# Report on

# the Assessment of

# the Geographical BSE-Risk

# (GBR) of

# INDIA

***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 data consisting of:

- Country Dossier of 17/12/1998, and information provided by the country's authorities and the country experts in 1999, comments of the competent Indian authorities on the first draft report on the assessment of the GBR of India of 21/06/1999 and 01/02/2000.
- Country comments upon additional request for information, received on 11/01/2001.
- Comments on the draft report from the Indian authorities, received 01/03/2001 and on the final draft report received 27/03/2001.

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.
- NIMEXE dataset of 1976 to 1987 on exports from EU Member States to India.
- 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 may have included non-mammalian MBM.

## 2. EXTERNAL CHALLENGES

### 2.1 Import of cattle from BSE affected countries

According to the country's information India's agricultural imports are minor due to extensive restrictions. In accordance with this policy, India has in principle not allowed import of bovine animals from any country known to be infected with BSE at the time of import. However, India has been ascertained that some import licenses for live cattle from such countries have been issued (the number of animals for which such license was granted is included in table 1).

It is said that all animals were imported for breeding purposes, were retained till their old age and did not enter the food or feed chain at all. After death, the animals are sent for autopsy, results of which are well recorded. The country dossier mentions that these animals are very effectively monitored and that these animals and their progeny can be fully traced-back. No evidence thereof or of the results of the mentioned autopsy were provided.

As can be seen in table 1, the data provided by India were inconsistent with UK and EUROSTAT export statistics. This is particularly striking for the exports of about 2,500

pure bred breeding bovines (Eurostat-code: 010210) to India from Germany and Denmark that are recorded by EUROSTAT but only partly in the Indian import statistics. As it has been practically impossible to solve these differences in the available data and because the statement by the Indian Authorities concerning the removal from the feed cycle of all the cattle imported from BSE-affected countries has remained unsubstantiated, a reasonable worst case hypothesis is the acceptance of the Eurostat data as possible challenge. These imports represent a low (1981-87), very low (1988-93) and negligible (1994-99) external challenge.

| **Import of live cattle (n/year) into INDIA from BSE-affected countries** | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Period** | **UK** | | | **DE** | | **NL** | | **DK** | | **Non-UK** | |
| ***Source:*** | **CD** | **EU** | **UK** | **CD** | **EU** | **CD** | **EU** | **CD** | **EU** | **CD** | **EU** |
| **1980** | | | | | | | | | | | |
| **1981** | | | | | | | | | *446* | | |
| **1982** | | | | | | | *12* | | | | |
| **1983** | | | | | | | | | *119* | | |
| **1984** | | | | | | | | | | | |
| **1985** | | | | | | | | | | | |
| **1986** | | | | 255 | | | | | | | |
| **1987** | | | | | *928* | | | | | | |
| **80-87:** | | | | **255** | ***928*** | | ***12*** | | ***565*** | **255** | ***1505*** |
| **1988** | | | | 60 | | | | | | | |
| **1989** | | | | | *336* | | | | | | *336* |
| **1990** | | | | 100 | *130* | | | 100 | *110* | | *240* |
| **1991** | | | | | | | | | | | |
| **1992** | | | | 100 | | | | | | | |
| **1993** | | | | | *100* | | | | | | *100* |
| **88-93:** | **0** | ***0*** | **0** | **260** | ***566*** | | | **100** | ***110*** | **360** | ***676*** |
| **1994** | | | | | | | | | | | |
| **1995** | | *1* | 1 | | | | | 202 | *202* | | *202* |
| **1996** | | | | | | | | | | | |
| **1997** | | | | | | | | | | | |
| **1998** | | | | | *31* | | | 79 | *79* | | *110* |
| **1999** | | | | | | | | 28 | *28* | | *28* |
| **94-99:** | **0** | ***1*** | **1** | **0** | ***31*** | | | **309** | ***309*** | **309** | ***340*** |

**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 India is a net exporter of MBM and MBM has never been imported into the country.

Updated UK export statistics that were received in December 2000 confirm that no MBM has been exported from UK to India.

EUROSTAT data show exports of MBM from France, Belgium, Netherlands, Spain and Ireland to India. The Indian authorities verified these imports and concluded that no MBM

has been imported from these countries, since no import licenses were granted. They suggest as possible explanation that MBM exports might be recorded with a destination India while being in fact only landed in India for subsequent immediate transport to another country (transit goods). However, as no evidence thereof could be provided, the figures reported in Table 2 should be considered as a reasonable worst case scenario. The figures for which no confirmation by the Member States could be obtained are not reflected in Table 2.

**Import of MBM, MM, BM or greaves (t/year) into INDIA from BSE-affected countries**

| Period | UK | | | SP | FR | BE | | NL | | IRE | | Non-UK | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Source:* | CD | *EU* | UK | *EU* | *EU* | CD | *EU* | CD | *EU* | CD | *EU* | CD | *EU* |
| **80-85** | *No imports according to both Country and Eurostat data* | | | | | | | | | | | | |
| **1986** | | | | *No imports according to both Country and Eurostat data* | | | | | | | | | |
| **1987** | | | | *7* | | | | | | | | **0** | *7* |
| **1988-1990** | | | | *No imports according to both Country and Eurostat data* | | | | | | | | | |
| **1991** | | | | | *65* | | | | | | *0* | | *65* |
| **1992** | | | | | | | *80* | | | | *0* | | *80* |
| **1993** | | | | | | | | | | | *0* | | |
| **91-93** | | | | | ***65*** | | ***80*** | | | | ***0*** | **0** | ***145*** |
| **1994** | | | | | | | | | | | *0* | | *0* |
| **1995** | | | | | | | | | *11* | | | | *11* |
| **1996** | | | | | *22* | | | | | | | | *22* |
| **1997** | | | | | | | | | | | | | |
| **1998** | | | | | | | | | | | | | |
| **1999** | | | | | | | *0* | | | | | | *0* |
| **94-99:** | | | | | ***22*** | | ***0*** | | ***11*** | | ***0*** | **0** | ***33*** |

**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 low between 1980-87, very low between 1988-93, and negligible since 1994. These challenges are due to imports from DK and DE, countries that only recently notified their first domestic BSE-cases, assuming that the order of magnitude of the exports registered in Eurostat correctly reflects the order of magnitude of imports into India. Although it is claimed that none of these animals entered the food or feed chain, no evidence thereof has been provided and therefore these imports pose the mentioned external challenge.

The imports of MBM posed a negligible challenge until 1990, and a low challenge between 1991 and 1992. Since 1993 only negligible amounts of MBM have been imported and the resulting challenge is assessed as negligible since that time. The external challenge due to MBM imports is considered, despite conflicting EUROSTAT and country statistics, due to the complete lack of evidence of control of imports by the Indian authorities.

<table>
<tr><th colspan="5">External Challenge experienced by INDIA</th></tr>
<tr><th colspan="2">External challenge</th><th colspan="3">Reason for this external challenge</th></tr>
<tr><th>Period</th><th>Level</th><th>Cattle imports</th><th>MBM imports</th><th>Comment</th></tr>
<tr><td>1980-87</td><td>Low</td><td>Low</td><td rowspan="4">Negligible</td><td rowspan="12">Challenges for MBM only appear in EUROSTAT data.</td></tr>
<tr><td>1988</td><td rowspan="3">Very low</td><td rowspan="5">Very low</td></tr>
<tr><td>1989</td></tr>
<tr><td>1990</td></tr>
<tr><td>1991</td><td rowspan="2">Low</td><td>Low</td></tr>
<tr><td>1992</td><td rowspan="7">Negligible</td></tr>
<tr><td>1993</td><td>Very low</td></tr>
<tr><td>1994</td><td rowspan="6">Negligible</td><td rowspan="6">Negligible</td></tr>
<tr><td>1995</td></tr>
<tr><td>1996</td></tr>
<tr><td>1997</td></tr>
<tr><td>1998</td></tr>
<tr><td>1999</td></tr>
</table>

**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.**

On the basis of the available information the overall assessment of the external challenge is as given in the table above. India was exposed to a low external challenge before 1988, due to cattle imports from Germany in 1987 that are only partly reflected in the Indian import statistics. Due to further cattle-imports India experienced a very low external challenge between 1988 and 1990. Thereafter cattle imports were negligible but since 1991 the external challenge became low, now because of imports of MBM from non-UK BSE-affected countries. Again the Indian authorities do not register these imports. In 1993 the external challenge turned again very low and since 1994 the external challenge is negligible.

## 3. STABILITY

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

**Feeding**

There is no official feed ban but feed regulation prohibits since 1999 the inclusion of animal materials in ruminant feed and official feed formulations have not included animal derived components in cattle feed since 1979, with the exception of bone meal that is deleted since 1997.

In the Indian livestock rearing system, dairy animals (cattle and buffaloes) are fed green fodder, dry fodder and feed concentrates from vegetal origin, oil-cake is very commonly used but, according to the country dossier, no material from animal origin is used as an ingredient of cattle feed. Only milk powder is included in milk-replacers for calves that are used in a very limited extent for high-yielding dairy animals.

According to the country dossier, four major reasons discourage the use of animal protein in cattle feed:

- Feed regulation: The Bureau of Indian Standards (BIS), a public sector organisation of the government of India has laid down standards and specifications of different cattle feed. The ingredients are from agricultural by-products, minerals and vitamins. The minerals are derived mainly from inorganic sources. In the BIS Standard IS:2052 – 1979 "Specification for compound feed for cattle (third revision)" standards for 34 feed formulae for compounding cattle feed mixture, using a large number of ingredients, were specified. None of these formulae contain any animal origin products. In 1992, BIS issued standard IS 1664:1992 (third revision) in which specifications for mineral mixtures for supplementing cattle feeds were laid down. One of the standards 1942:1968 related to specification for bone meal as livestock feed supplement. In August 1997, an amendment was made to this specification deleting the items "bone meal" and "bone ash". In June 1999, an official order (N° 2-4/99-AHT/FF) was issued reiterating the need for exclusion of all animal-origin products in ruminant feeds and asking the State Governments to ensure the continued implementation of this practice. There is no official feed ban, i.e. it is not illegal to feed MBM to cattle, but the BIS (1979) has prohibited use of any material from animal sources in cattle feed. Inclusion of mineral compounds made from bovine bone ash is still possible, but not practised.

- Cultural and religious aspects: 82% of the population are Hindu and reject the use of animal derived materials in bovine feed. This also limits to some extent the use of it in poultry feed. Only about 10% of poultry needs are accounted for by MBM.

- Economic considerations: Animal protein is relatively expensive in comparison to plant proteins (table 4). About 15,000,000 tonnes of cattle/buffalo feed were produced in 1997, at a price roughly 1/3 the cost of MBM. Hence there is a strong economic disincentive to include MBM in cattle/buffalo feed.

- Husbandry: By far the major part of cattle or buffalo is raised on very small farms that do not buy industrial cattle feed for economical or other reasons.

| | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 |
|---|---|---|---|---|---|---|
| Groundnut | 4751 | 6579 | 6993 | 4449 | 5317 | 7612 |
| Sunflower seed | 2547 | 3496 | 4048 | 3192 | 4095 | 5337 |
| Raoe seed | 2489 | 3762 | 3915 | 3271 | 4283 | 5096 |
| Rice bran | 2279 | 2773 | 2389 | 2040 | 3200 | 3409 |
| Soya | 6312 | 8628 | 9461 | 5553 | 5798 | 7915 |
| MBM (MM is not produced) | 9000 – 13000 | | | | | |

**Table 4: Domestic prices of plant derived feed stuff compared to the domestic price of MBM during the last five years (in Rs per MT). (Source: Compound Livestock Feed Manufacturers' Association).**

From this information it is concluded that feeding cattle or buffalo with MBM, BM, MM or greaves was possible, albeit unusual, before 1979, when inclusion of animal protein in bovine rations was officially prohibited, with the exception of bone meal/bone ash as mineral source. Due to the absence of feed controls it cannot be excluded, however, that involuntary inclusion happened.

Stray cows can be found anywhere in the country and if they could reach mineral-rich animal derived materials it is assumed that they would consume it.

## Rendering

There are two distinct rendering systems in India. On the one hand there are about 200 traditional "carcass recovery and animal by-product processing centres", on the other hand there is a modern rendering industry, created approximately 6 years ago, mainly integrated with/linked to large (buffalo-) meat processing facilities, operating for export.

The rural rendering units process fallen stock, including SRM. They recover the hides and skin of cattle and buffaloes, and boil the carcass for several hours for recovery of fat for soap or candles, and an estimated total quantity of 900 tonnes of tallow per year. Bones are collected and sent to bone crushing units. The remains are used as manure, to which ruminants are said not to have access. No MBM is produced. These plants are under the control of Panchayats (local governing bodies) and other civic bodies.

The modern rendering industry consists of 12 plants and produces about 54,000 tons MBM per year. Of this 14,000 tons are exported and 40,000 tons used in the growing poultry industry. Within this production 4% is poultry derived MBM, 81% is derived from ruminants and 15% from other species. The process conditions are $133^{°C}/20^{min}/3^{bar}$, applied in batch and continuous mode. As the process is called “dry” rendering, it is not

clear if the moisture content of the raw material is adequate for ensuring proper functioning with regard to reducing BSE-infectivity. No information on controls of the appropriate application of the standard conditions was made available.

It is concluded that the processes applied in the traditional rendering plants, where fallen stock is processed, cannot reduce BSE-infectivity, should it be present in the raw material. The process conditions in the modern rendering industry are on paper equivalent with the EU standard, except, probably for the moisture content. However, it is unclear how and if the appropriate application of these conditions is controlled.

Therefore the overall ability of the Indian rendering system to reduce BSE-infectivity, should it be contained by the raw materials, is regarded to have been very low in the past and to be still sub-optimal today.

**SRM and fallen stock**

A formal ban on rendering SRM was issued in December 1999. No information was provided on how this ban is implemented and what practices were used with regard to SRM before the ban. Most likely they were included in the rendering material. With regard to the modern rendering industry certain compliance can be assumed, however, no information on control measures and their results is available.

With regard to the traditional rendering industry it is assumed that SRM are still included, given the fact that these plants do not produce animal feed.

As the BIS standards did not include material of animal origin in cattle feed since 1979, the Indian authorities argue that SRM could not end-up in these feeds since that time.

**Cross-contamination**

- Only dedicated poultry feed factories are allowed to use MBM. They are located separately from other livestock feed manufacturers. This reduces the risk of cross contamination in feed-mills considerably.

- There is a hypothetical risk of cross-contamination during transport and at farm level, since MBM is included in poultry feed. However, this risk seems to be insignificant due to the fact that most of the multi-species farms are too small and cannot use any commercial feed for economical reasons and commercial scale poultry and cattle/buffalo industries are geographically segregated. In addition MBM-free and MBM-containing feeds are transported in separate containers as the feeds are for different species.

Feed controls are apparently carried out in feed-mills but there is no information provided on the date since when these controls are carried out, or on the methods, frequency, and results of these controls.

**Conclusion on the ability to avoid recycling**

In light of the above-discussed information it is assumed that the BSE agent, should it have entered the territory of India, could have been recycled but the likelihood of this seems small.

- Since 1994 a modern rendering industry exists in India that processed ruminant and other offal for inclusion into animal feed. However, it seems to be unlikely that any of their products ended-up in cattle or buffalo feed.
- On the other hand the traditional rendering does not produce feed ingredients. However, the by-products would contain practical all BSE-infectivity that enters the process and could therefore transmit the disease, should bovines have access to it. This cannot be fully excluded.

## 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**

Cattle census data are only available for 1987 and 1992 respectively (detailed data for 1992 are provided in table 5). Pure-bred types constitute <20% of the total cattle population (all zebu), and about 40% of the buffalo population.

- Approximately 60% of the cows are older than 2.5 years. For bulls, this figure is almost 75%.

- Livestock production is typically in small household holdings with 1-3 bovines per household kept together with other species. Bovines (both cattle and buffaloes) are mainly used for milk production and for work (males only). They are also kept for breeding. Only buffaloes are used for meat production. Stray or disowned cattle (which may no longer be productive) may be collected and housed in ‘cow sanctuaries’, so called ‘goshalas’.

- Almost all milk processed in the dairy industry in the country is procured from small-scale rural farmer’s families. Milk supplies by large-scale dairy farms are negligible, as there are only very few intensively managed dairy herds. The productivity level is generally very low, and costs prevent use of any supplementary feed. The average annual milk yield for indigenous cattle is around 500 litres, and 1,500-2,000 litres for “descript” buffalo, which is a buffalo of superior genetic make up. This average milk productivity would not make it necessary to use supplementary protein in cattle diet.

- Cows are not regularly slaughtered, for socio-cultural reasons. Instead, they are left to die a natural death and are then buried, burnt or "rendered". However, cow slaughter is permitted in 6 relatively small states (out of 25). The total numbers of cows slaughtered could not be clarified, nor their age at slaughter.

| YEAR 1992 (animal numbers in thousands) | CATTLE CROSS-BRED | CATTLE INDIGENOUS | BUFFALO |
|---|---|---|---|
| **Male** | | | |
| Under 1 year | 1159 | 10836 | 5535 |
| 1-3 years | 1-2.5 years 881 | 14241 | 3734 |
| over 3 years | Over 2.5 years | | |
| Used for breeding only | 177 | 10046 | 518 |
| Used for work only | 2098 | 52847 | 5013 |
| Used both for work and breeding | 259 | 7989 | 2346 |
| Used neither for breeding nor for work | 93 | 948 | 215 |
| Total male | 4667 | 96907 | 17361 |
| **Female** | | | |
| Under 1 year | 2157 | 14931 | 12016 |
| 1-3 years | 1-2.5 years 1907 | 19369 | 11037 |
| over 3 years | Over 2.5 years | | |
| in milk (a) | 4007 | 27537 | 25872 |
| Dry( b) | 1778 | 24447 | 13683 |
| Not yet calved (c) | 575 | 4313 | 2905 |
| Others | 127 | 1541 | 625 |
| Breedable female cattle (a+b+c) | 6360 | 56297 | 42460 |
| Total female | 10551 | 92408 | 66138 |
| **Total cross-bred cattle / indigenous cattle / buffalo** | 15218 | 189,315 | 83499 |
| **TOTAL CATTLE** | 204,533 | | |
| **TOTAL BOVINES** | 288,032 | | |

**Table 5: Results of Livestock Census 1992 - All India**

- According to the 1992 Livestock Census (see table 5), the total buffalo population is 84 million. The estimated buffalo population projected to be at the end of 2002 will be around 105 million. Depending on the state and region, there is variation with regard to distribution of animals and to age at slaughter. Slaughter of buffaloes is permitted but in the past only buffaloes older than 10 years were allowed to be slaughtered.

- Young (>7 years) male buffaloes are now slaughtered as a result of the growing meat industry that produced in 1997 around 1,403,000 tons of buffalo meat. These animals receive agricultural crop residues like wheat straw, sorghum straw, green fodder, oil seed cakes, cotton seeds, wheat bran and pulse industry by-products.

## Surveillance and culling

The surveillance system is passive, relying on notification. Notification of BSE is compulsory since September 1998. At the rural level, reporting of livestock problems is the responsibility of the village head man and the village record keeper who are officers of the State Government. Approximately 10 villages report to one veterinary aid centre (≈25,000 in total) where there exists clinical expertise. The next levels involve 15,000 veterinary dispensaries and 8,000 district level polyclinics that report to the state laboratories. The Animal Disease Monitoring and Surveillance Institute, which has four regional offices, finally compiles animal disease outbreak data.

According to the country authorities, the high value of bovines at the rural level provides an incentive for farmers to report all disorders. In addition there is a general provision at the State level to allow for compensation to be paid in the case of interventions due to

exotic disease outbreaks. This could theoretically apply if a case of BSE would be detected. The amount of compensation is not specified.

Information about BSE has been provided to veterinarians and livestock holders on a regular basis. Training programmes for farmers and veterinarians are arranged annually. It is however impossible with the current information to assess to what extent the 'grass-root' farmer/veterinarian is aware of BSE and its implications, and since when.

Rabies is present in India, and animals showing neurological disorders are investigated by histopathology. However, the annual numbers sampled are very low (below 50 per year in bovines).

During the last 10 years the number of CNS- suspects analysed annually for BSE are far below the OIE requirements but it is planned to increase the sampling in line with OIE guidelines. At an adult cattle/buffalo population of more than 100 million animals, the OIE guidelines would require about 800 suspects to be examined per year. It is also planned to provide advanced training in the most current diagnostic methods to a specialised team.

Active surveillance is not carried out.

## 3.3 Overall assessment of the stability

For the overall assessment of the stability the impact of the three main stability factors (feeding, rendering and SRM removal) and of the additional stability factors, mainly cross-contamination and surveillance plus culling, has to be estimated. The guidance provided by the SSC in its opinion on the GBR of July 2000 is applied. Consideration is given to the very different feeding and rendering systems in the modern industries and the rural sector.

**Feeding:**
Until the introduction of a modern rendering industry there was no MBM available in the country and imports were limited. The information provided also indicates that it was unlikely to voluntarily feed those cattle that received supplements (industry sector) with MBM, also since a domestic production exists. It also seems unlikely that it happens accidentally. However, information on feed controls and their results was not provided.

Accidental access of cattle or buffalo to remains from the traditional rendering industry, however, cannot be excluded, albeit use of these as cattle/buffalo feed seems to be excluded. It is concluded that feeding was "reasonably OK" before and after the official exclusion of MBM from the feed-formula for cattle or buffalo.

**Rendering:**
The processes used in traditional rendering cannot reduce BSE-infectivity should it enter the process. The modern rendering industry applies appropriate conditions in batch and continuous mode but controls are not specified. Overall the rendering is assessed as "not OK".

**SRM-removal:**
SRM are included in the raw material for traditional rendering and were also rendered in the modern rendering industry until 1999 but the implementation of the SRM ban of 1999 is apparently not checked. Therefore SRM-removal is assessed as being "not OK".

**Other stability factors:**
Cross contamination of prepared cattle/buffalo feed with MBM-containing poultry feed is unlikely and tends to increase the stability. BSE surveillance is found to be inefficient and therefore acts to reduce stability. Overall, "other factors" therefore tend to have no effect on the stability throughout the reference period.

| Stability of the BSE/cattle system in INDIA over time | | | | | |
|---|---|---|---|---|---|
| **Stability** | | **Reasons** | | | |
| **Period** | **Level** | **Feeding** | **Rendering** | **SRM** | **Other*** |
| **1980-1999** | Very unstable | Reasonably OK | Not OK | Not OK | |

**Table 6: 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.**

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 Indian 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. An external challenge resulting from cattle import 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 India the exports of live cattle from countries that later on experienced a domestic case to India were registered in 1981 (DK) and 1987 (DE). These could theoretically have posed a certain challenge. Also later on some live cattle have been imported by India from BSE affected countries, but numbers remained very low. All these cattle would normally have been imported for breeding purposes. They did most likely not end-up in the cattle feed chain, given the fact that a rendering industry that processes cattle and other animals for feed only exists since 1994, that these rendering plants are linked to export dedicated slaughterhouses, and that only dedicated poultry feed mills are authorised to use MBM. Bearing in mind that these imports are anyway low, and are unlikely to have

been processed into feedingstuffs, they are unlikely to have led to an internal challenge, even if it cannot be fully excluded.

Imports of contaminated MBM, MM, BM or Greaves would lead to an internal challenge in the year of import, if fed to cattle. 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 India a low external challenge through MBM imports occurred in 1991-1992. The only at risk animals from this challenge were in the small modern dairy farms; it seems highly unlikely that imported MBM could have reached rural family farms. Feeding of this material in the commercial dairy sector could only occur by accident since it was only used for poultry, but no evidence thereof is provided.

Taking this, the size of the challenge and the dispute over imports into account it is unlikely, but cannot be excluded, that an internal challenge developed from these imports. This would occur about five years after the first MBM imports that could have reached cattle, i.e. in 1996. Although the rendering parameters would not reduce BSE-infectivity if present, under normal conditions imported bovines would not be slaughtered, thus not rendered either or end up in the feed chain.

| INTERACTION OF STABILITY AND EXTERNAL CHALLENGE IN INDIA | | | |
|---|---|---|---|
| **Stability** | | **External Challenge** | **Internal challenge** |
| **Period** | **Level** | **Level** | |
| 1980-87 | **Very unstable** | **Low** | **Unlikely to be present but cannot be excluded** |
| 1988-90 | | **Very low** | |
| 1991-92 | | **Low** | |
| 1993 | | **Very low** | |
| 1994 - at current | | **Negligible** | |

**Table 7: 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

It is unlikely, but cannot be excluded that BSE infectivity entered processing. Theoretically the risk first existed about 3 years after the earliest import of breeding cattle that were potentially infected (1981), i.e. around 1984. It also might have occurred about 5 years after import of potentially contaminated MBM/feed stuff (1991) if it reached domestic cattle, i.e. around 1996. However, this risk appears to be low.

### 4.3 Risk that BSE infectivity was recycled and propagated

Given the low risk that infected domestic cattle were processed and that only accidental contamination of cattle feed or accidental access of cattle to rendering remains could lead to recycling, it is unlikely but cannot be excluded, 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 and, in particular, of MBM from BSE-affected countries. Should evidence be provided that the assumed level of imports is not correct, the assessment needs 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. However, amplification of the BSE agent is unlikely in the Indian system or would be rather slow, making the discovery of a GBR-increase particularly difficult.

### 5.3 Recommendations for influencing the future GBR

- Controlling that no MBM is fed to cattle/buffalo (feed control), improving the (modern) rendering, and controlling the exclusion of SRM and fallen stock from entering the feed cycle, would increase the stability of the system. A better control of the use made of rendering remains in the traditional rendering industry would also be helpful. These measures could make the Indian system stable and hence reduce any future GBR.

- Improved BSE-surveillance would provide a better basis for assessing the BSE-risk of India. Improved awareness raising and creation of incentives to report CNS suspects would enhance the efficiency of the passive surveillance. At least the target of 800 – 1000 CNS suspects annually analysed for BSE should be reached. Ideally it should be combined with active surveillance, i.e. sampling of statistically significant numbers in asymptomatic at-risk cattle populations (adult cattle in fallen stock and emergency slaughter).