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Controlling Avian Flu and Protecting People's Livelihoods in the Mekong Region

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Impacts of Avian Influenza on Poultry Production in Developing Countries

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Key Findings

- HPAI losses from public disease control measures and consumer reactions are much higher than those from poultry dying as a result of the disease.
- Disease impact can therefore be considerably mitigated by well-designed public and private HPAI risk management programmes.

Highly Pathogenic Avian Influenza (HPAI) virus of the H5N1 subtype re-emerged in Southeast Asia in late 2003 and can now be considered endemic in the region. Like other highly contagious livestock diseases, HPAI affects poultry production via three main pathways: (1) through the direct impact of disease-related morbidity and mortality, and the costs associated with *ex-ante* risk mitigation and / or *ex-post* coping measures that affect the incomes of producers and other stakeholders connected to poultry production and marketing; (2) through government interventions aimed at disease control, which include culling, marketing and movement restrictions, and investment in animal health infrastructure and disease preparedness; and (3) through consumer and market reactions, both domestic and international, affecting demand for poultry and poultry products and their substitutes, and thus prices of products and production inputs.

Quantification of the impacts of HPAI is complicated by the fact that direct impacts on livestock producers will propagate upstream and downstream through supply and distribution networks, that short-term reactions are likely to be followed by longer-term adjustments, that impacts include direct cost elements and foregone income, and that losses to the poultry sector will, at least to some extent, be 'externalized' on the one hand, and, on the other hand, be compensated for by gains in other livestock sub-sectors. As a consequence of these 'systemic' responses, the impacts of HPAI are strongly determined by the structure and flexibility of the poultry industry in affected countries, its links with other sectors of the national economy and its integration with global markets. Furthermore, the severity of impacts depends, among other things, on where, when, and in which component of the poultry industry the disease manifests itself.

This brief is based on a review of available evidence on HPAI impacts for the three pathways in the published as well as in the grey literature.

Poultry Production in Developing Countries

Over the past decade, the poultry industry has grown annually by 2.1% in terms of poultry numbers and by 3.7% in terms of meat production. In developing countries, three poultry production systems coexist. *Extensive* (traditional) poultry production is ubiquitous throughout the developing world, practiced by the majority of rural households keeping small flocks (tens of birds). These are predominantly indigenous, dual-purpose (meat and eggs) birds kept meet household consumption needs, social obligations and minor cash expenses. Birds are reared with minimal inputs and obtain most of their feed by scavenging, but command price premia in local markets. *Intensive* poultry production follows models developed in industrialized countries and is characterized by stratified stages of production, with primary breeders, multipliers, and raising farms with mechanized housing, a small number of breeding companies dominating the global supply of genetic stock, specialization in meat or eggs and use of specific birds for each product, high-density feeds tailored to specific production stages, increasing scale of production, and systematic integration with slaughter and processing industries. *Semi-intensive* production is a 'hybrid' between the aforementioned systems, combining characteristics of both, such as scavenging with feed supplementation, indigenous breeds crossed with industrial poultry lines, partial reliance on formal input supply systems and informal live-bird marketing networks, operating at intermediate scales (hundreds of birds).

The above poultry production systems usually operate side-by-side and are often even interconnected through supply or output marketing systems The relative contribution of each of the 'systems' to total national poultry production depends on the stage of development of the poultry industry, which in turn is related to the overall stage of national development, but is also determined by national agricultural and related policies.

HPAI Impacts

Direct and immediate impacts through morbidity, mortality and private and public prevention and control costs

Disease losses occur from bird losses through deaths or culls and from foregone income due to production downtime. On-farm losses are determined by the value of birds kept and revenues generated per bird. In the early stages of the HPAI epidemic, massive bird losses were experienced in Thailand (64m), Viet Nam (50m), Egypt (36m), Indonesia (17m), Anhui Province in China (9m), Bangladesh (2m) and Nigeria (1m), partly through disease-related mortality, but mostly though extensive government-mandated culling.

In addition to immediate losses from bird fatality, production is interrupted for several weeks and subsequent financial losses result from foregone poultry and egg sales. The magnitude of these secondary losses is linked to the scale and mode of production and differs with poultry species. Small-scale, scavenging backyard units have minimal investment costs and therefore only suffer from forgone income, while larger scale, commercially-oriented farms may additionally face liquidity problems arising from having to repay loans for buildings, feeds and other inputs.

Prevention and control costs arise through investment in biosecurity enhancements, possibly vaccination, upgrading of diagnostic capacity, and the cost of culling, disposal of carcasses and infected material (e.g. litter), disinfection of affected premises, more intensive surveillance and enforcement of movement control and other restrictions to poultry production and trade.

The costs of farm *biosecurity* enhancement are composed of investment costs required to 'upgrade' farm facilities and recurrent costs such as for example the repeated purchase of disinfectants. Further costs may arise from changes in labour requirements and / or changes to the faming system. For example, if previously free-ranging birds are confined in sheds for biosecurity reasons, more feed has to be bought and given to the birds, which increases production costs. It has been estimated that in Viet Nam the cost of upgrading the biosecurity of free-ranging backyard production systems would outweigh the benefits from potential economies of scale. The necessary investment costs for biosecurity upgrading of small commercial farms in Viet Nam, Cambodia and Lao PDR for example were estimated to fall into the range of USD 75 to 100 per farm, an amount that was found unlikely to be spent by villagers rearing small flocks for commercial purposes.

Live bird markets have been identified as important sources of HPAI risk and governments and local authorities are investing in improving their biosecurity. In Manila, biosecurity upgrading of live bird markets involved relocation and rebuilding markets outside the city with required investments of USD 1.3 million per market. The total cost of upgrading live bird markets in Viet Nam was estimated at between USD 5 and USD 10 million.

Vaccination can be used as part of a control / eradication programme to reduce the number of outbreaks, diminish virus circulation, and avoid culling of large numbers of birds. The total costs of vaccine, vaccine delivery, administrative and fixed costs for storage and logistics have been estimated at US$0.06–0.10 per bird vaccinated.

Strengthening *diagnostic capacity and disease surveillance* comprises high technological inputs, such as modern equipment, buildings, and training and salaries of staff. These costs are estimated at a minimum of US$500,000 for a basic setting. In Asia, for example, the costs of reagents for serological tests are between US$0.50 and 1.50, while virus isolation or molecular detection costs roughly US$10–20 per sample. The costs of *culling and disposal of carcasses* range from US$0.25 to US$1.00 per bird depending on location and population.

Direct and immediate impacts through consumer / market reactions

National reductions in demand for poultry products caused by consumer anxiety and fear of contracting HPAI have repeatedly affected domestic market chain participants through the combined effect of lower trading volumes and depressed prices. Table 1 displays some examples of domestic price and volume drops for poultry meat due to HPAI outbreaks in Asian countries.

Table 1. Impact of HPAI outbreaks on market trading activity in selected countries.

Country	Month	Price Drop	Volume Drop	Drop in Value of Sales
Cambodia	Jan, 2004	75%	80-90%	95-97%
Indonesia	Jan, 2004	50-85%	33%	66-90%
Myanmar	Mar, 2006	50-60%	40%	70-76%
Viet Nam	Oct, 2005	50-60%	50%	60-80%

International market reactions occur as import bans for all potentially risky products from affected countries by their trade partners. Net poultry meat exporters such as Thailand were severely affected, with Thai poultry export revenue in 2004 dropping to less than one half of the 2003 value.

Short-, medium and longer term impacts of HPAI

'*Upstream'* effects are felt by feed purveyors (30 to 90% demand drop), suppliers of day-old chicks (40 to 60% demand drop), and distributors of veterinary products and feed additives (25 to 55% sales drop), while '*downstream effects'* are experienced by traders, wholesalers, retailers, slaughterhouses, cold stores, vendors, restaurants and catering services, among others, as reductions in monthly turnover and consequently income. *'Horizontal effects'* were reported, for example, by rice farmers in the Mekong river delta, which complained that reductions of mobile duck flocks in rice fields resulted in increased damage from golden snails and increased occurrence of viral diseases, in turn resulting in higher pest control costs and lower incomes.

Medium and longer term impacts represent outcome combinations based on outbreak severity and policy responses. Countries with large poultry populations, such as Thailand and Viet Nam are undergoing large structural changes. For example, in Thailand, free-grazing transhumant duck raising was prohibited, with duck owners having to convert to housed production systems. Also, in reaction to import bans, there was a shift of poultry exports from unprocessed frozen to pre-cooked meats. Given the very heterogeneous nature of the poultry sector within and between countries, medium-term and longer-term impacts of HPAI in developing countries as a whole will be variable and are hard to predict

Conclusions

- Losses from animal disease control measures and from consumer and market reactions are often much higher than losses from poultry mortality. This has important policy implications in terms of targeting disease mitigation measures where they will deliver the highest public and private returns.

- Traditional, extensive systems require special consideration in national HPAI control programmes as they have only limited incentives to comply with current public disease control measures.

- Effective design of HPAI control policy requires development of models that incorporate epidemiological considerations and economic decision-making processes and capture the tradeoffs that exist between preventive, control, and monitoring efforts.

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