

Costs related to bovine spongiform encephalopathy control in the Czech Republic in 2001–2008

Náklady spojené s tlumením bovinní spongiformní encefalopatie v České republice v letech 2001–2008

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Abstract: This paper pays attention to and analyses two of the economic impacts of the BSE occurrence in the Czech Republic, namely the financial compensations to the farmers whose herds had been affected and the costs of animal killing and carcass disposal in the rendering plant. Between February 2001 and the end of June 2008, a total of 1 263 749 cows were examined and 28 cases of the BSE were detected. Consequently, 4 022 cows in cohorts were killed and their carcasses were safely disposed of. The farmers whose herds had been affected were provided compensations for the losses suffered. The total of the compensations in this period reached CZK 198,413 thousand. Of these, 83.3% (CZK 164.9 million) were compensations for the value of the killed animals, 9.7% (CZK 19.2 million) for the related costs, i.e., killing, safe disposal of carcasses and the examination for the BSE, and 6.9% (CZK 13.5 million) for the losses due to non-materialised production. The average costs per 1 BSE-positive animal were CZK 7.08 million and the average costs per 1 cohort animal were CZK 49 331. In the rendering plant responsible for killing the infected and cohort animals and safely disposing of their carcasses, the total of 2 221 tons of raw material was processed between March 2003 and February 2008, and this cost CZK 9 315 thousand. The fact that there were only two cases of the BSE in 2007 and none in 2008 suggests a trend towards the disease eradication, which is in agreement with the situation in the other EU countries.

Key words: financial compensation, bovine spongiform encephalopathy (BSE), cattle, infectious diseases, financial law, rendering plant

Abstrakt: Práce analyzuje ekonomické dopady nemoci BSE v České republice, především finanční náhrady chovatelům při výskytu BSE a také náklady na utracení a asanaci kadáverů ve specializovaném asanačním podniku. Za dobu výskytu nemoci od roku 2001 bylo v České republice do konce června 2008 vyšetřeno 1 263 749 krav a následně prokázáno 28 případů BSE. V souvislosti s nimi bylo v kohortách utraceno a neškodně odstraněno 4 022 krav. Celková výše vyplacených náhrad za celé období výskytu nemoci v ČR dosáhla téměř 198 413 tis. Kč. Z této částky bylo 83,3 % (164,9 mil. Kč) vyplaceno jako náhrady chovatelům za utracená zvířata, 9,7 % (19,2 mil. Kč) činily náklady na vyšetření na BSE, na utracení a neškodné odstranění kadáverů a 6,9 % (13,5 mil. Kč) představovaly ztráty způsobené nerealizovanou produkcí. Průměrné náklady na náhrady spojené s jedním pozitivním případem BSE činily 7,08 mil. Kč a průměrné náklady na jedno likvidované zvíře v kohortě činily 49 331 Kč. Zvláštní pozornost byla věnována nákladům na likvidaci kadáverů utráceného skotu v asanačním podniku v Žichlínce, kde bylo od března 2003 do února 2008 zpracováno celkem 2 221 tun kafilerní suroviny a kde celkové náklady na likvidaci dosáhly 9 315 tis. Kč. Skutečnost, že se v roce 2007 vyskytly pouze dva případy BSE a v roce 2008 nebyl dosud prokázán žádný případ, poukazuje na klesající trend výskytu nemoci u nás, což odpovídá i vývoji v ostatních zemích EU.

Klíčová slova: finanční náhrady, bovinní spongiformní encefalopatie (BSE), skot, infekční onemocnění, finanční právo, asanační podnik

For nearly two decades, the European beef demand was affected by the existence of bovine spongiform encephalopathy (BSE) because of its potential danger

to human health. The BSE is an infectious disease caused by prions and was first detected in Great Britain in 1985/1986. In 1988, it was ascertained that

the major source of infection was the use of meat and bone meal from the fallen stock animals (Wilesmith et al. 1988). In the Czech Republic, feeding meat and bone meal to ruminants was banned in 1991 (Anonym 1991).

In the industrialized countries, for the sake of public health cattle slaughtered at 30 months and older was examined for the presence of priors in the brain tissue. In the Czech Republic, the regular examination of animals came into effect on 1st February 2001 and, by 30th June 2008, a total of 1, 263, 749 cattle were examined, of which 28 animals were tested positive. Only two outbreaks of the bovine spongiform encephalopathy in 2007 and no case of the BSE in the first seven months of 2008 confirm that, in the Czech Republic, the disease incidence has a decreasing trend, which is in agreement with the situation in the other EU countries. As a result of 28 positive BSE findings, the total of 4 022 cows were killed and their carcasses were destroyed. The animals selected to be killed in relation to each BSE occurrence constitute a cohort, which is a group of animals born in the same herd within 12 months preceding or following the date of birth of the affected bovine animal.

In our country, the procedure for the destruction of the killed animals developed over years. At the first, 2001 BSE occurrence, the animals were killed on the farm and buried within its boundary. However, this proved difficult in terms of hygiene and sanitation and was ethically unacceptable. Therefore, on the following five occasions, the animals were killed and their carcasses disposed of at the regular rendering plants. This, however, carried a risk of contaminating both the premises and products and thus, in 2003, the rendering plant Asanace Žichlínek Ltd. was assigned by the State Veterinary Administration to become an institution specialized in killing all the BSE suspected animals, and in processing and disposing of their carcasses in the following years. The meat and bone meal produced was subsequently incinerated in cement works.

In accordance with the EU Common Agricultural Policy and farming promotion, the EU provides financial compensations to farmers who have suffered losses due to the BSE. Their allocation is regulated by the Act No. 166/1999 on Veterinary Care and on Amendment of Certain Related Acts (Veterinary Act), with particulars given in the Title IX Compensation of Costs and Losses Incurred in Connection with Dangerous Contagious Diseases (anonymous source 1999). This defines reimbursements to farmers whose cattle herds have been affected by the transmissible diseases specified in the Annexes 3 and 4 to this

Act. For 62 specified dangerous transmissible diseases, it outlines the indemnity strategies and the general itemisation of the compensation. The Czech legislation is in full agreement with the Regulation (EC) No. 999/2001 of the European Parliament and of the Council, of 22nd May 2001, laying down the rules for the prevention, control and eradication of certain transmissible spongiform encephalopathies, as amended (Pospíšil 2008).

To provide a deeper insight into the legal and economic aspects associated with the BSE in the Czech Republic, the first part of the study was focused on the evaluation of the indemnity policy and quantification of reimbursements provided for farmers according to the Veterinary Act in the period from 2001 to 2008. The total costs were itemised and the cost items broken down to cover the individual operations the farmers were responsible for in the BSE management and for which they were subsequently reimbursed.

In the second part, our aim was to calculate the costs related to the killing and disposal of the animals brought to the rendering plant Asanace Žichlínek Ltd. between October 2003 and January 2008.

MATERIAL AND METHODS

The chief method used in the first part was the evaluation of legal rules, i.e. legal acts, regulations and implementing provisions, and their application to the BSE occurrence in Czech herds. In addition, the EU legislation concerning this issue was analysed and compared with the relevant legislation of the Czech Republic.

The method of economic evaluation was the analysis of statistical data related to the costs of the BSE eradication in the Czech Republic; this information was provided by the Ministry of Agriculture of the Czech Republic (Saksún 2008). Subsequently, the data was related to the individual cost compensation items, as specified by the Veterinary Act.

The analysis presented in the second part was based on account records provided by the Asanace Žichlínek Ltd. (Nicák 2008). It included an evaluation of the whole process consisting of animal killing, carcass mechanical processing, heat treatment, sterilisation, drying, hammer-mill pressing and pulverisation, and dispatching of the processed material. The costs of transporting the animals to be killed at the rendering plant were not included. They were born by the farmers who were subsequently reimbursed by the Ministry of Finance in accordance with the Veterinary Act.

RESULTS

Part 1. Economic evaluation of loss compensations

The reimbursements for the 2001–2008 periods were itemised, analysed and finally summarised.

Table 1 shows the compensations for all costs spent in relation to the BSE between 2001 and 2008. A total of 28 animals tested BSE-positive and, consequently, 4 022 animals coming from 139 herds were killed due to the constitution of cohorts. The total of compensations in this period reached CZK 198 413 thousand. The average occurrence was 3.50 BSE-positive animals per year, the average costs per 1 BSE-positive animal were CZK 7.08 million, and the average costs per 1 cohort of animals (killing and carcass disposal) were CZK 49 331.

Of these, 83.3% (CZK 164.9 million) were compensations for the value of the killed animals, 9.7% (CZK 19.2 million) for the related costs, i.e., killing, safe disposal of the carcasses and examination for the BSE, and 6.9% (CZK 13.5 million) for the losses due to the non-materialised production.

The number of cohorts is not in agreement with the total of 139 herds affected, as shown in Table 1. This is because there were instances when an animal from the original cohort was transferred or sold to another herd. Its new keeper, having to comply with the Emergency Veterinary Measures, then had this cows killed and thus one cow was reported in association with two or more herds.

Part 2. Evaluation of the costs associated with animal killing and carcass processing at the Asanace Žichlínek Ltd

In the period from October 2003 to January/February 2008, a total of 3 572 cattle were killed and their car-

casses destroyed and disposed of at the rendering plant. This included 701 cows in 2003; 1 167 in 2004; 1 262 in 2005; 288 in 2006; 131 in 2007 and 23 animals in 2008. In the terms of the cohort size, the largest one (7th) included 875 cows, the smallest (27th) had only three animals. The average was 162 animals per 1 cohort. The animals of the last cohort derived from the BSE case detected on 19th December 2007 were gradually identified and destroyed early in 2008. The selected economic items and their distribution in the years 2003 to 2008 are shown in Table 2.

From Table 2, it follows that a total of 2 221 tons of raw material was processed at costs ranging from 3.50 CZK to 6.50 CZK per 1 kg between 2003 and 2008. The gradual increase in the cost per 1 kg was due to a rise in operation costs including higher wages and increased energy prices.

Based on the cost per 1 kg processed material, the total costs associated with animal killing and carcass disposal reached CZK 1 453 thousand in 2003; CZK 2 482 thousand in 2004; CZK 3 933 thousand in 2005; CZK 955 thousand in 2006; CZK 396 thousand in 2007; and CZK 95 thousand in 2008. The total costs for the whole period of 2003–2008 amounted to CZK 9 315 thousand

DISCUSSION

Although early and stringent veterinary precautions were adopted, in the first place a ban on feeding meat and bone meal (MBM) to cattle in 1991, the first case of the BSE in the Czech Republic was detected in 2001. The most probable cause was an indirect contamination of cattle feed with the imported MBM or with the MBM intended for feeding pigs and poultry and allowed for use before 2003 (Semerád 2007). In the period from 1st February 2001 to 30th June 2008, 28 BSE-positive cases were identified by the active

Table 1. Total costs (in CZK thousand) associated with 28 BSE cases in the period from 2001 to 2008

Period	Number of herds defined by cohort size	Number of animal skilled	Value of animals	Killing	Carcass disposal	Examination for BSE	Related costs*	Non-materialised production	Observance of emergency veterinary measures	Total
2001 to 2008	A. 109	219	10 350.8	232.9	1 076.5	161.3	103.3	133.8	0.7	12 059.1
	B. 15	633	22 006.4	342.9	1 932.5	697.3	460.6	1 036.7	109.0	27 094.9
	C. 15	3 170	132 572.5	1 297.8	8 671.7	3 531.6	729.5	11 681.0	413.6	159 259.1
	Total 139	4 022	164 929.7	1 873.6	11 680.7	4 390.2	1 293.4	12 851.5	523.3	198 413.1

A = 1–10 animals in a cohort; B = 11–100 animals; C > 100 animals in a cohort

*Costs related to killing and safe disposal of carcasses and farm decontamination

monitoring for the BSE involving 1, 263, 749 cows. The detection was so effective thanks to the well co-ordinated laboratory diagnostic procedures carried out in the laboratories of the State Veterinary Institutes in Prague, Jihlava and Olomouc.

To reduce the economic impact of the BSE on farmers, legal means have been established to reimburse farmers for the losses both direct and related. The latter involve costs of the examination for the BSE, transport of animals to a specialised rendering plant, their killing and safe disposal of their carcasses, and cleaning and disinfection of the holding and its equipment, though this procedure is questionable, because the BSE is not a truly contagious disease. In addition, the farmer is reimbursed for losses due to the non-materialised production. However, all these

compensations cannot completely cover the costs incurred in relation to the BSE.

In the first place, the producer-consumer relations, usually taking a long time to establish, are destroyed and the return to the market is difficult; also, large costs are necessary to build up the herd again. These costs are difficult to calculate and their compensation cannot be claimed because they are not treated by the legislation. A BSE incident is also associated with several adverse consequences, such as a loss of jobs in an agricultural enterprise, which can have a deep impact on rural populations. The ensuing problems in the broadest sense of the word can partly be eased by the commercial insurance policy. The past experience showed that most of the farmers were insured. Any payment of insurance benefit has no effect on the

Table 2. Selected costs of BSE-related cattle disposal at the rendering plant Asanace Žichlínek Ltd. and their distribution over the period from 2003 to 2008

		Quarter 1	Quarter 2	Quarter 3	Quarter 4	Total
2003	CZK/kg				3.50	
	kg processed				415 080	415 080
	animal killed				701	701
	total costs				1 452 780	1 452 780
2004	CZK/kg	3.50	3.50	3.50	3.50	
	kg processed	362 869	60 800	190 951	94 410	709 030
	animal killed	607	101	310	149	1 167
	total costs	1 270 042	212 800	668 329	330 435	2 481 606
2005	CZK/kg	4.50	5.00	5.00	5.00	
	kg processed	257 220	293 200	146 800	115 200	812 420
	animal killed	397	454	240	171	1 262
	total costs	1 157 490	1 466 000	734 000	576 000	3 933 490
2006	CZK/kg	5.00			5.00	
	kg processed	158 426			32 620	191 046
	animal killed	236			52	288
	total costs	792 130			163 100	955 230
2007	CZK/kg	5.00				
	kg processed	79 220				79 220
	animal killed	131				131
	total costs	396 100				396 100
2008	CZK/kg	6.50				
	kg processed	14 680				14 680
	animal killed	23				23
	total costs	95 420				95 420
Total costs for 2003 to 2008						9 314 626

amount of cost compensation based on the Veterinary Act. Since a farmer-insurance company relationship is a business one, it was not possible to find out the information on benefit payments and to include it in this study.

The total amount of compensations paid was CZK 5.5 million in 2001, CZK 1.6 million in 2002, CZK 47.0 million in 2003, CZK 39.8 million in 2004, CZK 91.9 million in 2005, and CZK 11.1 million in 2006. In 2007, it was only CZK 169.5 thousand, because the 27th case was an eleven-year-old cow whose cohort included only three animals left due to slaughtering of the other cows. Compensations provided in relation to the last BSE-positive case detected on 19th December 2007 were paid in March 2008 and reached CZK 1 356 thousand.

The total costs associated with the BSE occurrence in the Czech Republic amounted to CZK 198.4 million. The average costs per 1 BSE-positive animal were CZK 7.08 million and the average costs per 1 cohort of animals (killing and disposal of the carcasses) were CZK 49 331.

To ease the negative economic impacts of the BSE, the EU provides financial support for all member states. For instance, in 2007 the Czech Republic received € 1 640 thousand for the active monitoring and € 2 500 thousand for the eradication (EU-DG-SANCO 2006).

It is interesting that the amounts of reimbursement presented in the international literature are reported only as the total costs per certain period, including the data from the Great Britain which suffered most. The calculation of cost compensations is based on tables prepared in advance in which, for each cattle age category, the amount of compensation is given without any respect to the animal's actual productivity (Defra 2007). The British Government study has reported that the total net cost of the BSE crisis to the Exchequer by the end of the fiscal year 2001/2002 reached £ 4.2 billion, to which the EU contributed £ 487 million, which is 11.6 % (Brinkle 2002). It is evident that this high sum of money was relevant to the exceptionally high number of the BSE-positive cows that had exceeded 187 000 animals by that fiscal year. This sum also included £ 720 million to compensate for the loss of markets in the EU countries, because the European Commission banned beef export in March 1996 (in the USA, import of British beef was banned in the late 1980s). The beef production accounts for about 0.5% of the British gross domestic product and the British beef industry has over 130 000 employees. With the decrease in beef meat prices, the prices of all other kinds of meat increased in the Great Britain. This chiefly concerned poultry and

lamb meat, which increased in price approximately by 5%, with pork price remaining generally unchanged (Leeming, Turner 2004).

In Northern Ireland, the beef producing industry employs over 5 000 workers and the additional 600 000 are employed in the related industrial branches (Caskie et al. 1998). Thus, the rate of employment in this industry has a deep social impact. The costs of re-qualification for workers who had lost their jobs due to the reduced beef production were estimated to be 7.9% of all costs related to the BSE crisis (Muth et al. 2005).

This study paid attention to the costs of animal killing and their carcass disposal in the rendering plant specialised for this purpose. The evaluation was based on the cost per 1 kg of the processed material, which ranged from CZK 3.50 in 2003 to CZK 6.50 in 2008. Between March 2003 and January 2008, the total of 3 572 bovine animals associated with the BSE occurrence were killed there and their carcasses were destroyed and disposed of; this accounted for 2 221 tons of the processed material. The total costs for the whole period amounted to CZK 9 315 thousand. The considerable increase in costs during this period is in agreement with the inflation development (wage-push, energy price increase) in the domestic economy and is also related to the increased financial demands for the hygienic and technological quality of the rendering plant operation (septic and aseptic units, disinfecting fords, separation of processing routes) after the Czech Republic joined the EU.

Costs described here did not include the costs of transporting the animals to be killed to the rendering plant. These were covered by the farmer who was subsequently reimbursed by the Ministry of Finance in accordance with the Act No. 166/1999 on Veterinary Care and on the Amendment of Certain Related Acts. These costs greatly varied depending on the distance between the farm and the rendering plant and on whether the farmers had their own transporting facilities or had to hire it.

In one instance, no long-distance transport was needed. It was when the first BSE case was discovered in 2001 in the village of Dušejov in the Jihlava district. All 134 cows of the cohort were killed on the farm and buried in its vicinity. The carcasses were placed four metres deep in the ground and were covered up with a 1.5- to 2-metre layer of soil (Meloun 2006). Although this method of disposal may seem complicated, the total costs were only CZK 38 572 the (hydrogeological expert report CZK 8 000; wages CZK 12 901; local transport CZK 43 000; fencing CZK 13 371) (Saksún 2008), which was much less than what the process of disposal would have cost in a rendering plant.

However, for the public health and environmental reasons it was not possible to continue with this method of disposal. Moreover, the cohorts derived from the later BSE cases were larger in size than the first cohort buried in Dušejov. For instance, the cohort from the 7th case in 2003 had 875 cows and that from 22nd case in 2005 had 333 cows, and the burial of so many animals would not have been feasible.

The rendering process produces meat and bone meal; one kilogram of raw material gives 0.28 to 0.29 kg of it. In addition, 0.08 to 0.09 kg of animal fat is obtained; the residual fat content in meat and bone meal is 13% to 18% and residual moisture is 2.8%.

The meat and bone meal produced is transported to cement works for incineration at the temperature of about 1 200°C. One kilogram of meat and bone meal gives about 0.25 kg ash. By the process carried out at the rendering plant and by the subsequent incineration in a cement factory, 30 to 40 kg ashes are produced. The ashes are included in the cement production and become a part of the final product. Considering that the total number of cows killed and disposed of at the rendering plant Asanace Žichlínek was 3 572, the total amount of ashes produced in the cement works was 600 tons.

The rendering plant paid 1 CZK to the cement works for 1 kg meat and bone meal to be incinerated, and claimed an equal compensation from the Ministry of Agriculture of the Czech Republic. The funds to cover the expenses related to the disposal of meat and bone meal had been included in the state budget (the "General Treasury Administration" chapter) until 2007. From that year on, the funds were no longer available and the meat and bone meal was incinerated in the cement works free of charge. However, the cement works can utilize the caloric power of the meat and bone meal, because its 18 MJ per kg equals to the fuel efficiency of 1 kg lignite (anonymous source 2008). Considering that the average price of 1 ton of lignite is CZK 3 330, the 600 tons of burnt meat and bone meal contributed about CZK 1 998 thousand to the cement factory's budget.

CONCLUSION

Between February 2001 and the end of June 2008, the total of 1 263, 749 cows were examined and 28 cases of the BSE were detected. Consequently, 4 022 cows in cohorts were killed and their carcasses were safely disposed of. The total of compensations in this period reached CZK 198 413 thousand. Of these, 83.3% (CZK 164.9 million) were compensations for the value of the killed animals, 9.7% (CZK

19.2 million) for the related costs, i.e., killing, safe disposal of carcasses and examination for the BSE, and 6.9% (CZK 13.5 million) for the losses due to the non-materialised production. The average costs per 1 BSE-positive animal were CZK 7.08 million and the average costs per 1 cohort of animals were CZK 49 331. In the rendering plant in Žichlínek responsible for killing of the infected and cohort animals and safely disposing of their carcasses, the total of 2 221 tons of raw material were processed between March 2003 and February 2008, and this cost CZK 9 315 thousand.

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