

Animal health surveillance constraints in North and South: same-same but different?

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Abstract

Efficient animal disease surveillance systems are essential to prevent disease epidemics and the emergence of zoonotic threats. Most animal health programs rely on data generated by national surveillance systems, the efficacy of which can vary from one country and one disease to the other. To ensure quality of the data generated such systems need to be regularly evaluated. Many socio-cultural, economical and political drivers can affect their performance and their costs. Studies have been implemented within the past few years to better understand local constraints impairing animal health surveillance performances. This paper presents a comparative analysis of the constraints observed by these studies, both in developed and developing countries and its implication for animal health surveillance improvement.

Keywords: *Animal health, surveillance, evaluation, participatory, acceptability*

Introduction

In most regions of the world farming systems aim to ensure food security but also poorest communities' livelihood. Issues in disease control strategies and husbandry practices can result in disease introduction and endemic situations and directly pose a threat to the farmer's livelihood, food security and even national economies. Early detection and control of animal diseases through efficient surveillance systems is critical to prevent such issues but also emergence and re-emergence of human pathogens adapted from animals. Therefore, the improvement of surveillance systems has become a major issue especially with the emergence of recent zoonotic threats such as Ebola or H1N1pdm09. Information about infectious diseases at a global scale relies on national government surveillance systems. Despite the efforts undertaken by international organisations and national actors, the effectiveness of most surveillance systems remains limited especially in low-income countries (1). However, weaknesses in surveillance are also inherent in developed countries. To ensure quality of the data generated by the surveillance and therefore relevance of the epidemiological analysis and recommendation for disease control, the systems need to be regularly evaluated. The complex nature of these systems and the variable contexts in which they are implemented call for the need to apprehend all the socio-cultural, economical and political factors affecting their performance and their costs. Until recently the tool box available to evaluate animal health surveillance system performances did not take into consideration the context in

which surveillance was implemented, and rarely considered the socio-economic aspects of surveillance (2).

Within the past ten years the French Institute for International Research for Agricultural Development (CIRAD) and his partners have developed and applied innovative evaluation tools activities in South East Asia and Europe to better understand local constraints impairing animal health surveillance performances. This paper presents a comparative analysis of the constraints observed in developed and developing countries and its implication for animal health surveillance improvement.

Materials and methods

Evaluation of HPAI surveillance in Vietnam and Thailand

Delabouglise *et al.* assessed the perceived costs and benefits of HPAI passive surveillance in Vietnam and in Thailand (3). Briefly, surveys based on participatory epidemiology methods were conducted in three provinces in Vietnam to collect data on costs and benefits resulting from the reporting of HPAI suspicions to veterinary authorities. A quantitative tool based on stated preference methods and participatory techniques was developed and applied to assess the non-monetary costs and benefits.

In another study, Delabouglise *et al.* analysed the flow of sanitary information regarding Highly Pathogenic Avian Influenza (HPAI) suspicions in poultry in Vietnam (4). Participatory methods were applied to assess the type of actors and likelihood of information sharing between actors in case of HPAI suspicion in poultry.

Evaluation of swine disease surveillance in Vietnam

Pham *et al.* developed a novel methodology for economic evaluation of swine influenza surveillance in Vietnam integrating surveillance system organisation and performances but also functional and socio-economic factors affecting the performances of the system (5). Participatory epidemiology (PE) and social network analysis (SNA) were combined to provide information on the critical points of the system organisation to be improved. This information was then used in a discrete choice experiment (DCE) to assess the preference of stakeholders on different swine disease surveillance and control alternatives. The cost-benefit ratios of the different scenarios were then compared to the current situation in terms of disease control using a SIR model.

Evaluation of ASF surveillance system in Corsica

Calba *et al.* developed and implemented participatory tools to evaluate African Swine Fever (ASF) surveillance system in Corsica (France) (6). The objectives of this pilot study were, firstly, to assess the applicability of participatory approaches within high-income country environments involving various stakeholders and, secondly, to define and test methods developed to assess evaluation attributes. Two evaluation attributes were targeted: the acceptability of the surveillance system and its non-monetary benefits. Individual semi-structured interviews and focus groups were implemented with representatives from every level of the system. Diagramming and scoring tools were used to assess the different elements that compose the definition of acceptability. A contingent valuation method, associated with proportional piling, was used to assess the non-monetary benefits, i.e. the value of sanitary information. Sixteen stakeholders were involved in the process, through three focus groups and eight individual semi-structured interviews. Stakeholders were selected according to their role in the system and to their availability.

Evaluation of bTb surveillance system in Belgium

Calba *et al.* assessed the acceptability of the bovine tuberculosis (bTb) surveillance in Belgium, using participatory tools and the OASIS flash tool ('analysis tool for surveillance systems') (7). Participatory process, focus group discussions and individual interviews were implemented with representatives involved with the system, both from cattle and wildlife part of the surveillance. Three main tools were used: 1. relational diagrams associated with smileys, 2. flow diagrams associated with proportional piling, and 3. impact diagrams associated with proportional piling. A total of six criteria were assessed, among which five were scored on a scale from -1 to +1. For the OASIS flash tool, one full day meeting with representatives from stakeholders involved with the surveillance was organised. A total of 19 criteria linked to acceptability were scored on a scale from 0 to 3.

Evaluation of CSF surveillance in Germany

Schulz *et al.* used the ACCEPT method developed by CIRAD based on the two previous studies (6,7) to evaluate the functionality and acceptability of Classical Swine Fever (CSF) surveillance in wild boar in Germany, which is highly dependent on the participation of hunters (8). The acceptability of alternative surveillance strategies was also analysed. By conducting focus group discussions, potential vulnerabilities in the system were detected and feasible alternative surveillance strategies identified.

Comparative analysis approach

Key variables were identified in each one of the studies described above and retrieved within an excel database for comparative analysis of North and South surveillance constraints: study location, study period, study sample and study sampling method, disease under surveillance, surveillance objective, type of production and sector concerned, evaluation methods and tools, research questions.

The factors identified as impacting the performances of the surveillance were also retrieved and considered. A qualitative analysis was performed based on the description and frequency of the factors identified according to the different study variables listed above.

Results*Major socio-economic constraints identified*

All the studies performed in Vietnam demonstrated that farmers are facing several disease management options besides reporting, i.e. treatment, sale or destruction of animals. In those settings treatment was associated with disease management, mainly by or with the private sector (feed companies, drug sellers), or sometimes with the public one, in both cases without any official reporting. The option of reporting was associated with lots of uncertainty regarding outcomes (mainly the probability to get compensation), transaction costs and negative impact for the sector, as actors anticipated the release of health information to cause a drop of market price. Moreover, the action of reporting was associated with low acceptability and costs of social and psychological nature, such as feeling responsible for effects on the sector, stigmatisation and stress linked to animal culling. The consequences in terms of access to credit and losses of highly valuable genetic stock (in swine) also discouraged information disclosure. One expected benefit of reporting was the public assistance in cleaning farms and the environment to limit the disease spread. The studies also demonstrated that swine disease priority and indicators used for swine disease ranking varied between local and national level.

Acceptability: a major and underestimated issue

As for the Vietnam studies, the studies performed in Europe highlighted the issue of low acceptability of the surveillance system by the main local actors and its consequences in terms of disease reporting or performance of the system. The question of trust between field actors and health services proved central in all economic settings, more particularly targeting the expected effectiveness of information use for disease control. This also proved true among health services actors. Inside health services, case studies in Vietnam and Belgium pointed to a common issue of conflict interest at the level of the field veterinarian involved in both a private activity and public service mission.

North/South specificities

Two studies performed in Europe targeted mainly unstructured sectors, i.e. the free-ranging swine in Corsica, wild boars in Germany. These sectors were characterised by a loose link to animal health services, in the same way as mostly met in South East Asia (then even in large commercial settings and highly structured value chains, as in poultry in Southern Vietnam and Thailand).

Most of the breeders interviewed in the North expressed an obligation to comply with the system even if it was neither adapted nor acceptable for them. This was all the more

true in a structured sector as cattle rearing in Belgium, where health services intervene as an inspection body, with a compelling power. This motive of compliance because of law enforcement appears weaker in Vietnam. Indeed, a main concern of local authorities is there to build trust and relationships with the farmers' community, then trying not to appear as an inspection authority.

The private sector plays a central role in animal disease surveillance at local level in Vietnam and Thailand. Due to the limited private-public partnership, these operate as parallel disease surveillance and control systems. This situation is not observed as such in North countries, where the States mandate the private sector to implement surveillance of lower priority disease and wields a wide law enforcement power on priority disease. Nevertheless, public-private partnership in Europe is neither seamless, nor fully transparent; issues remain in accessing the surveillance data from the private sector. This, again, points to the common importance in North and South of trust between public and private actors, and of trust in effectiveness in disease control by public services.

A major specificity of developing country settings is the existence of a market for sick animals. While observed in many developing countries, this market in Vietnam appeared well organised, involving specific actors, slaughtering and selling points with strong links with the healthy animal value chain (unpublished data).

Discussion

This comparative analysis highlights that North and South countries share common constraints (socio-cultural and economical) on local actors' reporting decision. However, the origin and the responses to these constraints would differ from one setting to the other, linked to specific socio-cultural practices rather than the level of economic development of the country. Moreover, similarities and differences seemed to be linked to the type and level of structuration of the breeding sector concerned.

One of the most striking differences between North and South settings lies in the presence of markets for sick animals. Beside the effect on disease spread and the public health impact, this behavior of "emergency sale" has a strong negative impact on the surveillance performance as it reduces dramatically its benefits, especially in a context of high uncertainty of compensation payments. Additional studies are needed to understand the drivers of this behavior and formulate a strategy for change.

All the studies included in this comparative analysis used common evaluation tools mainly based on participatory approaches, although the object of evaluation varied. This

highlights the flexibility of the approach, which could be used under different socio-economic contexts but also across different disciplinary fields. This study further demonstrates the added value of participatory approaches as evaluation tools, allowing for comparative evaluation, hence a workable standardisation of the evaluation process.

All the studies provided evidence of local constraints not only linked to technical and epidemiological issues but also to sociological, cultural and economical aspects. Such data are critical to better inform decision-making and ensure efficacy of new or improved surveillance, as demonstrated in the evaluation of CSF surveillance acceptability by the hunters in Germany (9).

Conclusion

This comparative analysis highlights similarities and key differences in local constraints impacting disease reporting in North and South settings. It advocates the need to promote the analysis of these issues worldwide and the use of participatory approaches to develop adapted evaluation tools to tackle animal but also public health issues in the management of zoonotic and food safety threats. Such information is critical to ensure acceptability and sustainability of the surveillance systems and ensure proper resources management.

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