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Progress towards practical options for improving biosecurity of small-scale poultry producers

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After more than ten years of circulation of the H5N1 HPAI virus, the number of endemically infected countries is increasing and incursion of infection into HPAI-free countries continues to occur. Human activities are the main route for the spread of the virus. There are sets of biosecurity guidelines appropriate for large-scale commercial production systems, but despite the production of many recommendations for small-scale commercial and backyard poultry systems, there has been little evidence of impact.

This paper looks at the evolution of an approach by FAO to developing sustainable biosecurity measures for use by small-scale poultry producers. It is necessary to understand the attributes of the different possible measures and how these will affect the willingness and ability of producers with limited resources to apply them and how they will disrupt production systems. Studies of poultry sectors and market chains have reinforced the complex nature of these and the numbers of people involved in them, all of whom have a role to play in implementing biosecurity measures. Developing and achieving adoption of biosecurity measures will require a multidisciplinary and participatory approach working with producers, intermediaries, live bird market traders and, for backyard poultry, communities.

Keywords: biosecurity; avian influenza; poultry production

Introduction

More than ten years after the H5N1 highly pathogenic avian influenza (HPAI) virus emerged, the disease has become endemic in several countries and infection continues to enter disease-free countries from these endemic foci. In many countries, and perhaps

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most, the majority of outbreaks have been in the small-scale poultry sector made up of backyard and small-scale commercial poultry producers. However, this is not surprising as there are many more of these types of producers than large commercial units, and the actual probability of infection may well be lower for small-scale producers than large-scale producers, at least in some countries (Otte *et al.*, 2008).

Nonetheless, small-scale production systems are a key sector in the epidemiology of HPAI in both animals and humans. Most human cases of H5N1 have been related to the handling and/or preparation for cooking of infected poultry (Peiris *et al.*, 2007; WHO, 2008). In some countries, live bird markets have been one of the important elements in maintaining and spreading the disease (BCCP/FAO, 2007; FAO, 2007a; Kung *et al.*, 2007) and in leading to human cases (Peiris *et al.*, 2007; WHO, 2008).

After initial introduction of the virus, the major source of spread is human activities. People create spread directly by moving live birds (domestic and captive species), indirectly through contaminated materials (fomites), and through hunting activities. This is particularly true in endemically infected countries (Sims and Brown, 2008). The key to control of the disease is to prevent this secondary spread in domestic poultry. Biosecurity is an important element in decreasing spread and, if well-designed, allows producers to protect their poultry and themselves. Biosecurity is therefore both enabling and proactive.

There are sets of biosecurity guidelines appropriate for large-scale commercial producers, but despite the production of many recommendations for small-scale commercial and backyard poultry producers, there is evidence from field studies in Cambodia, Indonesia, Lao PDR and Vietnam, that even where there is good knowledge of the biosecurity messages that have been promulgated, uptake has been very low and improvements in biosecurity have not been achieved (Agrifood, 2006; DENPASAR, 2007; FAO, 2007b and 2007c; ICASEP, 2007; Seng, 2008). There are several reasons for this. There has been lack of involvement of stakeholders in developing recommendations for biosecurity measures, which has led to lack of ownership. Some of the proposed measures have not taken into account the realities of the situation in the field, *e.g.* housing indigenous breed poultry is relatively costly and completely changes the nature of the production system. In small-scale production systems, the return on investment may not be clear to the producers. The perceived (and in some cases actual) risk of infection is mortality, which is often accepted as normal. This all means that the incentives to adopt biosecurity measures may not be strong. It is therefore necessary to adopt a more practical and people-centred approach.

Approaches

UNDERSTANDING THE FULL PRODUCTION NETWORK (POULTRY SECTOR AND MARKET CHAIN ANALYSIS)

Achieving biosecure production is not primarily a technical issue, as we know what biosecurity measures would work if they could be applied. However, few veterinarians or animal production specialists have significant experience of working in small-scale commercial poultry systems and very few with backyard poultry. Producers in this sector mostly obtain advice on and treatment for health problems from paravets or owners of veterinary pharmacies. There has therefore been a lack of understanding by technical specialists of the structure of, and actors in, the small-scale poultry sector and how this affects the types of biosecurity measures that can be applied.

In response to this, the FAO has carried out many poultry sector reviews and market chain analyses in recent years in the regions most affected by H5N1 HPAI: Asia and

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Africa, including Vietnam, Indonesia, Egypt and Nigeria which are endemically infected. They have revealed the highly variable nature of the poultry sector among countries and, more importantly, the linkages between different sectors of the poultry market chain.

Small-scale commercial producers have complex interrelated market chains involving many actors in terms of the steps in the chain with large numbers at each stage. Backyard poultry are often part of relatively simple market chains, but there are very many flocks spread over wide geographic areas. In both cases, this many-to-many relationship makes disseminating biosecurity measures more difficult. The involvement of multiple intermediaries such as traders, chick suppliers, vaccinators, para-veterinarians, feed suppliers, etc. indicates the many potential cross-contamination points that need to be addressed.

UNDERSTANDING THE ATTRIBUTES AND APPLICABILITY OF BIOSECURITY MEASURES

Pagani and Kilany (2007) defined different measures according to their potential impact and ease of application. In Turkey, a World Bank HPAI project took into account the costs of different biosecurity measures when assessing their practical utility (World Bank, 2007). Vaillancourt (2000) looked at potential effectiveness against cost of biosecurity measures. By combining these approaches, and adding some other attributes, it is possible to describe each potential measure in a way that should indicate its applicability in different situations. The following characteristics of a biosecurity measure are suggested:

- Potential effect in reducing risk.
- Persistence of effectiveness.
- Possible speed of implementation.
- Technical ease of introduction and implementation.
- Initial cost (including labour/effort).
- Recurrent cost (including labour/effort).
- Disruption of the production system.
- Social, cultural and religious acceptability.

On this basis, it is possible to start identifying which might be applicable in different systems. This may seem obvious, but has not been practised uniformly. A common recommendation, for example, has been to house backyard poultry. This ignores the nature of the production system, because housing the birds would change the system from a low input/low output scavenging system to one dependent on constant inputs of feed and a higher labour cost.

UTILISING A MULTIDISCIPLINARY APPROACH

The approach being recommended is multidisciplinary; besides animal health and production specialists; it must involve socio-economists to provide insights into the costs and benefits of different measures compared with the risk of infection, and communication specialists who will provide expertise on the cultural aspects of developing and achieving significant adoption of sustainable biosecurity measures.

INVOLVING ALL STAKEHOLDERS IN DEVELOPING SUSTAINABLE BIOSECURITY MEASURES

There should be participatory field work involving all stakeholders to develop methods that can be sustained using available resources. It is necessary to define the limitations of what people can and will afford and what fits in with their normal routine in order to develop practical and sustainable solutions. It is also important that women and children

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be an integral part of the process because they play a key role in caring for poultry, particularly backyard poultry, in the small-scale sector. In villages, it will be important to develop a community-based approach because in situations where poultry are free ranging, their protection depends as much on the actions of the keeper's neighbours as of the keepers themselves.

FOCUS ON LIVE BIRD MARKETS

Changing practices at live bird markets has been an option used in some countries (Agrifood, 2007; FAO, 2007a; Lau *et al.*, 2007). In Vietnam, the changes have been directed at limiting (or banning) the sale of live birds and the introduction of quality certified poultry products. In Hong Kong SAR, the selling of some species has been banned and monthly rest days have been introduced. In Nigeria, the immediate destruction after use of transport containers made of cheap locally available materials has been launched; this may be a better option than the use of containers that can, but may not be, cleaned and disinfected.

USING INTERMEDIARIES TO SPREAD THE MESSAGE

The large number of small-scale producers implies that it will be difficult to achieve adoption of new practises. Media such as posters, radio and television can and should be used, but intermediaries should be actively involved in spreading and advocating the message among themselves and the producers. This will help promote the message as widely as possible. Producers are often sceptical of advice from government agents and more likely to trust the intermediaries they are used to working with. Some producers are prepared to adopt innovations on the recommendation of such advisers, but many, understandably, want to see the impact of such changes before adopting them. There is therefore a need to monitor the impact of the changes introduced by the early adopters in order to persuade other producers to also adopt them and to determine that the benefits outweigh the costs.

Conclusions

Achieving sustainable improvements in biosecurity in small-scale poultry production systems is more complex than in large-scale commercial systems. To do so will require deeper understanding of the attributes of different market chains, identification of all actors and interactions to define who should be involved in undertaking and promoting biosecurity, and establishing where the key risk points in the system may be. It will be necessary to use a participatory approach to produce sustainable, simple and affordable measures and to spread these through the system. At the village level, this will require a community-based approach.

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