

Report on
the Assessment of
the Geographical BSE-Risk
(GBR) of
PAKISTAN

NOTE TO THE READER

Independent experts have produced this report, applying an innovative methodology by a complex process to data that were voluntarily supplied by the responsible country authorities. Both, the methodology and the process are described in detail in the final opinion of the SSC on "the Geographical Risk of Bovine Spongiform Encephalopathy (GBR)", 6 July 2000. This opinion is available at the following Internet address:

<http://europa.eu.int/comm/food/fs/sc/ssc/outcome_en.html>

In order to understand the rationale of the report leading to its conclusions and the terminology used in the report, it is highly advisable to have read the opinion before reading the report. The opinion also provides an overview of the assessments for other countries.

FULL REPORT

1. DATA

- The available information was suitable to finalise the GBR risk assessment.

Sources of data

Country dossier consisting of:

- “Brief report to the European Union regarding the Bovine Spongiform Encephalopathy (BSE)/Scrapie free status of Pakistan”, drawn up by the Government of Pakistan, Ministry of Food, Agriculture & Livestock dated 21 December 1998.
- Country Dossier consisting of “Additional material on BSE free status of Pakistan in terms of EC Directive 98/477/EC” of 21 May 2000.
- Report on the assessment of the geographical BSE-risk of Pakistan – Reply to queries (11th January 2001).

Other sources:

- EUROSTAT data on exports of "live bovine animals" and of "flour, meal and pellets of meat or offal, unfit for human consumption; greaves", from EU Member States covering the period 1980 to 1999.
- UK-export data on "live bovine animals", 1980-1996 and on "Mammalian Flours, Meals and Pellets", 1980-2000. As it was illegal to export mammalian meat meal, bone meal and MBM from UK since 27/03/1996, exports indicated after that date might have included non-mammalian MBM.

2. EXTERNAL CHALLENGES

2.1 Import of cattle from BSE affected countries

- According to the country dossier, no imports of live cattle have occurred from EU Member States since 1980. In 1997 an import ban of livestock from UK and Ireland was installed.
- As can be seen in table 1, the data provided by Pakistan were inconsistent with UK and Eurostat export statistics. Exports from UK (192 cattle in 1987) and from NL (in 1982 and 1983) and Denmark (in 1983, '85 and '86) were recorded. These exports are currently being verified with the exporting countries.

Import of live cattle (n/year) into <u>PAKISTAN</u> from BSE-affected countries									
Period	UK			NL		DK		Non-UK	
Source:	CD	EU	UK	CD	EU	CD	EU	CD	EU
1980									
1981									
1982					91				
1983					50	752			
1984									
1985						102			
1986						245			
1987		192	192						
80-87:		192	192		141	1099			1240
88-93:									
94-99:									

Table 1: Live Cattle imports. Shading indicates period of different risk that UK-exports carried the agent, 1988-1993 being the period of highest risk. Sources: CD = Country Dossier, EU = Eurostat, UK = Export data from UK.

2.2 Import of MBM or MBM-containing feedstuffs from BSE affected countries

- According to the country dossier no mammalian MBM was ever imported into Pakistan from any EU Member State.
- EUROSTAT reports export of 68 tons of MBM from BSE-affected countries to Pakistan, from UK in 1995 (43t), from Belgium in 1992 (20t) and from Germany in 1997 (5t). These imports are not registered by the country.

Import of MBM, MM, BM or greaves (t/year) into <u>Pakistan</u> from BSE-affected countries									
Period	UK			BE/Lux		DE		Non-UK	
Source:	CD	EU	UK	CD	EU	CD	EU	CD	EU
80-85									
86-90									
1991									
1992					20				20
1993									
91-93					20				20
1994									
1995		43	43						
1996									
1997							5		5
1998									
1999									
94-99:		43	43				5		5

Table 2: MBM-imports. Shading indicates period of different risk that exports carried the agent, 1986-1990 being the period of highest risk for UK imports while 1994-1999 UK-exports are assumed to have been safer than exports from other BSE-

affected countries. Sources: CD = Country Dossier, EU = Eurostat, UK = UK-Export statistics.

2.3 Overall assessment of the external challenge

The level of the external challenge that has to be met by the BSE/cattle system is estimated according to the guidance given by the SSC in its final opinion on the GBR of July 2000.

It appears that the challenges resulting from live cattle imports have been moderate between 1980-1987, due to the imports from UK. If UK should not confirm these imports, the challenge still remains low due to imports from non-UK countries. Since 1988 the external challenge due to live cattle imports is negligible.

Although the MBM exports to Pakistan are not confirmed to have arrived in Pakistan, any external challenge that could have resulted from such imports would have been negligible.

On the basis of the available information the overall assessment of the external challenge is as given in the table.

External Challenge experienced by <u>PAKISTAN</u>				
<i>External challenge</i>		<i>Reason for this external challenge</i>		
Period	Level	Cattle imports	MBM imports	Comment
1980-87	Moderate	Moderate	Negligible	Due to UK imports of live cattle
1988-99	Negligible	Negligible		No imports from UK or other EU MS.

Table 3: External Challenge resulting from live cattle and/or MBM imports from the UK and other BSE-affected countries. The Challenge level is determined according to the SSC-opinion on the GBR of July 2000.

3. STABILITY

3.1 Overall appreciation of the ability to avoid recycling of BSE infectivity, should it enter processing.

Feeding:

According to the country dossier animal feed in Pakistan primarily consists of pasture grazing, green/dry fodder and to some extent agro-industrial by-products as supplement. Commercial rations include 8-12 ingredients for the production of various types of animal feeds, most common ingredients are oil cakes, cereal by-products, molasses and micro-ingredients.

There is no official ban on the use of MBM but feeding requirements are met through indigenous sources and through vegetable protein. The country dossier

mentions that no ruminant protein was or is fed to cattle, buffaloes, sheep and goats and that at the rural level, it is not economically viable to use commercial rations or supplements.

No information on the type of cattle feed mills is provided. There are 147 feed mills for poultry feed, it is not clear if any of these mills also supply cattle feed or operate alongside cattle feed mills.

Analysis of feeds is carried out with regard to microbial and nutritive status. Data is presented that shows indigenous crops provide approximately 72% digestible nutrient and 56% digestible protein requirements for all cattle, buffalo, sheep and goats. However, no analyses are reported regarding tests for the presence of MBM contamination in cattle feed.

Rendering:

A rendering industry exists in Pakistan and raw materials are collected from slaughterhouses everywhere in the country. According to the country dossier batch type dry rendering is used where animal by-products are processed at 133° C at 3 bar for 20 minutes. Other conditions are not specified and it is assumed that the effectivity of the process is not fully equivalent.

Production statistics for bone meal are provided, showing slowly increasing production of around 7000 tons per year over the period 1995-2000. The exported proportion is on average 33%. The large poultry industry uses mainly fish meal and soybean meal as protein source.

No information is provided on the annual production of MBM in Pakistan and it is regarded possible that in addition a sub-industrial scale rendering also exists in the country. End-products of this could be used as fertiliser to which cattle could have access.

SRM and fallen stock

There is no ban on rendering SRM. However, SRM such as brain, spleen and intestine are used for human consumption. This applies to large and small ruminants, irrespective of age, that are slaughtered. Other specified bovine offal such as thymus and tonsils are considered as waste and disposed off through burial/incineration.

Fallen stock/transportation deaths are disposed of after removing the skin. It is possible that the carcass is rendered, however in the case of diseased animals it is usually burnt.

Cross-contamination

A commercial feed industry exists, mainly for poultry but also commercial cattle feed is produced. No information is provided on measures to avoid cross contamination of cattle feed with MBM, used for poultry feed.

At the commercial level, farming of small ruminants, large ruminants or poultry is separate. Co-farming occurs in the rural sector but the use of commercial rations is not economic feasible at this level, while it cannot be excluded.

No examination of cattle feed for presence of MBM is carried out. Therefore cross-contamination of cattle feed with MBM is assumed to happen.

Conclusion on the ability to avoid recycling

In light of the above-discussed information it has to be assumed that the BSE agent, should it have entered the territory of Pakistan, could have been recycled.

3.2 Overall appreciation of the ability to identify BSE-cases and to eliminate animals at risk of being infected before they are processed.

Cattle population structure

Period	(*1000)	Average number of cattle \geq 3 years (*1000)						Total male and female \geq 3 years
	Total (all ages)	Male			Female			
		Breeding	Work	other	breeding	work	other	
1988-89	17,660	215	5025	166	4104	2179	563	12,052
1990-94	17,779	216	5059	166	4131	2193	568	12,333
1995-99	21,002	256	5977	196	4880	2591	672	14,572

Table 4a: Key data on the bovine cattle population

The bovine cattle population is apparently increasing, particularly in the last 5 years period. Nearly 69.4% of the population are older than 3 years of which 44% are male animals, used for working purpose.

The female population is mainly used for breeding but also for work, only 4.6% are used for other purposes, including milk production.

Period	(*1000)	Average number of buffaloes \geq 3 years (*1000)						Total male and female \geq 3 years
	Total (all ages)	Male			female			
		Breeding	Work	Lactating	Dry	Pregnant	Dairy	
1988-89	17,156	167	138	6609	2060	1666	10,335	10,640
1990-94	18,752	182	151	7224	2252	1822	11,298	11,631
1995-99	21,141	206	170	8144	2538	2053	12,735	13,111

Table 4b: Key data on the buffalo population

The buffalo population is as big as the cattle population, and also increasing. The percentage of animals older than 3 years is slightly lower (62%) and most of these are female (97%), used for milk production.

Livestock raising in Pakistan is mainly a small-scale activity with very few large commercial herds. Most farms have between 1-10 animals, both bovine cattle and buffaloes. Cross-species farming of bovines with buffaloes, sheep and goats, and poultry is considered to be common practice. None of these animals are expected to receive supplementary feed. Many “house-hold” farms keep 2-3 cattle/buffaloes and 3-4 sheep/goats per family to meet some of the basic day to day dietary requirements and to sell the surplus on the market.

Relatively few specialised peri-urban milk producing units and feedlots exist. The overall milk yield from bovines has moved from 1000 to 2000 kg per head per year. The reason for this trend is not clear but it would not require, in average, supplementary feeding.

Approximately 3.5 million of both buffalo and cattle are slaughtered per year, with 50% of the cattle and 40% of the buffalo over the age of 3 years. Females are slaughtered at a relatively higher age than males.

Surveillance and culling

A passive surveillance system operates in Pakistan and notification of BSE is compulsory, but it is not clear since when. The criteria used for defining a BSE-suspect case were not described in the country dossier. Training and awareness measures directed at BSE are not reported.

Currently there is no compensation for cases.

Diagnostic techniques such as immunohistochemical labelling of PrP, bioassay, western blotting are used for the detection of BSE/scrapie. These tests are performed at the Agricultural University, the Veterinary Research Institutes and National Agriculture Research Centre. No information is provided on where laboratory people were trained for BSE diagnostic.

Suspect cases of neurological disorders appear very low: 75 cattle and buffaloes were found to be infected with rabies during 1999. The number of suspect (and rabies negative) cases is not reported. Nor is it stated how many CNS suspects were notified in total and how many of them were tested for BSE.

3.3 Overall assessment of the stability

For the overall assessment of the stability the impact of the three main stability factors and of the additional stability factors, mainly cross-contamination and surveillance with culling, has to be estimated. Again the guidance provided by the SSC in its opinion on the GBR of July 2000 is applied.

Feeding: Feeding (R)MBM to cattle is legally possible and therefore no controls are carried out. Even if it seems unlikely that the small-scale farms that dominate the sector would voluntarily feed MBM, accidental cross feeding of poultry feed cannot be excluded. If sub-industrial scale rendering exists with by-products used as fertilizer, bovines could also have access to these. Therefore feeding is assessed as having been “not OK” throughout the whole period.

Rendering: Rendering is common practice in Pakistan. Material includes ruminant origin material, sometimes including SRM from condemned animals. The processes used could be adequate to reduce BSE-infectivity but no information on controls was provided, neither since when these processes are used and if they are used for any rendering carried out in the country. Also sub-industrial scale rendering is supposed to exist and cattle might have access to its products. Therefore rendering is assessed as having been "not OK" throughout the reference period.

SRM-removal: There is no SRM ban but most of the brain, spinal cord and intestines are used for human consumption. Therefore SRM-removal is assessed as having been "reasonably OK".

Other stability factors: Cross contamination cannot be excluded, mainly on farm but, if cattle feed is produced, also in feed mills. BSE surveillance is found to be inefficient. The "other factors" therefore reduce the stability.

Stability of the BSE/cattle system in <u>PAKISTAN</u> over time					
Stability		Reasons			
Period	Level	Feeding	Rendering	SRM	Other
1980-1999	Very unstable	Not OK	Not OK	Reasonably OK	↓

Table 5: Stability resulting from the interaction of the three main stability factors and the other stability factors. The Stability level is determined according to the SSC-opinion on the GBR of July 2000. The "other" factors i.e. cross-contamination and lack of surveillance reduce the stability.

On the basis of the available information it has to be concluded that the country's BSE/cattle system was and is very unstable.

4. CONCLUSION ON THE RESULTING RISKS

4.1 Interaction of stability and challenges

The conclusion on the stability of the Pakistan BSE/cattle system over time and on the external challenges the system had to cope with, are summarised in the table below. From the interaction of the two parameters "stability" and "external challenge" a conclusion is drawn on the level of "internal challenge" that emerged and that had to be met by the system, in addition to external challenges that occurred.

Any external challenge resulting from cattle imports could only lead to an internal challenge once imported infected cattle were rendered for feed and this contaminated feed reached domestic cattle. Cattle imported for slaughter would normally be slaughtered at an age too young to harbour plenty of BSE-infectivity or to show signs, even if infected prior to import. Breeding cattle, however, would

normally live for 10 years or more. Only animals having problems would be slaughtered younger. If being at an age of 4-6 years, they could approach the end of the BSE-incubation period and harbour, while being pre-clinical, as much infectivity as a clinical BSE-case. Hence the date when cattle imports could have led to an internal challenge is about 3 years after the import of breeding cattle that could have been infected prior to import. Special measures taken to avoid processing of imported cattle into feed could influence the risk of this to happen. In the case of Pakistan bovines were first imported from BSE-affected countries in 1982 and it is therefore possible that the agent could have entered the Pakistan system by this route as early as 1985.

On the other hand imports of contaminated MBM, MM, BM or greaves would lead to an internal challenge in the same year of import, if fed to cattle. Apparently the feeding system is of utmost importance in this context. If it could be excluded that imported, potentially contaminated feed stuffs reached cattle, such imports might not lead to an internal challenge at all. In the case of Pakistan only very small MBM imports might have taken place, according to export data recorded in Eurostat but the country could not identify these in its own import statistics. However, they would anyway be too small to represent more than a negligible external challenge. It is therefore highly unlikely that the BSE agent could have entered Pakistan by this route.

The information on the BSE/cattle system of Pakistan was not very detailed or complete. However, it is concluded that the Pakistan system is very unstable throughout the reference period. This indicates that recycling and amplification of the BSE agent, should it have entered the country, could and would most likely take place.

In view of the above-summarised analysis it is likely that an internal challenge developed in the mid eighties, mainly due to the occurrence of a non-negligible external challenge. The potentially infected cattle would have been rendered and possibly would have ended up in cattle feed. Feeding of this material to cattle could only occur by accident since it was only used for poultry, but no sufficient evidence thereof is provided.

Taking this into account it is unlikely, but cannot be excluded, that an internal challenge developed from the live cattle imports.

INTERACTION OF STABILITY AND EXTERNAL CHALLENGE IN <u>PAKISTAN</u>			
Stability		External Challenge	Internal challenge
Period	Level	Level	
1980 - 84	Very unstable	Moderate	Not present
1985-87			Unlikely, but cannot be excluded
1988- at current		Negligible	

Table 6: Internal challenge resulting from the interaction of the external challenge and stability. The internal challenge level is determined according to guidance given in the SSC-opinion on the GBR of July 2000.

4.2 Risk that BSE infectivity entered processing

Given the fact that the BSE-agent was most likely imported into the country, it is possible that BSE infectivity entered processing.

4.3 Risk that BSE infectivity was recycled and propagated

Given the fact that the BSE-agent possibly entered processing, it is also likely that BSE infectivity was recycled and propagated.

5. CONCLUSION ON THE GEOGRAPHICAL BSE-RISK

5.1 The current GBR as function of the past stability and challenge

The current geographical BSE-risk (GBR) level is *II*, i.e. it is unlikely but cannot be excluded that domestic cattle are (clinically or pre-clinically) infected with the BSE-agent.

Note: This assessment is mainly depending on the assessment of the external challenge that resulted from imports of live cattle from BSE-affected countries. Should evidence be provided that the assumed level of imports is not correct, the assessment has to be revised.

5.2 The expected development of the GBR as a function of the past and present stability and challenge

Given the low stability of the system, an external challenge could always lead to an internal challenge and an increasing GBR, if BSE infectivity is already present. However, amplification of the BSE agent is unlikely in the Pakistan system or would be rather slow.

5.3 Recommendations for influencing the future GBR

- Improving the stability of the Pakistan BSE/cattle system would make the country less vulnerable to external challenges. Controlling that MBM is indeed

not fed to bovines and that all rendering is carried out under appropriate process conditions would increase the stability, as would the exclusion of fallen stock and condemned SRM from entering the feed cycle.

- Introducing both passive and active surveillance would provide a better picture of the epidemiological situation with regard to BSE in the country. Ideally complete notification and systematic examination of all CNS-suspects for BSE, as laid down by OIE requirements, should be combined with a systematic sampling of a-symptomatic at-risk cattle populations (adult cattle in fallen stock and emergency slaughter).