Safety and quality practices in closed-house poultry production in Thailand: Lessons from 2004-avian influenza outbreak

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ABSTRACT

Food safety and quality as demanded by domestic and international trade are the major concerns in food production chains. Safeguarding these concerns presents challenging tasks across the entire farm-fork continuum. This progression is comprised of various segments that include governmental departments, farms, industries, transportation, retail markets and consumers. The devolution of these tasks among the stakeholders and the heterogeneous nature of safety measures at each stage require coherent good management practices. Thus, successful achievements of these need continuous efforts in identifying practical and cost-effective measures for reducing or eliminating food-borne risks to consumers, for example, the Avian H5N1 influenza. The recent outbreak of avian influenza (bird flu) in Asia, including Thailand, has heightened public awareness on requirements of good production practices in poultry and poultry products for both local and international needs. In addition, accurate and timely dissemination of information regarding diseases like bird flu are important issues that affect public perception and the implementation of preventive measures. Lessons from the avian influenza outbreak in terms of building cost-effective monitoring and surveillance systems can form a good basis for this and other poultry-borne diseases. The laid down regulations of "good" agricultural practices at each stage in the whole poultry production chain in Thailand are examined to assist in identifying the critical points that might have led to this outbreak. The knowledge gained is used in formulating preventive measures at these points.

INTRODUCTION

Out of the avian influenza (AI) outbreaks in the Netherlands in 2003 and in South East Asia and in North America in 2004 only the Asia outbreak affected 10 countries. In Thailand, the outbreak resulted in at least 37 million poultry being slaughtered in 41 of its 76 provinces. The imposition of quarantine on all affected zones include stamping out, movement control inside the country, screening, and zoning (vaccination is prohibited) in an effort to halt the spread of the ailment. The country planned several times to declare itself free of AI following an initial wave of outbreaks in January, but was forced to backtrack when more cases were announced (ProMED-mail, 2004).

In addition, this flu also affected 12 humans resulting in 8 deaths (with the intensive media coverage lasting for more than sixty days). However, morbidity and mortality resulted not from eating poultry products but from contacts with sick live birds or waste from them, (FAO/OIE/WHO, 2004; Hatta and Kawaoka., 2002) and this has added a new dimension to the definition of food safety in the animal protein industry. "Food safety is the effect on public health, both short and long term, of the origination, transformation, processing, distribution and consumption of animal protein." (Butland, 2004). When one examines this definition of food safety, it can be concluded that as far as animal protein is concerned the issue of bio-security merges with that of food safety.

What can Thailand do, not only to recover its "scratched" reputation, but also to move forward and fulfill its stated objective of being "a Kitchen of the World" (AFTS, 2003). In order to fulfill this objective, we need to identify the main reason for the rapid spread of the H5N1 strain of AI and thus to understand the structure of the Thai poultry industry. Hence, the events that affect the broiler industry cannot be separated from the events that affect other poultry production lines.

THE SITUATION ENCOUNTERED

The Thai poultry industry

Thailand is the fourth largest exporter of poultry in the world with 7% of the volume and 12% of the traded value. The export value of Thai poultry and poultry products is around US$ 1.17 billion annually and Thailand has by far the highest unit sales value of all exporters. There are over 220 million birds housed in over 31,000 farms across the country. Of these, approximately 34% are broilers, 25% are native layers. The duck farms account for 15% (Costale, 2004). The "industrialized" broiler sector has access to bio-security systems concept and the resources to implement them. However, a significant number of layers and native breeds are raised in small-scale farms that have poor established bio-security systems,

and furthermore those farms are in close proximity to each other.

What went wrong: Factors identified

Day-old-chicks (DOC) (breeder, hatchery)
- Genetic and immune status of the parents
- Come from infected parent flocks or contaminated at hatchery

Water
- Water contamination with waste/manure from infected farms or from wild birds
- Improper waste management/treatment

Feed
- Contamination during transportation, storage or between farms
- Bio-security at feed mills (pest control and disinfections)
- Improper treatment (heat treatment in the pellets process)

Litter
- Contamination with wild birds faeces
- Inadequate specification criteria when receive the litter
- Improper transportation, treatment and storage

Environment

Personnel
- Improper hygiene practice on production lines
- Inadequate training about cleaning and disinfection
- Lack of awareness promotion in humane handling of staff and contractors

Fomite
- Improper design (rough surface or difficult to clean etc.)
- Improper disinfection (dilution, handling and efficiency)
- Transfer between flock/farm (used and contaminated equipments were bought from infected farms that had closed-down operations)

Transport
- Lack of bio-security awareness for transportation between poultry farms
- Improper movement due to lack of training for driver

Bird-proofing - Inadequate sealed or screened to prevent entrance of although small birds

Consequences

As a consequence of the factors described is the ease at which the AI virus could travel between farms. So systems must be put in place that could not only solve the problems within the short time but also effectively educate farm owners and customers thus, allow imparting safety confidence about Thai poultry products also on international markets. The HACCP method ensures safety, whereas the ISO 9001 ensures quality of the product. When using the HACCP principles and its prerequisites (GAPs or bio-security) it is possible to identify, control and monitor critical points in farms, to adopt microbiological criteria and control measures in accordance with scientific principles, and finally to monitor farm hygiene by competent authorities or the third party audit to ensure safety of the product.
An example on the application of safety and quality control system to closed-house farm in Thailand is given in figure 1.

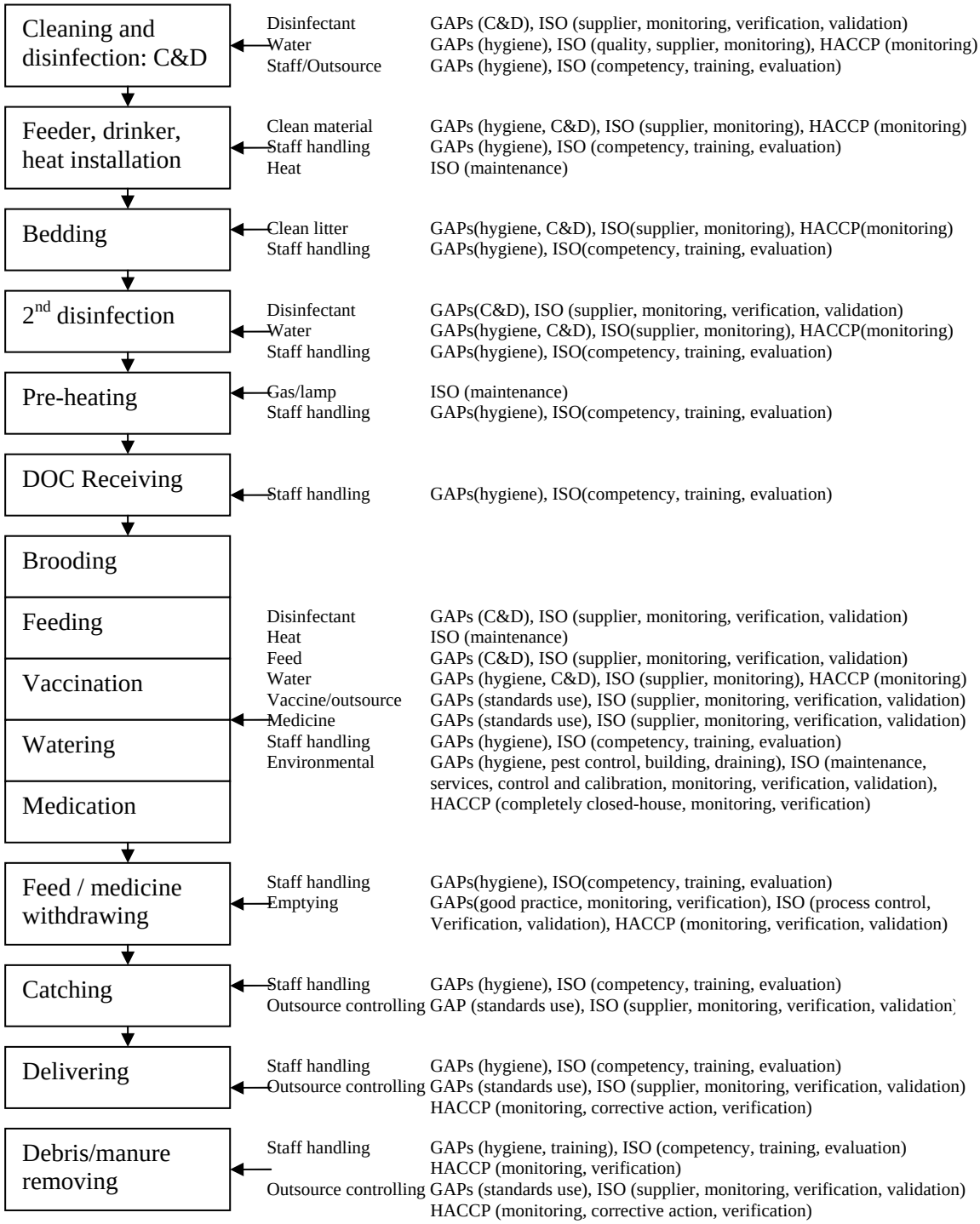
Discussion and conclusions

When such potentially devastating viruses as avian influenza are on the “horizon” then it is time to review your procedures, and verify that the systems in place are being endorsed regularly, consistently and effectively.

The best option to choose would be the total implementation of the closed-house system that provides manageable environment and prevents the contact with external wild birds and/or other pathogens carriers (insects, rats etc.). Furthermore, it offers an atmosphere that is amicable to the implementation of a cost-effective safety and quality system for basic control and prevention.

Primary producers, while not subject to the full application of HACCP principles, would be required to analyse the risk at each step of the production line, to set up the critical limits for those critical control points (CCPs), to monitor and eventually eliminate or reduce them to an acceptable level.

Figure 1 Roles of GAPs, ISO 9001, HACCP in production line of closed-house broiler farm



Good Agricultural Practices (GAPs) and/or bio-security are alternative prerequisite tools of HACCP for controlling the safety between each step of production line in term of water sources, manure/bio-solids management, health and hygiene of staff, facilities hygiene, transportation hygiene and traceability.

In order to ensure long-term success and customer satisfaction ISO 9001:2000 is recommended in term of training, equipment and facilities control, receiving, transportation, storage, traceability, recall and supplier control under the management commitment, continual improvement to meet such changes in quality requirements, conform to relevant regulation and ensure close collaboration between all steak-holders (owner, suppliers, contractors, industries, officials, consumers etc.).

The combination of safety and quality systems, for example HACCP and ISO, is worldwide accepted and effectively preventive systems for highly economically (Unnevehr.*et al*., 1999) and rapidly transmissible diseases such as AI and for operation that desire to exceed the regulation requirements for food safety.

Geographically, lessons learned from this outbreak took an international scope. The spread resulted into serious economic consequences for the Thai and other neighbouring poultry industries (more than half of the affected countries experienced highly pathogenic avian influenza for the first time in their histories). The diverse forms of poultry that coexist in the same areas were all affected by the crisis, directly (through infection and culling) or indirectly (crash in farm prices or impossibility of accessing the local and international markets). Further, the most important lesson learned was that there was unprepared emergency set up to deal promptly with the crisis. This was made worse by poorly coordinated response and information networks among the various sectors involved in managing the crisis. These lessons have created positive momentum in setting up both active and passive disease surveillance systems, continuous risk assessments, prompt reporting of disease outbreaks to relevant authorities, assessments and monitoring of disease prevention/control progresses, and improvements of collaboration between public health and agricultural sectors (including veterinary services) (WHO, 2004).

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