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Impact of foreign animal diseases at the industry level

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Summary

Industry-level impacts of highly contagious foreign animal diseases can be extensive and disruptive. These impacts are the sum of disease effects on the separate economic units that comprise the input supply, production, processing and marketing system of that industry. These industry-level effects would not include government costs or costs associated with disrupted travel or tourism or general economic activity. Direct impacts are those that are related to production and result in direct economic consequences for animal protein producers. Indirect impacts are consequences that include loss of trade, market and consumer confidence, among others. While it is prudent for governments to identify the costs of effective surveillance and prevention, these costs are often very small compared to the total cost of response and recovery associated with a disease outbreak. It is important that the effectiveness of those prevention programmes not be compromised because of other short-term priorities perceived to be more urgent.

Keywords

Animal diseases, Compensation, Economic costs, Economic impact assessment, Exotic animal diseases, Impact assessment, Industry.

Impatto delle malattie esotiche sull'attività industriale

Riassunto

L'impatto di malattie esotiche, non presenti sul territorio e altamente contagiose, sulle attività industriali può essere ampio e distruttivo. È la somma degli effetti della malattia sulle varie componenti economiche che comprendono le forniture, la produzione, la lavorazione e le attività commerciali di quel tipo di industria. Gli effetti sull'industria non includono i costi a livello governativo, o quelli legati ai viaggi e al turismo o, in generale, alle attività economiche. Gli impatti diretti sono quelli relativi alla produzione e si concretizzano in conseguenze economiche dirette per i produttori di proteine animali. Gli impatti indiretti sono le conseguenze sulle attività commerciali, il mercato e la fiducia del consumatore, solo per citarne alcune. Benché sia cautelativo per un governo identificare i costi di una sorveglianza ed una prevenzione efficaci, questi costi sono spesso molto ridotti se paragonati al costo totale della risposta e della risoluzione associato ad un focolaio di malattia. È importante che l'efficacia di tali programmi di prevenzione non vengano compromessi a causa di altre priorità a breve termine ritenute essere più urgenti.

Parole chiave

Costi economici, Indennizzo, Industria, Malattie animali, Malattie esotiche, Valutazione dell'impatto economico.

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Introduction

The impact of a foreign animal disease (FAD) on industry depends, by definition, on the bounds placed on the term 'industry'. Specific diseases will have different impacts because they affect different species or groups of species. Foot and mouth disease (FMD), for instance, potentially would impact the 'cloven-hoofed livestock industry', which includes animals such as cattle, pigs, sheep, goats, domesticated elk, deer and buffalo.

Similarly, exotic Newcastle disease would affect the poultry industry, which can include broilers, turkeys, layers, ducks and other avian species. Conversely, bovine spongiform encephalopathy (BSE) would affect the beef and dairy industry directly and classical swine fever (hog cholera) or African swine fever would affect the swine industry. Therefore, industry-level impacts of animal diseases must be evaluated in the context of all species susceptible to the disease in question.

It should also be noted, however, that a change in cost and availability of one animal protein source can, at least in the short term, have an impact on the economics associated with it and other animal proteins. An initial drop in supply will decrease availability and, given consistent demand, cause an increase in market price; this positive economic incentive will stimulate production. As either demand decreases or supply increases, the economic balance of supply and demand will be restored. In the long term, economic forces restore and maintain production balance.

A loss of consumer confidence has the potential to impact the demand for animal protein in an even more sustainable manner. Safety of food is the first factor affecting consumer purchases. The real or perceived loss of safety can have long-term ramifications on the economy of the protein from the affected animals and other proteins that are considered by the consumer to be related. So important is food safety that the perceived association with affected meat can imply food safety risks in related proteins even if they are not directly affected by the disease.

The industry-level effect of any FAD is the sum of its effects on the separate economic units that comprise the input supply, production, processing and marketing system of that industry. Industry-level effects would not include government costs or costs associated with disrupted travel or tourism or general economic activity. For clarity, potential industry-level impacts will be divided into two categories: direct and indirect impacts.

Direct impacts

All firms in an industry affected by a FAD would incur some measure of direct costs comprising increased expenses and decreased income or asset values. All these losses will depend on the scope of the disease outbreak, which itself depends on the specific disease, the number of affected species, the number of locations involved in the outbreak, how quickly the disease is detected, whether the disease poses a direct human health risk, and many other factors, such as the preparedness of public and private agencies to fight the outbreak and the success they achieve, especially in the hours and days immediately after diagnosis.

Direct losses could include productivity losses and inefficiencies. The effect of mortality is direct and the most recognisable of losses. The pathology and epidemiology related to a specific disease will dictate the phase of production or age of animal that is most susceptible to death losses. While death losses can also have a great psychological effect on producers, it often also

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has a limited time frame. Whether the death loss can be demonstrated by a simple bell curve or other mortality curves, direct mortality from disease is usually a limited event as acquired immunity in the population increases or other management practices are initiated.

More insidious and potentially much more devastating to the production unit are losses associated with an increase in the persistent baseline mortality, decreased growth, decreased milk production, decreased reproductive efficiency and other measures of production. These losses are ongoing and thus affect or threaten the sustainability of the production operation. Even if the operation has the economic wherewithal to survive the initial death loss from an outbreak, the long-term economic effects from production losses can be very severe and the ultimate cause of the demise of the production unit.

Decrease in market prices is also a potential direct loss from a disease outbreak. Until market forces are able to bring about a balance in supply and demand and restore a sustainable price structure, the short-term losses in the available animal protein due to lower demand are direct and could be substantive.

Once recovery starts, herds may be depopulated for disease control purposes. Even if subsidies or indemnities are paid for depopulation by governments, or if insurance or self-insurance programmes exist, there may be losses due to any difference between the indemnity paid and the fair market value of the animals. This is especially the case in herds that contain or provide breeding stock. It is difficult to project the real value of the breeding animals attributable to any genetic advantage that makes them a valuable asset in a breeding herd. An outbreak of disease may wipe out years and sometimes generations that have gone into creating the genetic base of the herd. That genetic base probably has value greater than the salvage market value of the animal. It is part of a future value of the animal that is difficult to project.

In addition, destruction of animals for welfare reasons may be necessary. The inability of the animals to eat, drink or rise, because of a devastating disease, can invoke humane considerations and decisions to euthanise animals. Depending on government policies, the state of the animals, the proximity of processing facilities and other factors, there may not be the opportunity to realise salvage or indemnity value for humane destruction of affected animals.

Another aspect of the animal welfare cost is the need to dispose of the animals or their products, such as milk and eggs, due to their presence in a quarantine area even though the animals may not be exposed to the disease agent. If the quarantine is for short period of time, the animals may eventually be allowed to be marketed. If the quarantine is extended and there is no possibility of marketing, the animals would have to be destroyed and the loss would be the same as those associated with depopulation of infected animals.

Local regulation may affect the method and economics of carcass disposal. Disease control through depopulation or humane considerations may mean euthanasia of large numbers of animals. There are direct costs of euthanasia and carcass disposal but there may be additional costs associated with environmental management of disposal sites. Unless there is governmental support for these additional costs, they would be borne by the producer or industry and may substantially add to the direct costs of a disease outbreak.

If there is a safe effective available vaccine, the response and recovery may include the use of vaccine to control the outbreak; the cost of the vaccine itself is a direct cost associated with the

disease outbreak. Vaccine costs may be a short-term liability if used only as a response tool but may be a longer, ongoing cost if used as part of a recovery or continuing prevention strategy. In addition to the direct costs of vaccine, additional vaccination costs would be incurred, such as the cost of labour to rapidly vaccinate large numbers of animals. Production losses associated with vaccine use should also be added. Restraining or otherwise handling animals for vaccination is stressful to the animal and has a transient effect on gain. The response of the animals to the vaccine may also contribute to production losses and can result in a short-term loss of appetite, decreased feed conversion or other production losses.

In order to re-establish production, there must be effective cleaning and disinfection. The direct costs associated with these procedures include the price of the materials and labour to do an effective job. Another direct cost would be the loss of use of the facility during the quarantine and disinfection procedure. It is important to ensure that disinfection is complete and the facilities are safe before repopulation. The length of the disinfection downtime for the facility will depend on: climate, effectiveness of the disinfectant on the disease organism, ability to completely remove organic matter in preparation for disinfection, the construction material, facility design and other factors.

The interruption of normal business practices can lead to significant losses for producers and also for the associated businesses that are part of the industry. Equipment manufacturers, feed suppliers, abattoirs and further product processors, and other businesses would all be affected when the normal operations of the production unit ceases.

Due to biosecurity procedures designed to protect the productivity of the unit, modern animal production has become more segmented. Isolating specific production phases from the others enables the implementation of specific biosecurity procedures designed for that phase. While the segmentation of production can be an effective biosecurity tool, it necessitates regular and planned movement of animals between production phase sites. Any disruption in the ability to move animals from the site of one phase will affect the production of the supplying and receiving sites around the one that is affected. Animals that should be moving to that production site as part of their progression to market will not be able to do so. Their growth will continue and may overcome the ability of the facility to accommodate them. Sites that should be receiving animals from the disrupted site will not be doing so. The effect is that of a barrier in a stream of regular animal movement – animals will back up upstream of the disrupted point and facilities will be empty downstream of that point. The result is disruption of business and loss of the opportunity for profit. It may also result in a need for destruction of the animals for animal welfare concerns as discussed previously.

Contingency plans for the disruption of animal movement in a quarantine area should be developed along with other plans for the quarantine procedures. Upon the discovery of an index case, the animal health officials or responsible political entity will define a zone of infection (Fig. 1). Within the infected zone, efforts will be made to identify contact premises in the proximity of the infected premises. Suspect premises, without direct connection to the infected premises but within close enough proximity to be at heightened risk of infection, will also be identified. Outside the infected zone will be a series of buffer, vaccination (if permitted and necessary) and surveillance zones (Fig. 1). Each zone may have its own quarantine and

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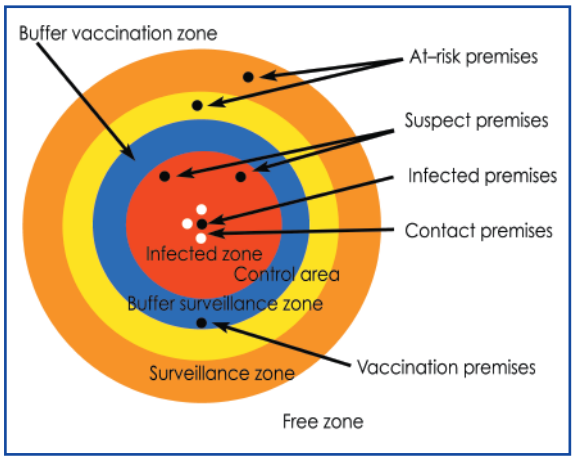

Figure 1
Definition of control, vaccination and surveillance zones around a site of infection

movement restrictions as deemed necessary to contain the outbreak by the responsible animal health officials. Facilities within any of these zones could then be affected and movement of animals, people, supplies and ancillary services could be disrupted.

It is important to note that in addition to producers whose herds are exposed and/or infected with the disease, and therefore are potentially eligible for some type of compensation, there are producers who may suffer a negative economic impact because of movement restrictions that disrupt the normal flow of animals. Most of these costs or profit losses would fall on the producers.

Indirect impacts

In addition to facing direct impacts, the entire affected industry would encounter substantial indirect costs that are manifested much more subtly. These costs do not require a cash outlay and may not appear as an immediate decrease in producer sales. It should be noted that indirect costs are, in general, more long term in nature than direct costs.

Indirect costs would include the loss of export sales and foreign demand. Trade policies, designed to protect the domestic industry in the receiving country, would be implemented. Ensuring that these restrictions are science-based and comply with the OIE *Code* (2) help to minimise these restrictions and defend the policies from challenge of the exporting country. These export losses would result in lower prices for products and animals in the short and intermediate term and a smaller industry in the long term.

The loss of a competitive position in export markets is as significant as the immediate loss of sales and demand. The position of a country in foreign markets is the result of the technology, structure of the production and processing sectors; it is based on providing a consistent supply of a high-quality product, which is the result of long-term product development. The exclusion of a country's products from a market would impact the current industry structure severely and open opportunities for other countries to move into the market; experience has shown that these new suppliers would be difficult to displace after an outbreak of disease has been controlled and/or eliminated.

A related indirect cost could be the loss of domestic sales and domestic demand. This impact would depend completely on the reaction of domestic consumers to the disease in question. That reaction is largely dependent on the information gathered about the disease and its implications and the communication of that information to decision–makers and directly to consumers. Risk communication is a key final step to the risk analysis process that also includes risk assessment.

Diseases such as BSE have had a significant impact on beef consumption in some countries

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even though the risk of causing disease in humans is very low. Informed consumers with confidence in their food safety system may help prevent a decrease in demand; an example would be the small change in demand following the 2003 BSE case in Canada and the 2004 case in the United States,. Even though the diseases are not a threat to human health, publicity surrounding the destruction of thousands or millions of animals still could affect consumer demand for products.

Costs to rebuild production capabilities could be a significant indirect cost to the affected industry. Decades of investment in production technology, such as improved genetics, could be lost in an animal disease outbreak. The more consolidated industries, such as poultry and swine, face greater risk of the loss of genetic material because of the use of fewer genetic lines and having animals in larger, more concentrated production sites. If the genetic nucleus is affected by an outbreak, the loss may take many years to replace.

The infrastructure necessary to serve the production sector of the industry would also be affected. Any decrease at the production levels would impact input suppliers (e.g. decreased demand for feed, pharmaceuticals, veterinary services and equipment), packers, processors, and retail and foodservice establishments. The losses from the 1997-1998 outbreak of classical swine fever in the Netherlands were estimated to total US$ 2.3 billion (1). Of these losses, 37% consisted of compensation paid for pigs that were destroyed for welfare reasons resulting from movement restrictions, and 25% were attributed to allied industries.

The supply and processing capacity may take much longer to rebuild than it took to undermine when the animal protein product supply ceased. Support industries to the production sector may have been directed to other activities or markets that would have the ability to utilise them. Redirection of these businesses back to support the affected industry may take a long time to achieve as personnel and supplies may need to be procured or refocused.

As an example of the devastating costs incurred by an industry in a disease outbreak, the 2001 FMD outbreak in the United Kingdom cost agriculture and the food chain £ 3.1 billion (roughly US$ 5.9 billion) (3). This figure includes both direct and indirect costs to the industry but not the other costs to society, such as loss of tourism and government costs, discussed earlier. Although many of these costs were compensated by the British government, agricultural producers still suffered a loss of £ 355 million (US$ 675 million) representing approximately 20% of the estimated total income from farming in the United Kingdom in 2001. Additionally, the food industrysuffered losses of £ 170 million (US$ 323 million).

In summary, while it is prudent for governments to identify the costs of effective surveillance and prevention, these costs are often a small portion of the total costs that are very small compared to the cost of a disease outbreak response and recovery. It is important that the effectiveness of those prevention programmes not be compromised because of other priorities perceived to be more urgent.

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