

# Overview on classical swine fever (CSF) “Learning from the Implementation of Regional Control Strategies and Approaches”

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## Introduction

Classical swine fever (CSF) is rated as one of the most important diseases of swine affecting swine production systems. The economic and socio-economic impact of CSF is high in production systems in Asia, Latin America and Eastern Europe. In 1993 and 1994, 10.7 and 21.4 million euros respectively were spent on outbreaks in Belgium and Germany, with a further 130 million euros spent for market support in 1994. In 1997, an epizootic outbreak centred in The Netherlands resulted in the compulsory slaughter and disposal of more than 10 million pigs, with costs estimated at over one billion euros. An estimation of the overall economic loss results in several times these amounts. CSF is one of the diseases that has caused major socio-economic damages in the EU during the last decades. For example in 2006 more than 120,000 pigs were culled in Germany due to an outbreak of CSF in domestic pigs.

Successful eradication of CSF has been achieved in many countries, including North America, Australasia, and parts of Northern Europe, and many such countries have successfully maintained freedom in the absence of vaccination, i.e. with a fully susceptible swine population. Regional experiences in South America, Central America have demonstrated to be successful in progressive control and CSF elimination where industry and public sector share common objectives and resources to control CSF at national level.

In developing countries the economic impact of CSF have consequences in livelihoods in family production systems. Some crude figures based in losses on pig mortality due to CSF in Latin America indicated that between 1997 and 2001 losses were estimated at approximately 30 million USD for Mexico based only on official reports. In Chile, between 1983-1997 direct losses due to morbidity and mortality were estimated at 2.5 million USD (Pinto, 2003). This figures does not include the costs of vaccination and should be increased due to underreporting which was considered high in particular in small holders due to the absence of compensation to losses by CSF outbreaks. In Haiti, investment in CSF control was estimated for a 10 year vaccination program predicted a cost-benefit ratio ranging from 16.4 to 32.0 million USD. This cost-benefit analysis of CSF control programmes in Haiti indicated that there are very strong economic arguments in favour of an intensive, national CSF control program in a country where small holders account for almost 90% of the pig population (Otte, 1997). In other studies, McCauley (1997) demonstrated in small holders in Honduras that, mortality attributable to CSF was 13.5% of the total mortality on a pig holding and the case fatality rate was between 40 and 70%. The same author concluded that by controlling CSF, total mortality on a small pig holding can be reduced by 21%.

The progressive control and eradication of CSF in Latin America and Europe are examples of how CSF control can be achieved by using effective tools available such as vaccination, effective disease surveillance and rapid reporting systems from farmers, good capacity of laboratories, early diagnosis and rapid elimination of infected herds and control of animal movement. In some countries where CSF has been eradicated, for example in Chile, new innovative schemes as insurance policies were set up during the last phase of the program to cope with potential losses of any resurgence of CSF in the commercial sector. However, despite intensive efforts at the national, as well as regional level in Central and South America, the complete eradication of CSF in some regions has proven to be elusive, since CSF is still endemic in many countries and spill over is observed from this areas to free areas around the world. The latter is most likely due to the persistence of the virus in domestic pig populations in endemic settings, and in some regions such as Europe or Balkan region where wild boar and wild pigs populations play a role in CSF transmission.

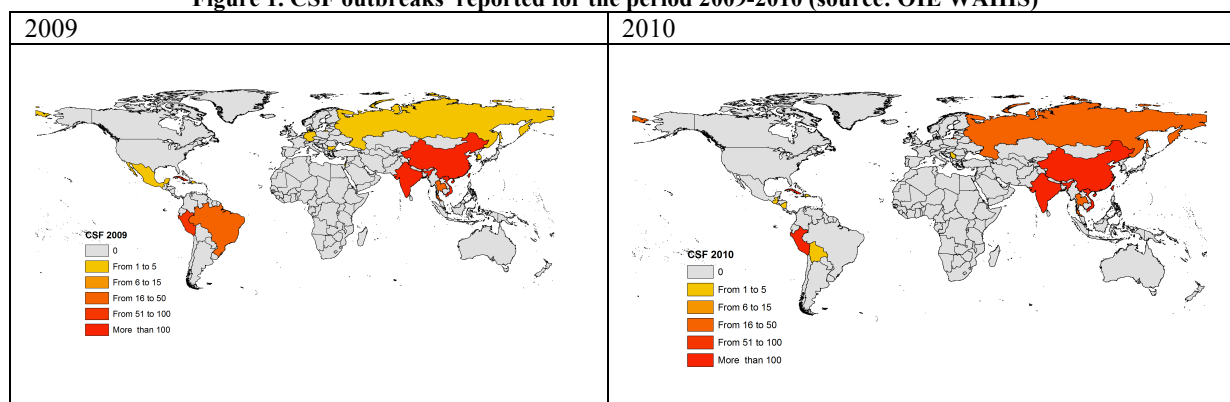
## Dynamics of CSF

CSF is a disease that under natural conditions the infection occurs in domestic pigs and wild boars (*Sus scrofa*). Infected pigs can transmit CSF virus to other pigs by direct contact. Swill feeding practices play a major role in the introduction and spread of CSF virus into new areas and this has been associated in outbreaks in Europe in 1997 were caused by virus originated in Asia that was introduced via swill illegally fed to pigs in Germany.

CSF still remains widespread in several regions and in others disease status is unknown due to lack of surveillance (Figure 1). CSF is widespread in Andean countries, Amazon region, the Caribbean, Asia and Eastern Europe. In 2010 as example, 59 countries reported to OIE that the disease never occurred; 73 countries that the disease was absent during 2010, with 12 of those countries reporting CSF in the previous two years (2008-2009); and 24 countries reporting new cases of CSF during 2010. Many countries have successfully maintained CSF freedom in the absence of vaccination, i.e. with a totally susceptible swine population however it need to be taken into account that true incidence of CSF is underestimated in some regions due to the weakness of veterinary services and resources available for CSF surveillance, diagnosis and control activities.

In Latin America for example, there are epidemiological and ecological aspects that characterise the regional distribution of CSF such as continued trends in the demand for pork and pork products, an increase in swine investment with low production costs which are able to compete advantageously in international markets and the feeding of swine with swill feeding in family production systems. This backyard systems which predominant in some countries of this region constitutes a favourable environment for disease transmission and maintenance due to the difficulties of veterinary services to implement CSF control and eradication over a swine population over an extensive area (Vargas et al., 2004)

**Figure 1. CSF outbreaks reported for the period 2009-2010 (source: OIE WAHIS)**



CSF control is based on the application of biosecurity measures and the appropriate use of vaccines on a regular and prophylactic basis. In some countries, where CSF still is endemic, progress toward control and eradication is still very slow and influenced strongly by economic and social factors. In those endemic settings, the role of backyard pigs in the epidemiology of CSF is not fully understood, therefore there is a strong need for increasing knowledge of CSF and intervention strategies in those systems. Although, in countries with a high proportion of family production systems, large scale commercial farms have been successful in controlling and eradicating CSF, there still remains a substantial challenge to address CSF eradication and to keep this commercial and integrated systems free in presence of a family production system where disease transmission can be sustained. CSF still persists in endemic areas due to factors such as a lack of capacity of the veterinary services, an absence of robust diagnostic capacity and effective surveillance, lack of quality control and registration of vaccines and vaccinations and the lack of adequate compensation schemes to encourage early reporting by farmers and private veterinarians, lack of a regional strategy for CSF elimination. In endemic areas, CSF seriously affects small production units, livelihoods and food security in particular in rural communities; therefore, CSF is not only a disease with implications for international trade, it is also a food security threat.

In Andean countries and Amazon region CSF still is present in some countries however progress has been achieved in areas of Brazil and Colombia. Uruguay, Chile, south Brazil and Argentina are free of CSF and there is an intensive control program developing in the Andean region where still CSF endemic. Central America shows an important advance in the eradication of CSF with sporadic outbreak occurrence. Mexico was declared free of CSF in 2009 and three Caribbean Countries still are considered CSF endemic: Dominican Republic, Haiti and Cuba.

In Europe the situation of CSF indicate that there are some countries reporting the presence of CSF in wild boars such as Germany, Italy and France and in domestic pigs only in countries of Eastern Europe.

Many countries in Asia countries are reporting outbreaks of CSF regularly to OIE. China with almost half of the pig population in the world is considered endemic together with South East Asia. CSF control in endemic

countries remains in the domain of the private sector with the initiatives promoted by official veterinary services. In Africa the situation of CSF is uncertain with South Africa and Madagascar reporting outbreaks of CSF and updated surveillance efforts are needed to confirm areas where there is not circulation of the virus and areas where the disease could be circulating without being reported.

#### CSF Control: Following the experience of regional approaches

Based on the experience of regional road maps for CSF control in the American Continent, common strategies help to harmonise technically and financially the efforts to control this disease. This support coordination in CSF control in endemic countries and to progressively increase the number of zones and countries free of the disease. The Plan is including a Control, Eradication and Free Phases. The Plan was based on the regional experience obtained in the Control and Eradication of FMD and New World Screwworm (Vargas et al., 2004)

However, despite the eradication of CSF in specific regions, new approaches to control CSF may be needed in the remaining infected regions where CSF persists. Based on official reports, in Africa, the disease is not reported except in South Africa and Madagascar, country where also African swine fever (ASF) is reported. The lack of regular reports from countries in Africa, indicates that more efforts on surveillance of CSF need to be taken and performing differential diagnosis with ASF to be done routinely.

One challenge for CSF is that the virus can be maintained in domestic pigs and wild boar (*Sus scrofa*) populations and therefore with consequent risk of transmission between species. In countries which have significant wild boar populations, increased efforts are in place to improve prevention and response efforts to address CSF cases in wildlife, together with other measures to decrease risks of transmission between domestic pigs and wild boars. In Europe, in Germany, France and on the island of Sardinia, Italy, the CSF virus is maintained in the wild boar population. The maintenance of CSF in wild boar populations is a result of dense populations and high fertility resulting in regular addition of large numbers of susceptible young offspring that can maintain the circulation of the virus.

OIE Terrestrial Code (Chapter 15.2) establish the conditions for freedom in a country in domestic and/or wild boar populations and the requirements. Controlling and eradicating CSF is particularly challenging in developing countries affected by both swine fevers (Classical and African swine fever). Clinical signs of both diseases are very similar and surveillance based on clinical signs cannot differentiate between them. In fact in the Russian Federation, Eastern Europe and parts of Africa where inaccurate differential diagnosis solely based on clinical signs is applied and use of laboratory testing is not routine for every outbreak suspected, the incidence of CSF disease is under or overestimated. A new procedures for official recognition procedures by OIE is envisaged to be applicable in 2013.

#### CSF advantages for control and eradication

After the elimination of rinderpest from the world, CSF presents some characteristics which make it a very interesting target for effective control and eradication:

- a. In all countries where CSF occurs it has been included by the public and private sectors as one of the priority livestock diseases to be controlled and eradicated.
- b. CSF virus is genetically stable and the virus has not incurred significant changes and mutations. This stability of the virus supports the wide use of the live attenuated C-Strain vaccines for CSF as very safe which provide excellent immune protection when vaccination schemes are correctly applied. Vaccination is a tool for controlling CSF in endemic areas, but also can be used as a response measure in an emergency situation.
- c. Global trade of pig meat has grown 9.9% annually since 1992. This dynamism of the pig industry worldwide presents challenges for swine health. The pig industry is increasingly committed to assure the quality of pork products worldwide, including addressing safety and health issues through the effective control or eradication of major swine diseases. These activities include addressing CSF in countries of Europe, the Americas and Asia. These regions are composed of many emerging economies, also of interest to the expansion of the pig industry with small holders which still contribute significantly to pig production and pork consumption.
- d. The OIE (World Organisation for Animal Health) has resolved, under the request of its Member Countries, to include CSF as a disease with an official recognition status. This new official procedure is planned to be implemented in 2013. Official recognition of CSF-free status will serve as encouragement

to countries to make progress in the progressive control and eradication of CSF and creates strong incentives for FAO to expand its technical assistance to support regional road maps and national control/eradication programs.

- e. There is a positive experience in some regions such as Latin America that CSF can be progressively controlled in and eliminated from different production systems on different continents. CSF control is well advanced in the progressive control pathway where economic and social factors have been addressed, including good public/private partnership. As example, in the Continental Eradication Plan for the Americas, the commitment is to declare freedom of CSF in the Americas in 2020. However in other regions such as China with more that 50% of the world pig population and some regions in Africa, the situation of CSF remains uncertain and therefore surveillance and more research need to be done to help achieve the global elimination of CSF. Also in Europe, CSF has been eliminated from domestic pig populations however CSF remains a challenge because of the difficulty of controlling CSF in wild boars.
- f. Lessons learnt with the emergence of pig diseases such as PRRS in South East Asia and China since 2007 or Teschovirus in swine in Haiti in 2009 clearly shows that control of pig pathogens represents a major challenge and a more balanced approach to promote swine health in a region with almost the half of the swine population.

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