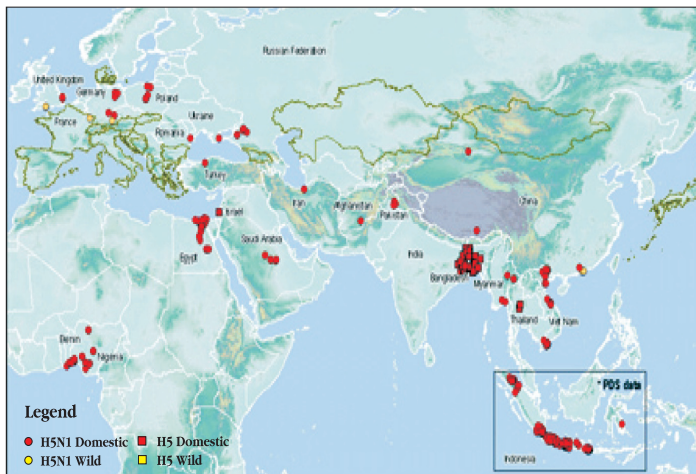


Tackling Avian Influenza, an Emerging Transboundary Disease

B. Ganesh Kumar and K.K. Datta

The threat of avian influenza (often referred to in the media as 'bird flu') has received a great deal of attention globally in recent years and has become one of the most publicized emerging infectious diseases. Ever since the discovery of highly pathogenic H5N1 strain of avian influenza in China in 1996, the virus has spread rapidly in Asia, Europe, and Africa. Indeed, the presence of the virus has now been confirmed in birds or humans in more than 70 countries (World Organization for Animal Health, 2007 and FAO, 2008). As of mid December 2007 there were 340 confirmed clinical human cases of H5N1 influenza reported in 12 countries, resulting in 208 deaths (WHO, 2007). Of late, the South and Southeast Asian countries are increasingly experiencing this episode and suffering from this menace (Fig. 1).

Fig.1. HPAI Outbreaks Across the Globe



Six months period (30 July 2007 - 30 January 2008)

Source: Food and Agriculture Organization, 2008

Understanding Avian Influenza

Highly Pathogenic Avian Influenza (HPAI) is an infection caused by avian influenza Type A viruses. These occur naturally among birds, and wild birds worldwide carry the viruses in their intestines. HPAI is not a new disease (Alexander, 1987). Its occurrence predates the industrialization of the poultry subsector. However, outbreaks of avian influenza are increasingly frequent, probably as a result of intensive agricultural practices, high virus transmissibility and the presence of natural reservoirs in migratory birds. Raising backyard flocks also increases the opportunities for poultry to catch the diseases carried by wild

birds due to failure or inability to implement appropriate biosecurity/disease management systems in smallholder flocks in Asia. Moreover, majority of the countries in this region do not have adequate disease surveillance systems in place, or the resources to introduce recommended emergency disease control measures. Live-bird markets have also been blamed for maintaining and spreading avian influenza viruses and pose major challenges to veterinary authorities. The principal means of transmission to humans has been through direct and close contact with infected live poultry or surfaces that have been contaminated with secretions or excretions from infected birds (USDA, 2006; WHO, 2006). However, concerns about the possibility of genetic mutations leading to transmission among humans have led national and international health agencies to take actions to both prevent and prepare for the possibility of a pandemic.

Hitherto, while most of the focus has been on the potential impacts of pandemic influenza in humans, little attention has been paid to the economic losses that have already resulted from avian influenza in wild and domestic birds. These include direct financial losses resulting from the death of infected birds and from measures designed to control the spread of the virus. FAO estimates that H5N1 avian influenza has led to the death or destruction of more than 200 million birds worldwide, resulting in over \$20 billion in economic losses.

Growth of Poultry Subsector and the Recent Impediments in India

India is the fifth largest producer of eggs and ninth largest producer of poultry meat in the world, producing over 34 billion eggs and about 600,000 tons of poultry meat in 2004. Over the past decade the poultry industry in India has contributed approximately US \$229million to the gross national product (GNP). Several breakthroughs in poultry science and technology have led to the development of genetically superior breeds capable of higher production, even under adverse climatic conditions.

The other major driving forces behind the growth of poultry over others are raising demand for animal protein, changing consumer behaviour and lifestyle, increased disposable income, emergence of contract farming / poultry integrators, enhanced availability of input services in the country etc. The quick

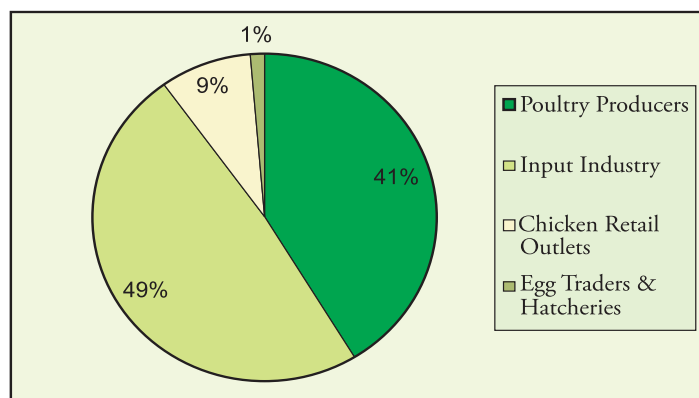
and regular income generating nature of poultry is another major factor contributing to the growth of this sector as a fledging rural agricultural enterprise in several parts of our country. Poultry meat and eggs represent an excellent source of supplementary income and essential nutrients for the poor, particularly for children and women. The economic and potential nutritional losses faced by poor producers due to disease outbreaks can be devastating. They face immediate loss of income and assets from the death of infected poultry and the culling of other birds. Additional income losses occur in the period between an outbreak and re-stocking. Production costs are likely to rise following the introduction of control strategies.

Impact of Avian Influenza

Of late, the outbreak of Avian Influenza in different states of the country in the last few years (Maharashtra in February, 2006; Manipur in July, 2007; West Bengal in January, 2008; and Tripura in April, 2008) has become a major deterrent for the growth of this crucial sector. Various media reports mentioned that Maharashtra, West Bengal and Tripura has culled about 15, 33 and 2 lakh birds, respectively, which threw this occupation into turmoil following the outbreak. A recent study by NCAP in Manipur in July 2007 revealed that about 3.39 lakh birds were culled and 24 tonnes of poultry feed destroyed post-flu, causing a total loss of about Rs. 2455 lakh, which amounts to 14% of total value of livestock outputs and 0.5% of gross state domestic product of Manipur.

The value chain for poultry is a complex one, involving several activities, viz. breeding, feed production, input supply (feed, chicks, medicines), chicken production, collection and trade (of eggs and/or live birds), slaughter, processing, final sale and consumption. Market shocks associated with largely misplaced, but understandable public fears, fuelled in part by the media, regarding safety of poultry products due to avian influenza outbreak used to have a devastating impact on traders. It was found that producers and the input industry borne the brunt of loss due to outbreak, measuring about 41 and 49% of the total loss in Manipur (Fig. 2).

Fig. 2. Distribution of Total Loss on the Poultry Sector due to Avian Flu in Manipur



Consumer responses to outbreak of avian influenza in birds have also been immediate and dramatic, resulting in additional economic losses. These lead to a marked but temporary fall in sales, prices and consumption of poultry products and consequent rise in those of its competitive products both during and after outbreaks (Table 1).

Table 1. Price of Chicken and its Competitive Products in Manipur, August 2007

(Rs. / Kg)

Product	Pre-Flu	Post-Flu	% Change
Dressed Chicken	75	65	-13.33
Fish	65	120	84.62
Pork	80	110	37.50

Source: NCAP Socio-economic Survey

Hence, avian influenza, like other transboundary animal diseases (TADs), will have a wide-ranging impact on the livelihoods of smallholders, regional and international trade, food safety, public health and international travel and tourism. The challenge is to maintain a balance between protecting poultry from the disease and reducing disruption of the livelihoods of people involved in producing, processing and selling poultry.

The probable winners of this kind of outbreak might be veterinary professionals, vaccine producers, pig and fish farmers, traders of other livestock. Further, adding the impact of bird flu on other subsidiary sectors like transport, hoteling, tourism, trade etc. would reveal much bigger loss to the economy. Since most of our poultry producers are smallholders, any kind of effect of such a dangerous infectious disease could leave a lasting impact on the livelihood of the farmers (Table 2).

Table 2. Impact of Avian Flu across the Value Chain of Poultry Sector

Part of the Industry	Losers	Winners
Production	Small Producers; Producers with high investments in fixed assets	Producers, not affected directly by Avian Flu; Other livestock and fish farmers
Supply Industry	Feed industry; Day-old chick suppliers	Veterinary professionals; Vaccine producers
Marketing	Sole traders of poultry meat and egg	Traders of other livestock
Consumers	Urban poor; Rural poor in areas affected by Avian Flu	-

What are the Containment Measures?

After any unusual mortality in poultry is noticed, the farmers are expected to report to the local veterinary authorities, who thereby send the samples to the nearby Regional Disease Diagnostic Laboratory (RDDL) or to High Security Animal Disease Laboratory (HSADL), Bhopal and National Institute of Virology, Pune for testing. Upon tested positive for HPAI, Dept. of Animal Husbandry, Dairying & Fisheries, Ministry of Agriculture, Govt. of India notifies the outbreak of HPAI in that state to the global community through Office International des Epizootis (OIE) (World Organization of Animal Health). It also instructs the affected state to start the necessary actions contained in the Action Plan of Animal Husbandry.

Control and containment operations are required to be undertaken around the infected premise. They comprise culling of birds; disposal of birds and infected materials; quarantine and restrictions of movements in the operational area, clean-up, disinfection and sanitation followed by post-operation surveillance in and around the infected zone. Poultry is culled in a radius of 3–5 km and surveillance is carried out in a further radius of 5–10 km for 90 days as per the protocol laid down by OIE to regain freedom from Avian Influenza. Though this measure is very effective in the regions where cage system of poultry rearing is practiced, the compliance is achieved with much difficulty where backyard farming and deep litter system of rearing is prevalent.

How to Tackle it Better?

Quick diagnosis, culling & compensation: The speed of detection of HPAI is considered to be the major determinant of the extent of subsequent spread. After notification of the outbreak of HPAI and consequent culling operations, it must be ensured that compensation is adequate and timely so as to ensure better compliance for effective control and stamping out of the disease from the affected region. Although it has been suggested that compensation is an incentive for farmers to report disease (World Bank, 2006), field observations suggest that this relationship is weak when livelihoods are at stake or when high value birds such as fighting cocks are involved. This was evident when there were outbreaks in Manipur and West Bengal in mid 2007 and early 2008 respectively. Hence, the compensation rates may appropriately be fixed as per the farming system in different regions / states as there is much variability in terms of resource endowments, entrepreneurship and scale of operation.

Compensating indirect losses: Normally, compensation covers only the direct losses, which include the value of animals and sometimes costs related to the disposal of dead animals and cleaning and disinfection. Here too, the farmers don't get the compensation of total market value of their stock, though

Govt. of India has a fixed rate of compensation for different kinds of poultry. For example, poultry producers in Manipur have lost about Rs. 316 lakh as a result of culling of birds and destruction of materials, while they received only Rs. 99.13 lakh as compensation, which is about 31% of the actual value. The farm-level consequential losses on the entire value chain, due to business interruption, movement control and price effects are not compensated. Similarly, dead animals before culling are also not compensated. Overall, the impact of such disease outbreaks could be much bigger in causing indirect losses to input industries, hatcheries, transport sector, tourism, hoteling etc. Appropriate policies should be formulated such as compensation for them on the basis of their minimum daily turn-over.

Biosecurity: The best way to control HPAI is to prevent exposure by imposing strict biosecurity measures. Mixed poultry farming is widespread across states in our country, especially in the rural areas of eastern and north-eastern region. Segregation of terrestrial and aquatic poultry is not practiced in many small farms, during transport to market and in some live-poultry markets. Of all the types of poultry reared, domestic ducks are those most likely to have contacts with wild birds, given their common habitat in wetlands/paddy fields. Hence, it is likely that control of H5N1 Avian Influenza would be better achieved by the separation of domestic waterfowl from terrestrial chickens, at least in markets and commercial farms, though there is difficulty in achieving this in backyard conditions at the village level.

Cage system of housing: In a commercial flock, field experience suggests that the virus spreads rapidly among birds reared in deep litter system at high stocking rates than in cage system. Observations in Maharashtra outbreak in 2006 confirmed this. Hence, the spread could be controlled if the housing system is changed. Further, uniform age-group policy should be adopted in poultry farm. This is best done by adopting 'all-in-all-out' production system.

Wildlife check-post: Until the emergence of HPAI in Asian region, wild birds were not regarded as a primary source of HPAI viruses. A large number of migratory birds travel to India during the winter season from Siberia and other colder regions of the world. As the winter is more favourable for the spread of HPAI infection, there is a need to be vigilant about the disease in the season. Accordingly, the wildlife management is advised that in case of any eventuality/death of wild birds due to some unknown reasons, the morbid material from such birds may be sent to the HSADL, Bhopal for confirmation.

Vaccination: OIE recommends that in case of an outbreak of HPAI in a densely populated poultry area, vaccination can be one of the options to be adopted as a control policy as vaccines were found to be successful in ducks under laboratory conditions. It is being used for containment of infection in

China, Indonesia and Vietnam and the number of reported cases of disease in poultry and humans has fallen since widespread vaccination was introduced in these countries, though it has not been proved that this improvement was due solely to vaccination (Sims and Narrod, 2008).

Awareness in the general public about the disease and its consequences should be made through print and electronic media based on scientific facts and figures. It must be emphasized that proper cooking at more than 70^o temperature for 30 minutes eliminates the virus and it is absolutely safe to consume properly cooked poultry meat and eggs. It is, of course, necessary to encourage hygienic way of slaughtering, dressing and packing of chicken meat. It is also important that details of negative results reported by the laboratory in respect of the surveillance samples are periodically furnished to the media. The journalists should also be invited to awareness campaigns to report the things in the right perspective. The poultry farmers associations, cooperatives, NECC, APEDA, etc. should be actively involved in this process.

Surveillance programme: Vaccination and/or culling should be followed by strict surveillance programme in the affected or at-risk region. The disease has been reported particularly in neighbouring countries like China, Pakistan, Myanmar, Bangladesh and Afghanistan and hence, our country is highly vulnerable for the entry of avian influenza into our territory. Surveillance mechanism should be strengthened, particularly in border states in order to prevent entry of wild and domestic birds.

Disinfection: Chicken eggs from infected hens can potentially contain virus but, because the clinical course of HPAI in chickens is extremely short, it is unlikely that many infected eggs enter market chains. A theoretical risk remains but there are no reported cases of human disease associated with consumption or handling of eggs. Hence, regular disinfection of egg flats is required whenever they are returned to a farm.

Insurance: To mitigate the impact of such disease outbreaks in future, an appropriate insurance mechanism may be developed for the poultry farming general and backyard farming in

particular. While doing so, not only the flock size, but also the livelihood status of the farmers and the vulnerability of the states bordering with endemic neighbouring countries should be taken into consideration.

In general, policies towards avian influenza in outbreak situations must necessarily involve the rural poor majority, besides all the stakeholders whose interests must also be protected. This is particularly important in sensitive regions like North-Eastern states which are bordering the endemic countries of South and South East Asian nations, failing which there may be added problems of internal security.

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September 2008

B. Ganesh Kumar and K.K. Datta are Senior Scientist and Principal Scientist respectively at National Centre for Agricultural Economics and Policy Research, New Delhi. Thanks are due to PK Joshi, Anjani Kumar, Suresh Pal and P Adhiguru for their valuable inputs and suggestions for improvement of the content and presentation. Usual disclaimer applies.

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