it can be concluded that almost all horses are transported to Italy from Poland, Romania, Spain and Hungary. All these transports take more than 8 hours and many of them more than 24 hours. Half of the horse meat consumed within the EU-27 is consumed in Italy and another 25% in France. The consumption in Italy is decreasing because it is a traditional consumption pattern for older people with relatively low incomes. Among younger people, there is an increasing awareness and sensibility towards the consumption of horse meat as horses are increasingly perceived as companion animals. Given this trend, it can be expected that consumption in Italy will continue to decline as will the import of horses and/or horse meat.

Figure 1: Most important transport routes for live horses for slaughter within Europe (horse numbers in 1000s).

The scenario of no international transport of horses alive (67,000 horses in 2007) would have the following impact (see Table 3):

- increase in slaughter capacity in Spain (30%), Poland (83%) and Romania (>700%);
- decrease in slaughter capacity in Italy of almost 60%.

This would mean that slaughter capacity and employment will shift from Italy to Spain, Poland and Romania. How many employees are associated with the slaughtering of 67,000 horses is unknown.

Table 3: Production, trade and slaughtering of horse (in number of heads) in the major EU member states in 2007 and impact of a ban on trade of live horse on slaughter capacity.

Country	IT	FR	ES	PL	RO
Production	39,366	24,057	26,244	63,423	15,309
Export	-54,740	5,963	6,337	28,818	13,154
Slaughtering	94,106	18,094	19,907	34,605	2,155
Change in slaughter capacity in case of a ban on export of live animals	42	133	132	183	710

Source: own calculation from "le Marche des produits laitieres, carnes et avicoles en 2007 for horses (p 287-294)".

To transport 67,000 horses alive, about 3,000 consignments are required. These trips will last a week for a return freight. If the horses were slaughtered in the production areas and transported as meat, just 1,400 consignments annually would be necessary. Consignments with meat can be executed faster because no resting for live animals is necessary.

The impact on the environment is that only 56% (1 – (1,400 consignments * 1.2 (additional use of fuel)/3,000 consignments)) of the diesel needed to transport live animals would be needed to transport meat. Even though, the additional costs for energy and investment in refrigerating equipment would be 12% higher per meat consignment, as the number of consignments would fall from 3,000 to 1,400, total transport costs would be 52% (1,400 *1.12/3,000).

In conclusion, a ban on transport of live horses would benefit animal welfare given the fact that presently most horses have to travel more than 24 hours, and reduce the emission of CO_2 and total transport costs by almost half. Therefore, based on these parameters, transporting meat instead of transporting live horses alive is more sustainable.

4.2 Pigs within Europe

In 2007, about 22 million piglets and slaughter pigs were traded internationally within Europe. Figure 2 shows the main transports routes (>400,000 heads a year).

Figure 2: Most important transport routes for live piglets and slaughter pigs within Europe (in million live heads).

Figure 2 shows that the most important export countries for piglets and slaughter pigs are the Netherlands (9.5 million heads) and Denmark (over 5 million heads), followed by Germany and Spain with about 1.7 million heads each. The most important importing country is Germany (10.9 million heads or over 50%) followed by Spain with 1.8 million heads. In fact, there are three more or less separate markets:

1. The market in the north west of Germany for piglets and slaughter pigs (mainly supplied by Denmark and the Netherlands) (see Rabobank 2008);
2. The Austrian shortage of piglets mainly supplied by the South of Germany (see Rabobank 2008);
3. The Portugees imports of slaughter pigs from Spain, and Spanish imports of piglets from The Netherlands and Germany.

Besides these three markets, there are transports of piglets from the Netherlands to Italy and Belgium.

International transport of pigs within Europe continues to increase. The main reason for this is the growing slaughter capacity in Germany which has increased

in the last 10 years from 38 million annually to 53 million in 2007. This increased the import of piglets and slaughter pigs from the Netherlands and Denmark (Rabobank 2008). It is expected that the slaughter capacity will grow further in Germany. This also means that more piglets or slaughter pigs will have to be imported alive (see Table 4).

Table 4: Number of pigs imported and number of slaughtered pigs (in million heads) per country in 2007 and in the case of a total ban on export of live animals

	2007		possible future	
	piglets and pigs	slaughtering	piglets and pigs	slaughtering
Germany	9.2	53	0	47
The Netherlands	-9.5	14	0	18
Denmark	-5	21	0	23
	-5.3	88	0	88

If trade of live animals is no longer possible or permitted, this would have a huge impact on the structure of the pig chain in Europe, especially in Germany, The Netherlands and Denmark (see Table 4). About 10% of the slaughter capacity of 53 million heads slaughtered annually in Germany would become redundant. Increasing slaughter capacity in Denmark and The Netherlands is an option. However, fattening the piglets which are now exported from Denmark and The Netherlands (almost 10 million piglets) is almost impossible due to national environmental regulations. The impact on other countries is likely to be limited because they are more or less self sufficient from production to slaughtering. A possible scenario might be

- Germany: an increased home production of piglets and slaughter pigs by 4 million and decrease in slaughter capacity by 6 million (no import but increased home production);
- The Netherlands: a decrease in piglet production by about 5.5 million and increase of slaughter capacity by 4 million (no export and decreasing production);
- Denmark: a decrease in piglet production by about 3 million and increase in slaughter capacity by 2 million;
- In Spain, Austria and Italy the piglet production would have to increase by a small percentage for them to become self supporting.

This shows that production of piglets and slaughter pigs and the slaughter capacity will change in the north west region of Europe. This will also impact the regional employment.

Animal welfare will increase because piglets and slaughter pigs will no longer be transported internationally. This is particularly true for the 30% or 3.6 million pigs that are now transported for over 8 hours.

The number of live animal consignments will decrease. This will be compensated for by additional national transport of live animals and the increase in international trade in meat. In Table 2, 76,000 consignments are mentioned, annually involving about 400 full time drivers. The number of drivers needed to export the additional meat produced in Denmark and the Netherlands (additional 6 million slaughters) is about 166 annually. About 100 additional drivers will also be needed to transport animals alive nationally. This means that the employment will be reduced by 100 to 150 drivers annually.

Fewer consignments also means less use of fuel and lower emission of CO_2. This will enable a reduction of CO_2 by about 40%.

Total transport costs will also fall in this case with 29% ((400 drivers-166*1.12-100)/400).

In conclusion: a ban on transport of pig(let)s alive will lower the risk of welfare problems, decrease the emission of CO_2 by 40% and lower the total transport costs by almost 30%. Transporting meat instead of transporting pigs alive is more sustainable. However, there will be huge structural effects on the regional production and slaughter of pigs within Europe.

5. Discussion

Increasing animal welfare during live transport of animals can be achieved through a total ban on international transport. A remark is that international, regional transport can take place over less distance than national transports. In the case of pigs a lot of international transport (from NL to DE and from NL to B) can be regarded as regional transport to the nearest slaughterhouse. Handling around transport and transport itself affects the welfare of the animal. During long transport the environmental conditions will change which needs adaptation of the environment in the compartment of the animal. More over the animals need to be

fed and watered which ask for special care of the animals. Decreasing the duration of travel will decrease the risk of poor welfare (Lambooij, 2007).

A ban on international transport would be a very restrictive measure and, as shown, will have a huge impact on regional production, regional slaughter capacity and associated employment. The proposal by the European Parliament and NGOs (a limit of 8 hours transport time for animals destined for slaughter) is far less restrictive than the option presented in this paper. Policies will not, however, change that quickly due to the regional impact of these changes. Regional industry and employment will move from consumption areas within the EU (like Italy and Greece) to production areas (like The Netherlands, Denmark, former Eastern Europe countries).

The results in this paper should be interpreted with some care. Only two sectors have been discussed, the competitiveness of the total chain has not been taken into account and only three impacts (animal welfare, transport costs and CO_2 emission) have been considered. Through modeling the transport of animals alive and taking into account the expected developments in regional production and consumption within the EU, we hope to provide further evidence for these findings.

6. Conclusions

Export of meat instead of live animals is more sustainable. Risks of animal welfare problems will be lowered (no additional unloading and loading, no mixing of groups of animals, but more short distance national transports with possible animal welfare problems), total transport costs will decrease and CO_2 emissions will fall.

The structural impact depends on the proportion of animals transported for further fattening. Within Europe this number is small for sheep and horses, for cattle, pigs and poultry it is large. If this number is small only slaughter capacity has to become more coordinated with regional production. If the number of animals for further fattening is large, regional production also needs to be adapted in some way.

Although the present proposals (limit to 8 hours transport for animals for slaughter) are not as restrictive as the option presented in this paper (total ban on international transport), the impact is still likely to be substantial. The case of horse shows this, for the case of pigs this is less evident.

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