

BIOSECURITY AND POULTRY AGRIBUSINESSES: A CONCEPTUAL OVERVIEW

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Abstract

Consumer feedback is an aggregation of the consumer perception and interpretation of the product value chain in an entire production system. It is therefore a planning tool for production expansion and diversification to satisfy end users' needs. Although the poultry agribusiness subsector is exposed to biosecurity risks in the entire value chain, it has been analysed on segmented isolation which lacks an aggregate conceptual value of biodiversity risk factor in the production risk-benefit analysis of the subsector. This paper seeks to establish a conceptual direction for end user feedback in analysing biosecurity risks in the entire poultry agribusiness value chain.

Key Words:

Poultry Value Chains; Poultry Agribusiness; Value Chain Approach; Biosecurity Principles.

Introduction

Poultry biosecurity are procedures that prevent introduction and spread of poultry infectious diseases (Nyaga, 2007b; Permin and Detmer, 2007; Cunningham and Fairchild, 2012). The concept encompasses policy and regulation protecting agriculture, food and the environment from biological risks (FAO, 2003). Biosecurity risks are business risks among poultry agribusinesses (Aila, 2014). Several studies have demonstrated both risks of biosecurity violation (Bojesen *et al.*, 2003; Nerlich *et al.*, 2009; Leibler *et al.*, 2010; Muteia *et al.*, 2011; Mwanza, 2009) and benefits of its adoption (Gibbens *et al.*, 2001; Nerlich *et al.*, 2009; Aila, 2014). Various actors are contacted in isolation in these studies namely smallholder producers, industrial producers and processors, traders and consumers. Okello *et al.* (2010) for instance, do not assess the entire poultry value chain in their analysis as consumer or end user feedback is not sought. Aila (2014) on the other hand, concentrates on effect of biosecurity principles on consumer preferences for indigenous chickens. These studies, however, do not integrate biosecurity risks and benefits to overall poultry agribusiness success. Therefore this paper aims at integrating biosecurity to poultry agribusiness processes using the value chain approach.

A Value Chain Approach Integrating Biosecurity into Poultry Agribusinesses

The value chain approach identifies the various ways poultry products reach the final consumers (Cloy, 2005; Nyaga, 2007a; Aila *et al.*, 2012). These ways are potential culprits for biosecurity violation leading to a risky poultry food chain, especially, given prevalence of zoonoses (Osano and Arimi, 1999; Gibbens *et al.*, 2001; Perko-Mäkelä *et al.*, 2002; Bojesen *et al.*, 2003). At the same time, these ways are opportunities to plug in biosecurity within the value chains (Nyaga, 2007a). The result of the plugging in assures biosecure poultry products delivery. Therefore, the agricultural value chain approach can help in conceptualizing biosecurity within the context that poultry agribusinesses operate. The value chain proposes additive value at successive levels with potential biosecurity risks and benefits.

Cloy (2005) presents a linear agricultural value chain model applicable to poultry agribusinesses (Aila *et al.*, 2012). This framework modifies the typical value chain proposed by Porter (1985) to include the unique opportunities agribusinesses pose (both production and processing exist at successive phases). Industrial or manufacturing value chains see the firm as the epicenter of combined production and or processing. Indeed these two concepts are used interchangeably in most literature (Crawford, 1997). Web-like value chains (see Nyaga, 2007a) also exist. These are however complex though depicting real life scenarios.

The linear framework is therefore simple and communicative in a sense that agribusiness managers can appreciate. It has seven successive phases namely: input supply; agricultural production; first-level handling; processors; wholesalers and distributors; retailers; and consumers (Cloy, 2005). Some phases can be eliminated for pedagogy without loss of meaning as these activities can be fused with adjacent activities. For instance input supply can be fused with production; first level handling can be combined with either production or processing; wholesaling, distribution and retailing can be named marketing activities. Therefore, production, processing, marketing and consumption distinguish agricultural value chains from other value chains.

Several phases within the value chain can be combined by an agribusiness as its business model permits. For instance, large industrial players may combine the first six phases and only connect with consumers dispersed within a given region or country. Some actors may control one or two phases while other players, especially smallholders and some retailers, may take care of only one phase each. Actors controlling several phases tend to develop biosecurity standard operating procedures, religiously follow them and appreciate the benefits accruable from compliance (Nyaga, 2007a). These players offer a greater assurance of biosecurity to succeeding players in the value chain who might be third party retailers and consumers. Single phase actors, especially smallholders are potential culprits in the disease chain (Nerlich *et al.*, 2009). Alternatively, an agribusiness outsourcing from several actors along the value chain must be wary of potential biosecurity lapses and must instill precautionary measures for business success. The rest of the discussion assesses individual poultry value chain phases with biosecurity lenses. Potential biosecurity risks and benefits are exposed and implications for poultry agribusiness delineated.

Biosecurity Issues within Poultry Input Supply, Production and Processing

Poultry biosecurity studies have perhaps concentrated on production issues. This is because biosecurity originates from agricultural production (FAO, 2003; Waage and Mumford, 2008; Koblenz, 2010). Poultry biosecurity was aggravated when highly pathogenic avian influenza (HPAI) outbreak reached an endemic state globally (Manzella and Vapnek, 2007; Nyaga, 2007b; Permin and Detmer, 2007).

Four value chain phases can be isolated that are directly connected to poultry production. These are input supplies, production, post-harvest handling and processing. Permin and Detmer (2007) identify four biosecurity principles that are relevant to these phases. These are control of incoming animals, control of in- and out-going material, management of the flock and control of other animals. These principles have gained general acceptance in the literature (Pierson, 2001; Nyaga, 2007b; Butcher and Yegani, 2008; Aila, 2014) even though Conan *et al.* (2012) is in doubt.

Both control of incoming animals and control of in- and out-going material principles are suitable in directing input supply decisions and activities in poultry agribusinesses. For instance, day old chicks should be sourced from regulated sources (Nyaga, 2007b; Permin and Detmer, 2007, Aila, 2014), feeds and ingredients must be of high quality (Owaga *et al.* 2011; Aila, 2014). Two kinds of poultry agribusiness might find these principles particularly beneficial. These are feed millers whose output feeds into poultry production and hatchery operations who supply day old chicks. If biosecurity is infused at these stages, there is greater guarantee that its risks can largely be eliminated at later phases of the value chain and benefits utilized throughout the chain. During the production phase, all four biosecurity principles have been shown to be important (Permin and Detmer, 2007, Aila, 2014). Several studies have demonstrated the efficacy of maintaining biosecurity standards at production (Gibbens *et al.*, 2001; Bojesen *et al.*, 2003; Mwanza, 2009; Nerlich *et al.*, 2009; Leibler *et al.*, 2010; Muteia *et al.*, 2011; Aila, 2014). Agribusinesses that outsource poultry products as inputs (from hatcheries or feed millers) for their own production must mitigate biosecurity challenges associated with such processes. Production managers must oversee biosecure poultry production to avoid business losses associated with chick and bird mortality due to violated biosecurity conditions. Taking advantage of biosecurity at this stage authenticates marketing messages that assure successive phases of

product quality.

Biosecurity in Poultry Marketing and Distributive Activities

Having produced biosecure poultry products at preceding phases, poultry agribusinesses should carefully devise marketing strategy that takes advantage of biosecurity. Moreover, biosecurity can be a distinguishing factor that assures consumers of food safety. Decisions about the product (the developed poultry product), price, place and promotion (Crawford, 1997; Kotler *et al.*, 2013) must be considered based on agribusiness' situations and business goals for overall success. These decisions need to recognize the role biosecurity plays in enhancing the value of the poultry product. Products requiring dressing of poultry are a potential biosecurity risk especially for zoonoses such as *Campylobacter* (Osano and Arimi, 1999; Gibbens *et al.*, 2001; Perko-Mäkelä *et al.*, 2002; Bojesen *et al.*, 2003). Therefore care must be taken at such product development. Moreover, such care becomes a potential message to be communicated to customers as a point of difference. The agribusiness' economics must be visible in its pricing strategy (Norwood and Lusk, 2008; Kotler *et al.*, 2013).

Place decisions involve distribution activities the agribusiness engages in. These decisions involve choice of channels and intermediaries and logistical decisions (inventory, warehousing, transportation, customer service and order cycle time) (Aila *et al.*, 2011; Kotler *et al.*, 2013). These decisions should deliver economic value to the customer (Xu, Kaye, & Duan, 2003; Aila *et al.*, 2011). Such decisions and activities must eliminate pathogen contamination of the poultry product much as assure delivery of biosecure poultry products.

Promotion decisions on the other hand involve communicating agribusiness' market-offerings to the consumers. Aila (2014) asserts that agribusinesses should develop strategies that are more efficient in communicating biosecurity principles to consumers by taking advantage of the favourable preferences for indigenous chickens. This communication should reaffirm the biosecurity decisions infused in the value bundle the consumer is receiving.

Biosecurity in Poultry Product Preparation and Consumption

Poultry products need to be prepared before consumption (Cloy, 2005). Preparation can take place at either retail hospitality businesses or consumer homes. It is imperative that food preparation must be hygienic to eliminate pathogen contamination (Gibbens *et al.*, 2001; Bojesen *et al.*, 2003). Retail hospitality businesses are therefore regularly inspected to ensure they conform to public health guidelines.

Both consumption of these poultry products and subsequent disposal of wastes must be biosecure (Pierson, 2001; Nyaga, 2007b; Butcher and Yegani, 2008). Waste disposal in particular might lead to pathogen build-up if not properly done. Public health guidelines on waste disposal should be adhered to curtail pathogen growth and accumulation. Where free-range poultry are involved, improper poultry consumption waste disposal is a direct biosecurity violation.

Conclusion

The importance of poultry biosecurity in literature requires practical applications that poultry agribusinesses can relate to. The value chain approach enables agribusinesses to appreciate

practical actions and decisions that can eliminate biosecurity violation and enhance adoption of biosecurity principles for optimal benefit. Ultimately, this paper creates this required awareness and impels critical thinking on ways of integrating biosecurity in agribusiness poultry chains. This paper has practical implications for poultry agribusiness managers in making day-to-day decisions along the poultry value chains.

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