Classical swine fever in northeast India: Prevention and control measures

Bernard Bett, Ram Deka, V Padmakumar and M Rajasekhar

What is classical swine fever? And why does it matter?

Classical swine fever (CSF) is a highly contagious, potentially fatal viral disease that affects pigs. This disease is a major constraint to the development of pig farming systems in northeast India where pig farming is a main source of livelihood for most households. About 80% of households in northeast India rear pigs and pork is a key part of the local diet.

Impact of CSF on local economies and livelihoods

A 2011 participatory epidemiological study conducted in Assam, Nagaland and Mizoram by the International Livestock Research Institute (ILRI) with support from the Sir Ratan Tata Trust (SRTT) and Navajbai Ratan Tata Trust (NRTT) showed that pig farmers in India incur huge losses from mortality, treatment and replacement costs—over 2 billion Indian rupees (INR) each year (INR 57.0437 = USD 1 at 28 June 2012) (see Table 1).

Table 1. Projected economic loss from CSF in three northeast Indian states (in million INR)

<table>
<thead>
<tr>
<th></th>
<th>Assam</th>
<th>Mizoram</th>
<th>Nagaland</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cost of mortality</td>
<td>1775.74</td>
<td>33.98</td>
<td>267.25</td>
<td>2076.97</td>
</tr>
<tr>
<td>Cost of treatment</td>
<td>24.07</td>
<td>0.44</td>
<td>0.004</td>
<td>24.51</td>
</tr>
<tr>
<td>Cost of replacement</td>
<td>102.10</td>
<td>1.93</td>
<td>18.79</td>
<td>122.82</td>
</tr>
<tr>
<td>Total costs</td>
<td>1901.91</td>
<td>36.35</td>
<td>286.04</td>
<td>2224.30</td>
</tr>
</tbody>
</table>

Source: PE study, ILRI (2011).
CSF control options

Recommended measures to control CSF include the use of sanitary prophylaxis (disease reporting, strict import policy, quarantine, routine serological surveillance) and medical prophylaxis (use of a modified live-virus vaccine). India requires a total of 22.26 million doses of CSF vaccine per year, with northeast India alone requiring 7.64 million doses.

Currently, the country has about 1.2 million doses of the vaccine, which is less than 1% of the total requirement (Table 2 below).

Table 2. Vaccine availability and requirement

<table>
<thead>
<tr>
<th></th>
<th>India</th>
<th>Northeast India</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of pigs</td>
<td>11.13 million</td>
<td>3.82 million</td>
</tr>
<tr>
<td>Vaccination doses required/year</td>
<td>22.26 million</td>
<td>7.64 million</td>
</tr>
<tr>
<td>Vaccine availability</td>
<td>1.2 million doses¹ (lapinized CSF vaccine)</td>
<td>0.04 million</td>
</tr>
<tr>
<td>Gap</td>
<td>21.06 million doses/year</td>
<td>7.60 million doses/year</td>
</tr>
</tbody>
</table>


¹ About 3 lakh doses by IVRI, 1 lakh doses by Institute of AH&V Biologicals, Mhow, 19000 doses by Veterinary Biological Institute, Guwahati and the remaining by other institutes (details not available). Reference year 2010.

Three vaccine types are available in India

Lapinized vaccine: is developed by serial passage of CSF virus in rabbits, and the vaccine is processed from the spleen and other lymphoid tissues of the infected rabbits. The biggest limitation in the production of this vaccine is its dependence on the availability and continuous supply of rabbits.

This vaccine is currently produced by the Institute of Veterinary Biologicals at Guwahati, Kolkata, Lucknow, the Institute of Animal Health and Veterinary Biologicals, Mhow and Indian Veterinary Research Institute, Izatnagar.

Lapinized cell culture vaccine: The lapinized vaccine strain is used to produce vaccine in cell culture. Production of this vaccine does not depend on availability of rabbits and can therefore be made in large quantities. This vaccine is currently produced on ‘trial basis’ by the Institute of Animal Health and Veterinary Biologicals (IAHVB) in Bangalore.

Its commercial production is expected soon after licensing is received from the government. It is reported that the Indian Veterinary Research Institute also has developed this technology and is working towards its commercial production. Production and use of this vaccine appears to be the best available choice.

The available infrastructure in some of the veterinary biological institutes can be used for this purpose but with additional equipment and capacity strengthening.

Cell culture vaccine: Local CSF virus is isolated from the field during disease outbreak and grown in cell culture and attenuated to produce the vaccine. This technology (developed by Dilip Kamur Sharma of Assam Agricultural University) is in the experimental stage.

Though this vaccine is of immense value in the implementation of northeast India’s regional and national CSF control and eradication programs, its commercial production will take time.
Policy recommendation for prevention and control of CSF

- To meet the immediate demand, the lapinized vaccine production facilities at the Institute of Veterinary Biologicals (Guwahati, Kolkata, Lucknow) and at the Institute of Animal Health and Veterinary Biologicals, Mhow, should be strengthened with infrastructure and manpower support. This can increase production level from the current 1.2 million doses to 5 million doses within one year.

- Simultaneously, to meet the country’s entire demand, commercialization of the lapinized cell culture vaccine technology through public–private partnership is a next best option. In this context, the plan by the Indian Veterinary Research Institute to commercialize this technology through private firms may be strongly supported.

- In the long run, the cell culture CSF vaccine should replace the lapinized cell culture vaccine and production of the latter stopped. To produce this vaccine on a commercial basis, the seed virus strain available at Assam Agricultural University (AAU) should be made available to vaccine manufacturers on terms and conditions specified by AAU after its independent validation.

- There is a need to strengthen the ‘cold chain facilities’ at the Institute of Veterinary Biologicals, Guwahati, and the vaccine storage capacity at the headquarters of each state in the region. Also, portable mini cold storage facilities and transport boxes (similar to those provided under the Government’s rinderpest eradication program) should be made available to all veterinary institutions to enable preservation and distribution of vaccines to sparsely distributed livestock populations.

- Given the limited human resource capacity in state government departments, a system of delivery of vaccination services (including awareness creation) by trained vaccination scouts can be established under the supervision of the animal husbandry and veterinary departments.

- Strengthening of laboratory infrastructure for rapid CSF diagnosis and initiation of disease control measures by the state veterinary authorities.

- After bringing down the disease to a considerable level, in the long term, develop a strategy for vaccination at key border points/markets/trade routes and develop quarantine facilities.

- Movement of pigs from outside the northeast region and from neighbouring countries should be monitored.

- State CSF surveillance units should be set up in each state’s directorate of Animal Husbandry and Veterinary Services and the state epidemiologist with his/her colleagues should independently investigate all disease outbreaks supported by laboratory investigations. These surveillance units need to have laboratory diagnostics (from Assam Agricultural University AAU), adequate staff and computers, internet and other inputs. A mobile disease investigation vehicle fitted with basic diagnostic laboratory equipments may also be placed at the disposal of field disease investigation teams along with other specialist diagnosticians. Online management information systems should capture information on vaccination, vaccinators, blood samples etc.
• National CSF control/eradication policy–program: The government may consider launching a national CSF control/eradication program with particular focus on northeast India under the ensuing 12th plan period. This may be designed similar to the rinderpest eradication program and unused infrastructure and human resources from the rinderpest program could be utilized in the new program.

• A new regional vaccine production centre exclusively for CSF may be established at Guwahati. A committee may be formed to prepare a detailed project report for the establishment of the centre.