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**Werner Kleinhanß  
Gerhard Haxsen  
Friedrich Uhlmann**

**Economic assessment of a feed ban of animal meals**

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# Economic Assessment of a Feed Ban of Animal Meals

Kleinhanss, W.\* , Haxsen, G.\* and Uhlmann, F.\*\*<sup>1</sup>

## Abstract

The existing system of rendering with feed recycling of animal meals is criticised due to the BSE crisis as well as to abusive practices in processing of animal meals. Based on model calculations the economic effects of alternative rendering systems are evaluated, taking into account a partial or total feed ban for animal meals. Four scenarios are assessed which refer to different quantities of waste disposal in Germany.

## 1 Introduction

The existing system of rendering is based on an almost completely recycling of proteins and fat within the feed cycle. This system has been strongly criticised related to BSE and due to sometimes abusive practices in the processing of animal meals in some countries of the EU. The declining acceptance induced drastic price reductions and a strong reduction of feed using for animal meals in Germany. Due to these problem proposals were made, ranging from a prohibition of specific risk material (SRM) for feed production up to a total feed ban for animal meals. After repeated delays the SRM directive of the EU-Commission was finally adopted in June of this year. Therefore, the use of SRM for feed production is no longer allowed starting from October 2000. For Germany this means that approximately 170,000 t of fallen animals and specific risk materials cannot be used any more for feed and have to be disposed otherwise.

The economic evaluation aims at assessing the costs of alternative disposal schemes and at working out recommendations with regard to policy decisions in this area. It is based on a study on behalf of the Federal Agricultural Ministry (KLEINHANSS et

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<sup>1</sup> Federal Agricultural Research Centre (FAL), Bundesallee 50, D-38116 Braunschweig  
\* Institute of Farm Economics and Rural Studies  
\*\* Institute of Market Analysis and Agricultural Trade Policy

al., 2000). Special emphasis is given to different price conditions of animal meals. Referring to the situation in Germany, four scenarios were analysed, which differ according to the quantities of raw materials which might be disposed of alternately:

- (1) SRM (75,000 t)
- (2) SRM and fallen cattle as well as sheep and goats more than 1 year old (168,000 t)
- (3) SRM and all fallen animals (0.47 million t)
- (4) total feed ban for animal meals (1.83 million t of raw materials which have to be processed obligatorily by rendering plants).

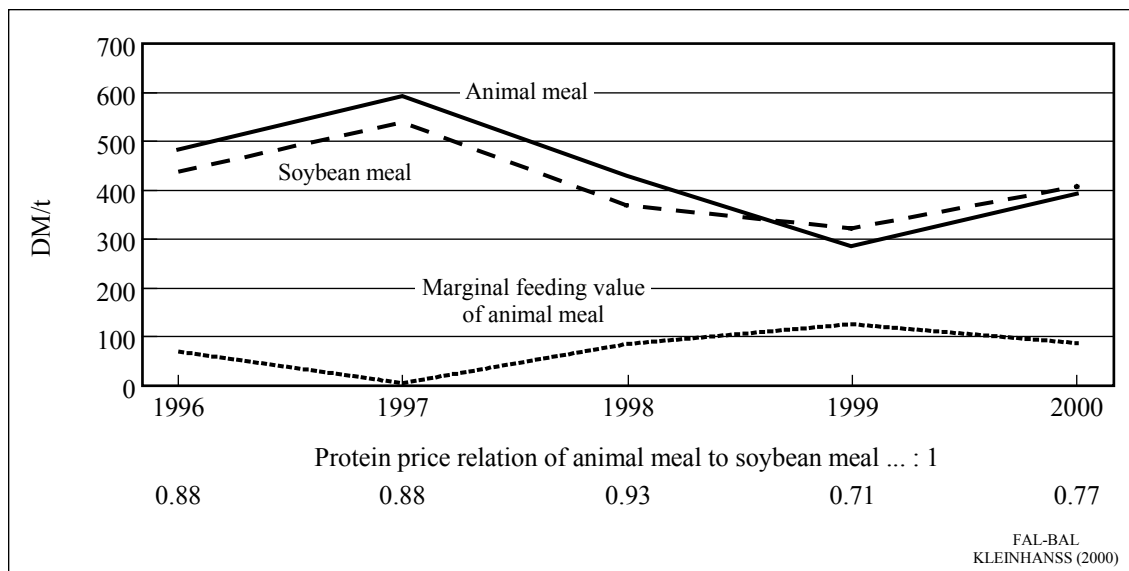
Alternate disposal schemes being considered are the incineration of fallen animals and SRM, the burning of animal meals within incineration plants for household wastes, the use of meals for energy (heating plants, cement factories), anaerobic treatment to produce biogas and the production of fertilisers. The calculations assume separate systems of the use of raw material for feed and non-feed, that is collection, storage and processing of risk materials are totally separated from the traditional feed recycling system. As in a first step sterilisation and possibly drying is necessary, we assume that risk materials are processed in specialised rendering plants which are not allowed to produce animal meals for feed. Disposal fees and the additional transport costs were defined depending on the different technical processes and quantities to be disposed of.

## 2 Results of model calculations

The **existing system of rendering** including the recycling as feed is used as reference for the economic evaluation of the alternate routes of treatment and removal of specific risk materials. Based on available information the costs of rendering (excluding by-product credits) in the existing scheme amount to 260 DM per ton of raw material. They are only partially covered by the value of by-products for the animal meal and fat. Since by-product prices show significant fluctuations, the model calculations take into account the price development for the animal meal and soybean meal from 1996 to 2000 (see figure 1). The variation of the animal meal prices results from the fluctuations of vegetable proteins on the one hand, and from problems of acceptance of animal meals as feed on the other hand. Until 1998 the price of the animal meal was higher than that of the soybean meal. Due to the drastic

decrease in internal demand related to BSE and the dioxin crisis in Belgium the price of the animal meal dropped considerably in 1999.

**Figure 1: Price development of animal meal and of its feeding value**



In general, animal meal is an inexpensive protein feed related to its protein content. Based on raw protein its price relationship to soybean protein was between 0.93:1 and 0.88:1 between 1996 and 1998. Due to acceptance problems in animal feeding its price relationship dropped to 0.63 in July 1999. Its marginal feed value, pronounced in cost reductions related to soybean based protein feed, varies between 10 and 100 DM per ton of the animal meal (see figure 1).

Including the by-product credits for feed the existing system of rendering has relatively high costs. Under price conditions for animal meals and fat during the past the net costs for rendering 1.83 million t of the raw materials amount to 140 million DM in 1997 and to 240 million DM in 1999, respectively. The deficits must be shared by farmers and regional administrative bodies which are in charge of the rendering system in Germany.

## 2.1 Alternative (non-feed) waste removal schemes

At first, we focus on cost estimations for alternate processes under different assumptions concerning disposal fees for meals or pre-processed raw materials. Scenario 3 (0.47 million tons of raw materials) is taken as an example to explain the calculation scheme. We refer to the price conditions of the year 1999 while the price

for the animal meal is related to ‘normal’ conditions assuming a price relationship of 0.88:1 related to soybean protein. Table 1 illustrates the scheme of cost calculation for the biogas route compared to the reference system. The most important changes are:

- The costs for collection, transport and processing of raw materials (including sterilisation) increase by around 11 million DM; they are mainly due to transportation while there are no costs for drying.
- Assuming fees of 31 DM/t raw material, to be paid to the owner of the biogas plant, additional costs of 15 million DM can be expected.
- By-product credits for feed will be reduced by around 66 million DM, because of quantities of the animal meal and fat in conventional rendering become lower; furthermore the price of the remaining animal meal entirely based on slaughterhouse wastes (without fallen animals) will be reduced by approximately 7% due to the drop of protein content from 55 to 50%.
- The feeding value for the remaining animal meals decreases by around 17 million DM.

**Table 1: Costs of alternate rendering via the biogas route (Scenario 3: 0.47 million tons)**

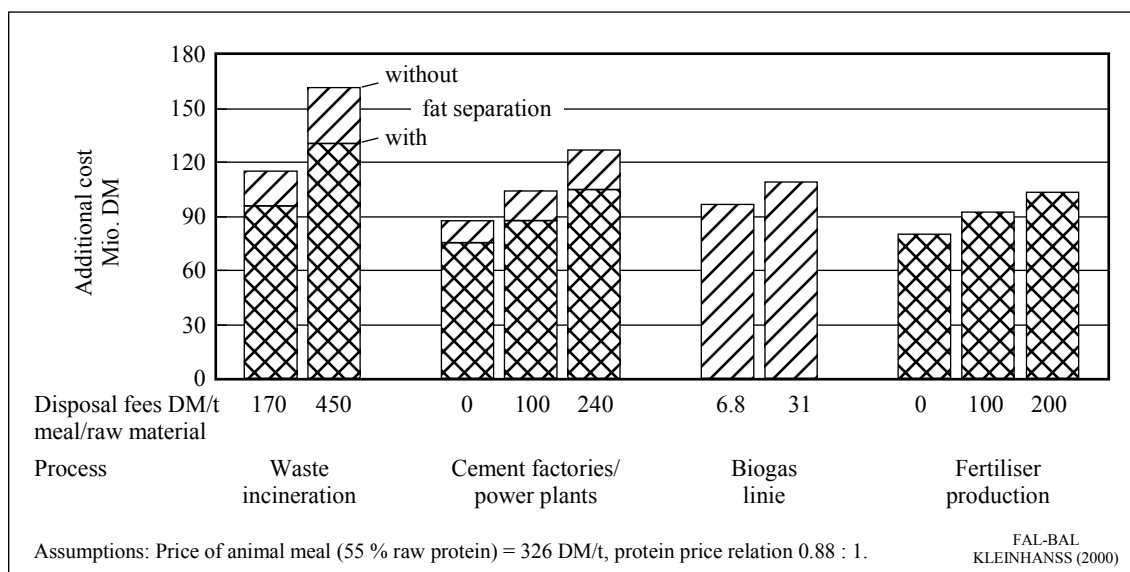
		Existing rendering scheme	Alternative rendering of SRM	
			feed line	biogas line
Raw materials	Mio. t	1.83	1.36	0.47
Collection and processing of raw material	Mio. DM	487	362	136
Disposal fees	Mio. DM			15 <sup>2</sup>
By-product credit for feed	Mio. DM	-222	-156 <sup>1</sup>	
Feeding credits for animal meal	Mio. DM	-37	-20	
Net costs	Mio. DM	248	186	151
Additional costs for alternative rendering	Mio. DM		337	88
<sup>1</sup> Price of animal meal (55 % raw protein) = 326 DM/t, protein price relation to soybean 0.88 : 1. <sup>2</sup> Disposal fees: 31 DM per ton of raw material.				FAL-BAL KLEINHANSS (2000)

In relation to the reference system the additional costs for the alternative rendering system amount to 88 million DM, which is mainly determined by the deficit of by-product credits and the lower margin in animal feeding.

In the following, other alternative processing and using systems is discussed, referring to scenario 3 (0.47 million tons) and taking into account different process configurations and disposal fees (see Figure 2):

- For the removal of meal (dried, not sterilised) in waste incineration plants disposal fees of approximately 170 DM/t of meal can be expected, if only the variable costs of the incineration plants are taken into account. This might be true, if available incineration plants are not used to their full capacities. Additional costs of the alternative scheme amount to 95 or 115 million DM with/without fat separation. It is a common practice that disposal fees are calculated on a full cost basis for those raw materials which have to be removed obligatorily; under these condition fees of 450 DM/t can be expected. In this respect the additional costs are in the range of 130 and 165 million DM (with/without fat separation). The fat separation and its separate use as a substitute for fuel-oil become the more favourable the higher disposal fees are. The main reason is that the volume for which fees have to be paid is reduced and further there are by-product credits for fat used as fuel.
- In using animal meals in cement processing disposal fees of 240 DM/t are announced for Switzerland and 100 DM/t for France, respectively. For the first case, the extra costs amount to 105 and 125 million DM, respectively with/without fat separation; in the second case to 85 and 105 million DM, respectively. Using meals in coal fired power stations disposal fees of 100 DM/t can be expected, resulting in the above named additional costs. With higher energy prices disposal fees might be reduced to zero such that additional costs of the alternative system will be less than 90 million DM.
- Extra costs via biogas production or use for fertiliser are situated in the same order of magnitude as the two processes mentioned before. The underlying raw material quantities could be processed as a co-substrate in existing biogas plants. As fertiliser production on the base of animal meals seem to be a niche market it is not certain if even the small quantities can be used in this sector.

**Figure 2: Additional cost of alternate rendering patterns related to Scenario 3 (0.47 million tons)**



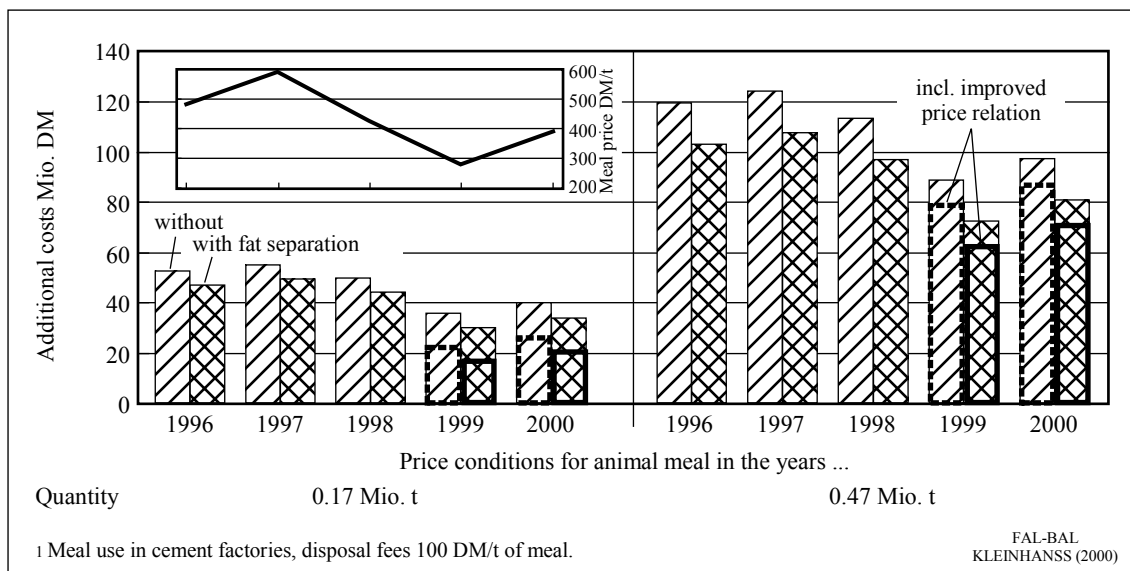
### ***Influence of the price of animal meal and of quantities to be removed***

Besides the above named processing and using schemes, the costs of alternate rendering schemes are influenced by meal prices and the quantities to be processed and used alternatively (partial or a total feed ban). These aspects are discussed in the following based on the disposal alternative "meal use in cement factories" assuming disposal fees of 100 DM/t of the dry meal. Figure 3 shows the additional costs for alternative disposal for different quantities of raw materials, that is 0.17 million t (scenario 2) and 0.47 million t (scenario 3). The calculations take into account the price development for animal meals and fat between 1996 and 2000:

- By-product credits are mainly influenced by the **price level of animal meals** and fat. Under less favourable price conditions for feed compounds the costs of the existing rendering scheme are higher; therefore the marginal costs of the alternative processing scheme become lower. Costs of the alternative rendering scheme increases with the level of feed prices.
- Another aspect is related to **acceptance problems** for animal meals used as feed. Assuming that these problems could be solved with alternative rendering, higher prices based on 'normal' protein price relationships and a larger demand for animal meals can be expected. Due to the improving price relationship, costs of the alternative rendering scheme can be reduced by around 10 million DM under price conditions of the years 1999 and 2000. This figure is only in effect for alternative processing of specific risk materials and

fallen animals; it is not real for a total feed ban because there is no production of animal meals for feed.

**Figure 3: Additional rendering costs for 0.17 and 0.47 million tons of raw materials, respectively under different price conditions for animals meals**



- Assuming the most favourable process combinations (with fat separation, increase of the price relationship) additional costs for alternative rendering (using meals for energy in cement factories at disposal fees of 100 DM/t) the additional costs depending on quantities of raw materials and the price situation for animal meals during the last five years vary between:
  - 18 to 50 million DM with the SRM prohibition (scenario 2; 0.17 million tons)
  - 60 to 110 million DM with the prohibition of SRM and fallen animals (scenario 3; 0.47 million tons)
  - 220 to 300 million DM for a total feed ban of animal meals (scenario 4; 1.83 million tons).



### 3 Conclusions

Referring to the SRM-directive specific risk materials must not be used any more for feed production starting from October 2000. Therefore, in Germany, about 170,000 t of specific risk material have to be removed from the feed sector and alternatively used, e.g. for energy. The alternative disposal is technically feasible, but it leads to higher costs than the present system due to the facts that no many savings for rendering (the collection of raw materials, drying sterilisation) can be expected and instead of by-product credits disposal fees have to paid to the final user. Suitable processes are the use of meals in the cement industry, combined heat and power stations as well as the biogas route. The removal of SRM and fallen animals from the feed cycle could make a certain contribution to overcome acceptance problems in using animal meals for feed, which might allow a better price relationship to vegetable proteins and might cause a larger home consumption of animal meals. The export of animal meals to CEEC's — as it happens today — is not a suitable strategy to solve the problems because some of these countries will enter the European Union soon.

Only those raw materials should be removed from the feed cycle, that are classified as specific risk materials or not more accepted by the consumer for ethical motives (for example fallen animals). This is not real for the majority of the raw materials being rendered in the existing scheme because they are qualified for consumption, but are moved in the rendering system due to economic reasons. Alternative rendering due to a total feed ban is neither necessary for epidemic and hygienic reasons, nor is it economically and ecologically meaningful. It would lead to drastic additional costs, which will not entirely be covered by the regional administrative bodies. If they are totally passed on to the producers the economic competitiveness of the meat sector will be negatively affected.

#### Reference

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