

# **Poultry Sector Rehabilitation Project – Phase I**

## **The Impact of Avian Influenza on Poultry Sector Restructuring and its Socio-economic Effects**

**Prepared for**

**Food and Agriculture Organization of the United Nations**

**By**

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## Preface

A report prepared for the Food and Agriculture Organization of the United Nations by Agrifood Consulting International.

This report<sup>1</sup> is a final report for the the impact of avian influenza on the poultry sector under the Poultry Sector Rehabilitation Project. The report presents a socio-economic impact study on the effects of avian flu on the poultry sector in Vietnam.

The fieldwork for the report was carried out over one month in December 2005. The report involved the analysis of background data, field trips and key informant interviews with people involved in all sectors of the poultry industry.

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The views expressed in this report are those of the consultants and do not necessarily reflect the views of the FAO or the Government of Vietnam.

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# 1 Introduction

## 1.1 Context and Objectives

1. The first emergence of the H5N1 virus in poultry in Vietnam in mid-2003 and subsequent outbreaks in late 2003, 2004 and 2005 have exacted a considerable toll not only upon human health but on the livelihoods of the more than 9 million farm households and many other stakeholders in Vietnam's poultry sector. The aggregate economic cost of the disease and its containment has been significant, while the on-going restructuring of the sector in response to the outbreaks is prompting more changes still. This report was prepared as Phase I of the poultry sector rehabilitation component of the Avian Influenza Emergency Recovery Project (AIERP). The purpose of this component is to provide recommendations on the impact and implementation of proposed policies to improve biosecurity of the poultry sector, in particular activities that will result in restructuring. These recommendations should ensure that the control measures are properly designed and that the restructuring yields long-term economic benefits by taking into account the needs and characteristics of the different poultry sector stakeholders. Phase I was designed to provide background information on the value chains for poultry in Vietnam, the risks presented by AI and its control, and the effects of on-going restructuring. It had five specific objectives:

1. Map the main poultry market chains supplying Hanoi and Ho Chi Minh City in Vietnam;
2. Make a preliminary identification of points and linkages along the chain that may present risks of AI infection to livestock and people;
3. Collect information on proposed control measures;
4. Identify tentatively the socioeconomic impacts of control strategies on livelihoods of producers, traders, processors and retailers; and
5. Provide a draft design for Phase II of the study.

2. Phase II of the study, in turn, will seek to assess more thoroughly the socio-economic impact of the restructuring and small stakeholder responses, and to formulate appropriate policy recommendations to address the animal and health risks identified while taking into account the economic impact on stakeholders.

3. The research focused upon the supply chains for Hanoi and Ho Chi Minh City respectively, as these areas concentrate Vietnam's production of and demand for poultry, and the bulk of losses from AI so far. The selection of both areas provides interesting points of contrast. The North specializes in chicken production while in the South, a large number of ducks are produced. Northern producers rely on local varieties, while their counterparts in the South use mainly improved breeds. Northern producers operate on a very small scale, while production in the South has an industrial focus and exhibits greater vertical integration. The response to AI in the South to date has been far stronger than the response in the North.



4. The study adopts a value chain approach<sup>5</sup> to the study of the poultry sector. The approach permits a focus on the production and marketing chain from inputs through to the consumer, as well as a framework for analyzing the participation of each stakeholder in the value chain and the distribution of the resulting benefits. It further allows the research to capture the changing nature of agricultural markets from a system of market-based transactions to an integrated, agro-food channel where networks of relationships between suppliers, processors and retailers are the key drivers of product distribution and innovation. The development of such value-chains is increasingly shaping agriculture and agribusiness, and can confer distinct advantages in improving the efficiency of the supply channel and the quality of the finished product. However, the ability of the poor to benefit from such relationships merits attention, particularly in the case of poultry where the emergence of a new set of standards arising from the AI epidemic is prompting sector-wide restructuring in the areas studied. The value chain approach is not only a useful framework to assess public and animal health, but also to consider the risks of spreading disease, and the potential for different forms of coordination within the value chain to allay them.

5. The study relies on both primary and secondary data. Primary data collection relied on qualitative research techniques, notably semi-structured interviews. We met a wide range of stakeholders throughout the value chain, including input suppliers (of both feed and chicks), farmers, traders, animal health personnel, and representatives of large companies and supermarkets. We follow FAO's identification of four groups of farmers based on their scale and level of biosecurity: Sector 4 farmers undertake backyard production with minimal biosecurity; Sector 3 farmers undertake semi-commercial production with low biosecurity; Sector 2 farmers undertake commercial production with moderate to high biosecurity; and Sector 1 farmers undertake industrially-integrated production with high biosecurity. By tracing the main value chains for each type of farmer before and after the recent outbreaks, we consider systematically the impact of AI on each. While the study therefore covered a range of production systems, we focused particularly on semi-commercial producers employing minimal bio-security, which stand to lose the most from the on-going restructuring of the poultry sector, owing to their dedication to poultry farming coupled with an inability to comply with new production standards. However, in the South it was necessary to consider producers operating on a larger scale; few semi-commercial farmers remained in poultry farming owing to a more highly-developed value chain and to a stronger response to AI.

6. Because the study is based on qualitative techniques applied in two parts of the country over a short period of time, its findings are meant to be indicative rather than representative. However, we believe they provide useful insights into the effects of AI to date, and a solid framework upon which to base Phase II of this study, which aims to obtain a more fully representative picture of the sector. The principal difficulty encountered in the course of this fieldwork was the reluctance of some stakeholders, particularly but not exclusively small traders/retailers, to speak with team members. Some individuals feared that the researchers were in some way associated with animal inspectors, and were wary of revealing the stakeholders with whom they had dealings. Others – notably supermarket

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<sup>5</sup> Following Kaplinsky and Morris (2000), we define the value chain as “the full range of activities which are required to bring a product in service from conception, through the different phases of production (involving a combination of physical transformation and the input of various producer services), delivery to final consumers, and final disposal after use”. The authors note that analysis of these chains gives careful attention to the various types of integration mechanisms at play, the governance systems at work, and the potential opportunities and threats they present. Our approach to the value chain highlights the actors along the chain, the extent to which each participates, and the distribution of gains among them (FAO 2004, p. 2).

representatives – refused to talk with team members on the basis that AI was too sensitive a subject. Some companies and farmers seeking to maintain bio-secure production were reluctant to let strangers onto their premises. Nonetheless, we were able to speak to a sufficient number of stakeholders to compensate for these gaps. In addition, we did not visit any districts experiencing outbreaks of AI, even though in some cases they were more suitable for study than the districts we visited. Finally, it should be noted that the study was undertaken at a time when the situation was evolving rapidly; at the time of the fieldwork (December 2005), the market had passed through a period of crisis and was undergoing a partial recovery, prompted by widespread publicity encouraging the consumption of “safe” chicken. The situation described here is illustrative of this specific period, and is likely to have changed since the study was conducted.

## 1.2 Summary of Conclusions

7. Our main conclusion is that the AI outbreaks and ensuing regulations have led to a serious dampening of the market throughout the value chain coupled with a shift toward large-scale producers and processors able to supply safe high-quality poultry. One byproduct is the marginalization of semi-commercial and traditional farmers from markets that they could previously access, with spill-over effects on small-scale traders (assemblers and retailers), slaughterers and input suppliers. The financial losses suffered throughout the value chain have been considerable; they have been highest in absolute terms for commercial stakeholders but relatively worse for semi-commercial producers. The points of risk to animal and human health within the value chain pertain overwhelmingly to semi-commercial and traditional farming and marketing systems, and relate to production, transport, slaughter and marketing. The government has implemented an aggressive series of control policies that have been effective in stamping out the disease and increasing public awareness of H5N1 and associated risks. However, regulation aiming to restructure the sector does not take into account the circumstances of many smaller stakeholders, and to the extent it is enforced, may serve to restrict market outlets and change risk management practices. A proposal for Phase II suggests a closer examination of the socio-economic impacts of restructuring – with a particular focus on ‘at risk’ channels in the value chain – to assess the responses of stakeholders economically and in terms of biosecurity.

8. The report is organized as follows. Section 2 will provide a basic profile of Vietnam’s poultry sector while Section 3 summarizes the evolution of AI to date and describes the value chains mapped in the course of this study, Section 4 summarizes the evolution of AI to date and, details the risks to animal and human health found within each value chain. Section 5 explores control strategies that have been implemented and proposed so far. Section 6 provides an analysis of the the socio-economic impact of restructuring, Section 7 provides a very tentative exploration of the coincidence of risk, regulations and stakeholder vulnerability (in terms of value chain sector, position and location). Finally Section **Error! Reference source not found.** outlines a proposed workplan for Phase II of this study. The Appendices provide the TOR for the study (Appendix A), give the full list of informants interviewed in the course of the study (Appendix B), excerpts from our interviews with various stakeholders (Appendix C), a list of the legislation summarized in the main text (Appendix D), and a list of workshop participants (Appendix E).

## 2 Overview of Vietnam's Poultry Sector

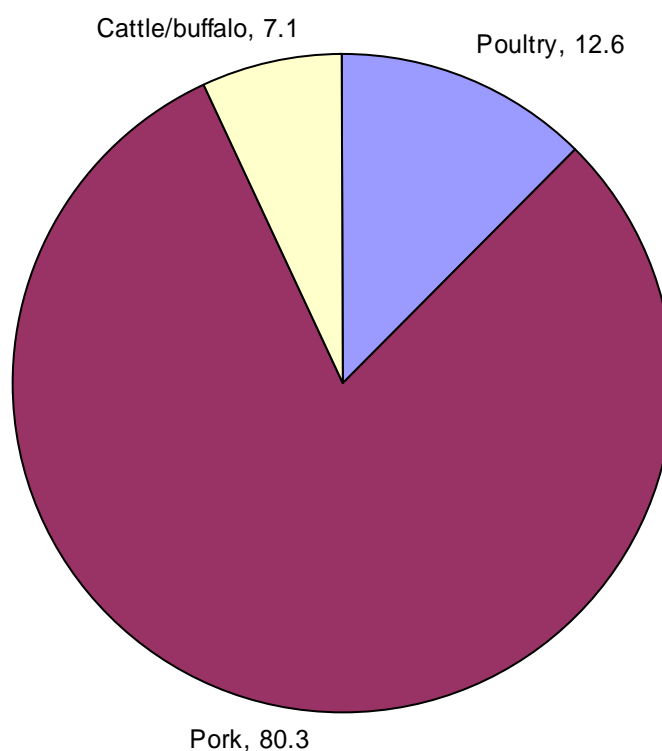
9. Agriculture accounted for 20 percent of Vietnam's GDP in 2004, with livestock accounting for about 22 percent of agricultural GDP. Poultry, in turn, is the country's second most important meat source after pork, accounting for an estimated 13 percent of the total in 2004 (Figure 1) – though it averaged about 16 percent prior to the onset of AI. Of this share, 70 percent is made up of chicken, and the remainder is mostly duck and Muscovy duck.<sup>6</sup> However, poultry plays a more important economic role than this relatively modest share of production would suggest, for at least five reasons:

1. It has grown more than other types of livestock in recent years. In contrast to cattle and pig, poultry stocks climbed between 1990 and 2003 at an average annual rate of about 6 percent (Table 1 and Figure 2), with higher growth in 2000-2003 than in the 1990s. Sharp drops in 2004 and 2005 reflect the impact of AI.
2. Despite registering sharp increases until 2003, increased production had trouble meeting demand until the onset of AI. While consumption per capita of poultry products is still very low (an estimated 3.9 kg/head in 2001), it had been climbing quickly. Poultry consumption doubled between 1990 and 2000 alone (Delquigny et al. 2004, p. 88). High demand among the rich relative to other livestock products suggests strong future growth potential,<sup>7</sup> as does relatively low average demand compared with other Asian countries. For instance, average egg consumption per capita in Vietnam stands at about 50 per year, compared with 320 in China (USDA 2005).
3. The relatively low costs of raising poultry relative to cattle or pigs make it the most popular livestock enterprise in rural households throughout the country, constituting an important source of cash income – particularly for women – and favoring poverty reduction. Among about 12 million farming households, it is estimated that more than 70 percent keep poultry. Poultry is the most important livestock-based income source for the poorest quintile, with the sale of poultry products providing about 7 percent of cash income for these households, according to the VHLSS (2002). Poultry provides a form of savings that can be immediately available, and is a relatively inexpensive protein source.
4. Poultry production is fairly evenly distributed regionally (Table 2),<sup>8</sup> especially compared with pig raising, although the scale and technology used, and consequently productivity, varies widely. Benefits from production accordingly foster geographically-balanced growth.
5. Development of the sector has rested so far upon growth in the poultry stock rather than productivity (as measured by the offtake rate) suggesting considerable potential gains from raising productivity.

<sup>6</sup> Poultry farmed also includes quail, turkey and guinea fowl but these are only present in small numbers.

<sup>7</sup> IFPRI's (1998) survey found that high-income households consumed a per capita average of 10.4 kg per year of chicken, compared with 8.3 kg of pork and 6.9 kg of beef. Low income households, in contrast, consumed an average of just 6.4 kg of chicken annually.

<sup>8</sup> However there is strong intra-regional variation (see Epprecht 2005).



Source: General Statistical Office data.

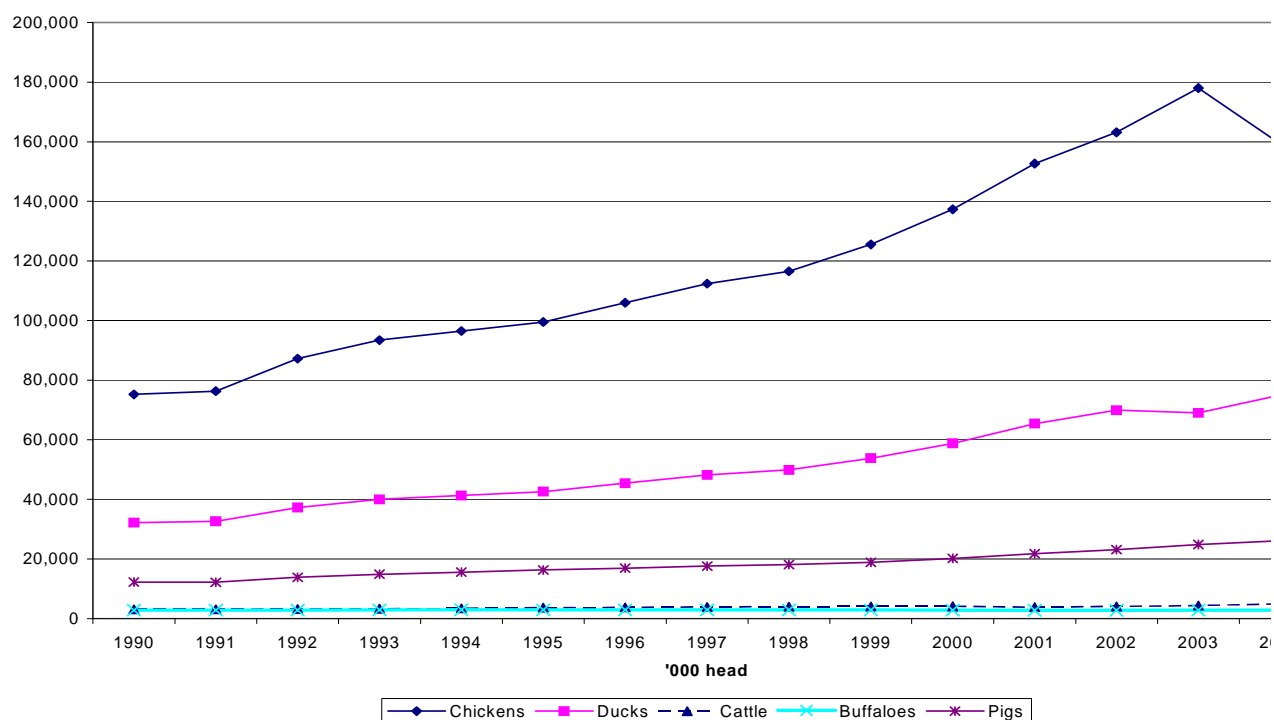
**Figure 1 Contribution of Pork, Poultry and Cattle/Buffalo to Meat Production, 2004**

**Table 1 Livestock Production in Vietnam, 1990-2005**

ITEM	Number of animals ('000 head)	Annual average growth (%)		
		1990-2000	2000-2003	2004
	2004			
Chicken	159,233	5.8	8.3	-11.8
Ducks	75,000	5.8	5.1	8.0
Cattle	4,908	2.8	1.9	10.5
Buffalo	2,870	.1	-.7	1.2
Pigs	26,144	4.8	6.7	4.8

Source: FAOstat data.

10. The highest density of poultry producing farms is found in the Red River Delta (Vinh Phuc, Bac Ninh, Hung Yen, Ha Tay Ha Nam, Nam Dinh and Thai Binh provinces) followed by the Mekong Delta (Map 1). These two delta areas also concentrate semi-industrial and industrial production – notably Hai Duong, Hoa Binh, Ba Ria, Lam Dong, Ha Tay, Binh Dong, Long An and Dong Nai provinces (Delquigny *et al.* 2004, p. 20). Poultry production has become relatively more important in the North than the South in recent years (Figure 3), while production and marketing systems exhibit considerable differences between both areas. Northern production is primarily household-oriented while industrial poultry production is far more prevalent in the South (Figure 4). Small producers – mainly in the North – rely on local varieties, while their semi- and industrial counterparts – mainly in the South – favor improved breeds (Table 3). Local, cross-breeds and exotic breeds exhibit sharp differences with respect to mortality rates, egg production and egg weight (layers), and slaughter weight and age (broilers). However, local breeds are preferred by consumers and can capture up to twice the price of exotic birds.



Source: FAOstat data.

**Figure 2 Number of Livestock in Vietnam ('000 head), 1990-2004**

**Table 2 The Regional Distribution of Poultry and Meat Production, 2004**

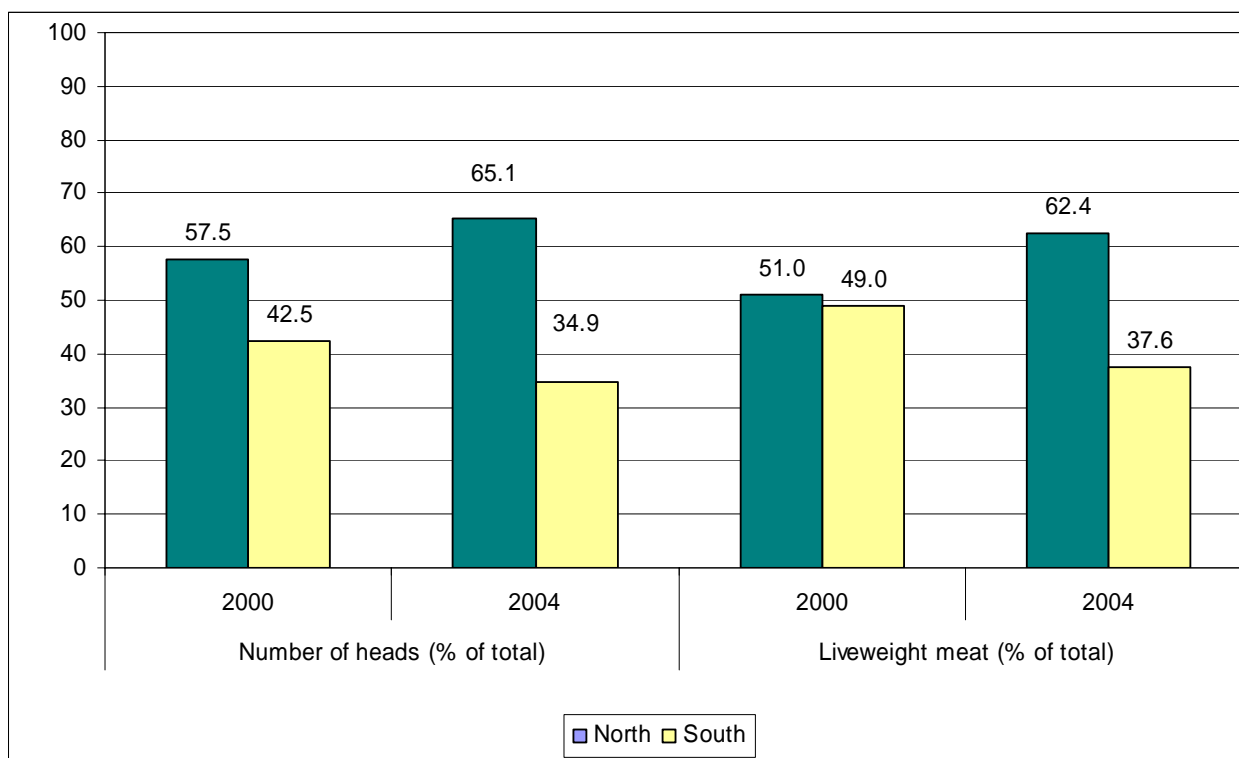
REGION	Number of heads ('000)	%	Liveweight meat ('000 tons)	%
Red River Delta	59,084	27.1	103.7	32.8
North East	39,510	18.1	48.4	15.3
North West	7,875	3.6	6.6	2.1
North Central Coast	35,595	16.3	38.5	12.2
South Central Coast	14,797	6.8	17.6	5.6
Central Highlands	8,682	4	10.6	3.3
South East	17,050	7.8	26.4	8.4
Mekong River Delta	35,561	16.3	64.4	20.4
VIETNAM	218,153	100	316.4	100

Source: Government Statistical Office data.

**Table 3 Percent of Producers Raising Local Varieties of Chicken by Region, 1999**

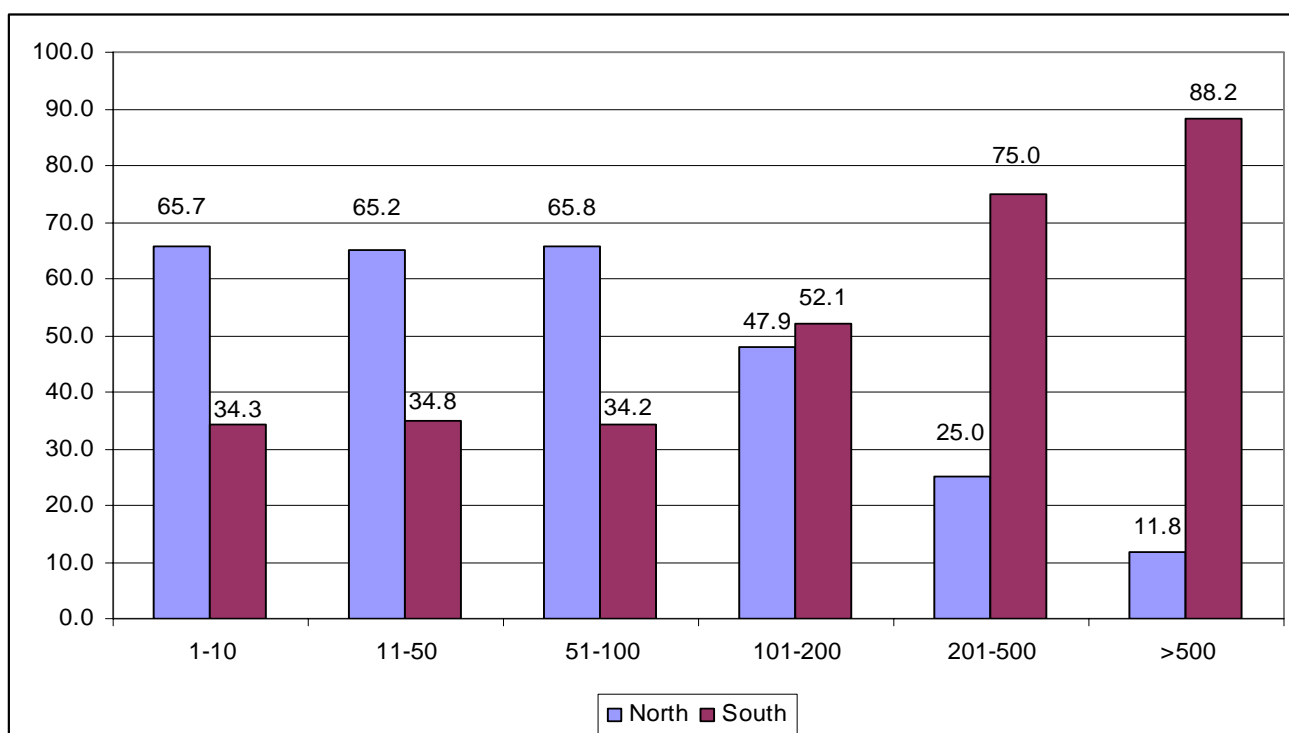
REGION	%
Red River Delta	53.61
North East	77.74
North West	91.95
North Central Coast	72.07
South Central Coast	36.67
Central Highlands	27.03
North East South	11.67
Mekong River Delta	27.27

Source: IFPRI-MARD survey 1999.



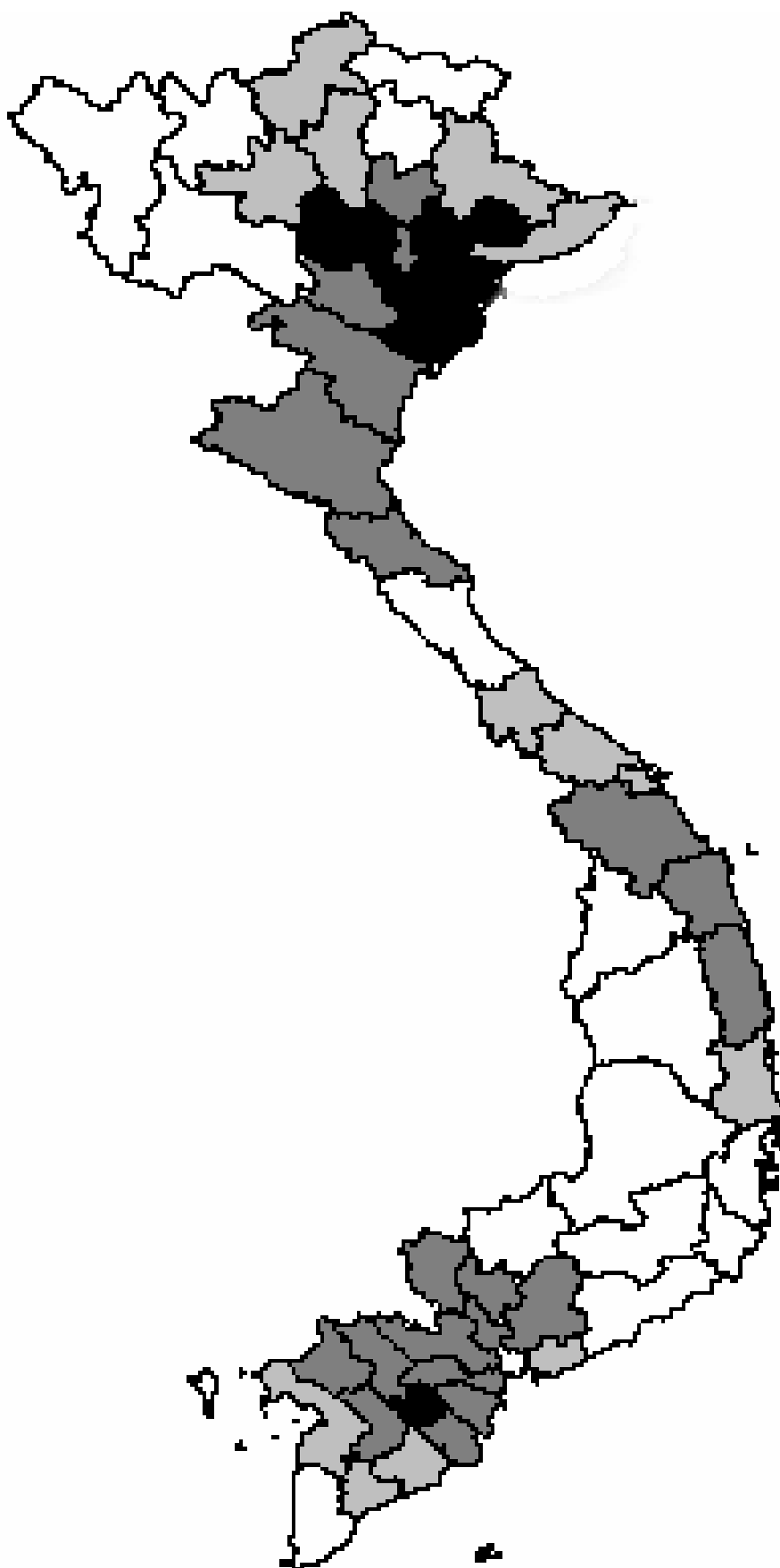
Source: Government Statistical Office.

**Figure 3 Shifts in North-South production, 2000 and 2004**



Source: Background paper for IFPRI (1998) study.

**Figure 4 North South Comparison of Household Farm Size of Chicken Producers, 1997**



White: less than 12 farms / km<sup>2</sup>; Light grey: between 12 and 20 farms / km<sup>2</sup>; Dark grey: between 20 and 50 farms / km<sup>2</sup>; Black: more than 50 farms / km<sup>2</sup>  
Source: Delquigny 2004, p. 19.

**Map 1 Density of Poultry Farms by Province, 2001**

### 3 The Value Chain for Poultry

#### 3.1 Introduction

11. HPAI outbreaks have led not only to a contraction of the poultry market but also to a restructuring of the value chain in favor of industrial forms of production in the areas surrounding Hanoi and HCMC. The fieldwork showed a very depressed market in December 2005, but one that was showing signs of recovery from the severe crisis of the previous two months.<sup>9</sup> At the low point, prices were 50 to 60 percent below normal,<sup>10</sup> and one observer reported that the volume of poultry sales had fallen by half, from about 40 million poultry per month to 20 million.<sup>11</sup> The recovery was characterized by an increase in volumes traded and prices, though volumes remained far below pre-AI levels.<sup>12</sup> However, the gains from increased trade largely accrued to industrial sector farmers employing highly biosecure production to produce “safe” chicken. There was an evident decline in the importance of semi-commercial producers in particular, and backyard farmers; neither group is producing chickens using biosecure methods, nor has the links with large slaughterhouses that producing certified chicken requires. Moreover, the regulations adopted to cope with AI have increased the segregation between the industrial and non-industrial production channels, diminishing the few links that had previously existed. This seems to have hastened a number of tendencies towards modernization underway before AI, fostered by several trends, notably: rising income among the Vietnamese population spurring demand for more processed goods and higher-quality food; the increased presence of large multinational companies employing cost-effective techniques and vertically integrated production; the growth of supermarkets in big cities and their increase in market share;<sup>13</sup> and rising concern over food safety reflected in more stringent production standards.

#### 3.2 The Value Chain and its Components

12. The value chain for poultry is a complex one that involving several activities: breeding, feed production, input supply (feed, breeding chicks, medicines), production, collection and trade (of eggs or live birds), slaughter, processing, final sale and consumption. We first describe the main stakeholders in the value chain, then examine the relationships between them and how they have evolved with the AI outbreaks, and finally assess the overall impact of AI on the distinct channels within the value chain, and their importance relative to one another.

<sup>9</sup> On 8 December 2005, MARD Minister Cao Duc Phat participated with other high-ranking officials in a feast featuring certified chicken in Dong Nai province, where several of Vietnam’s largest chicken farms are located. He announced that it was safe to eat cooked chicken, an announcement that was widely disseminated through television and other media, and prompted an immediate increase in demand for and prices of poultry products.

<sup>10</sup> “Demand for checked poultry, eggs kicks up a notch”, *Thanh Nien*, 12 December, 2005.

<sup>11</sup> Tran Cong Xuan, Chairman of Vietnam Poultry Association, quoted in “Poultry farmers despondent”, *Vietnam News*, December 12, 2005.

<sup>12</sup> Interview with retailer and supermarket representatives, see also “Chicken consumers come back”, *Vietnam News*, December 17, 2005. The general consensus of our informants during the study was that people were still a bit confused as to whether it was safe to eat chicken. Nonetheless, the government campaign to promote certified chicken had a strong positive effect.

<sup>13</sup> The number of supermarkets has increased from zero in 1990 to 55 in Hanoi and 71 in HCMC by 2004/2005 (see Moustier *et al.* 2005, p. 7).



13. Most production involves local varieties of chicken (80 percent of the total) of generally low quality non-renewed stock. The state sector is involved in producing local, cross-breeds and exotic varieties while the industrial sector focuses on exotic breeds. Overall, the state supplies about 15 percent of breeding chicks (down from 38 percent in 1995), while large private companies supply about 80 percent, and smaller Vietnamese companies – mainly in the South – supply the remainder. In theory, the 12 state farms (see Box 1) are supposed to focus on breeding GGP and GP stock (with exotic breeds imported from China and industrialized countries), while the 26 provincial farms breed parent stock, but in practice, because of economic constraints, the roles have become blurred, and the vast majority of public farms only survive owing to the sale of DOCs (Delquigny *et al.*, 2004). The supply of breeding chicks in the government system is in need of renewal: WB (2004) reports a significant deterioration of genetic quality. The production of breeding chicks has fallen sharply with the AI outbreaks, particularly among domestic producers; there is some concern the supply of breeding chicks will not be able to keep up with demand as the poultry market recovers.<sup>14</sup> Breeders of duck eggs in HCMC particularly expressed their worry over the future impact of the ban on hatching duck eggs (Fieldwork).

14. The cost of commercial feed accounts for up to 70 percent of the cost of raising industrial chicken. Vietnam's poultry normally consume an estimated 8-10 mt/year of complete feed, nearly all of which is directed toward semi-commercial and industrial farms (Table 4). The main stakeholders are again foreign companies: CP Group, PROCONCO, Cargill, JAPFA, Fuyomarc'h, Nutriway and Centralys (d'Anlau 2004). Some state companies and small local producers also manufacture feed of a lower quality. In 2004, about 80 Vietnamese manufacturers were listed in the North and several hundred in the South producing on a widely-varying scale ranging from about 30 to 36,000 tons of feed per month (d'Anlau 2004). About 43 percent of feed companies are located in Southeast Vietnam and 26 percent in RRD (USDA 2005, p. 14). The AI outbreaks have had a sharp effect on feed manufacturers, particularly those selling to semi-commercial producers. For instance, An Phu Animal Feed Enterprises, a member of Saigon Agricultural Corporation, reported a drop of 90 percent in feed production while CP Animal Feed Group reported a drop of 60-70 percent.<sup>15</sup> Farmers almost universally reported keeping far less poultry than before the crisis, and feeding their birds the minimum rations necessary to sustain them. This of course weakened the birds, making them more susceptible to disease, and lowering their potential sale price. There were also reports of birds starving for lack of food.

**Table 4 Feed Consumption for Poultry in 1998**

Type of farming system	Concentrate	Commercial
Traditional	90	10
Semi-commercial	30	70
Commercial	n.a.	100

Source: Background paper for IFPRI (1998 study).

<sup>14</sup> "Vietnam poultry farmers struggle in bird flu aftermath", *Thanh Nien News*, February 10, 2006.

<sup>15</sup> "Poultry farmers hit hard by bird flu", *Vietnam Economic Times*, 15 November 2005.

### Box 1 Vietnam's State Breeding Farms

Vietnam's 12 State farms:

1. Tam Dao Chicken Breeding Company (Vinh Phuc)
2. Ba Vi Chicken Breeding Company (Ha Tay)
3. Luong My Chicken Breeding Company (Ha Tay)
4. Chau Thanh Chicken Breeding Company (Nam Dinh)
5. Thuy Phuong Poultry Research Centre (Ha Noi)
6. Dai Xuyen Centre for Duck Breeding and Research
7. Van Phuc Poultry Research Centre (Ha Tay)
8. Hoa Binh Breeding Centre (Hao Binh)
9. Upland Breeding, Research and Development Centre (Thai Nguyen)
10. Central Vietnam Breeding, Research and Development Centre
11. Hai Duong Centre for Duck Breeding

These farms are under the responsibility of MARD, with four managed by the National Institute of Animal Health (NIAH) and 8 managed by the Livestock General Company. The first ten are located in the RRD, while Binh Thang is in the MRD and Hai Duong is in the Central region.

15. The slaughter and processing of poultry is not very industrialized, even among the large foreign companies. As of 2004, there was just one abattoir in the North (NIAH) and one in the South of Vietnam – and little in the way of storage facilities. A small number of large companies had contracts with these slaughterhouses to kill and package poultry for them, or sold live birds to slaughterhouses. However, these large-scale slaughterhouses were generally felt not to be commercially viable because their costs were too high and their meat was not of acceptable quality for export (IFPRI 1998). Until recently, most farmers regardless of scale produced live chicken sold on local markets, with most slaughter taking place at the market, small-scale unregulated slaughterhouses (operating at low levels of technology and hygiene) or consumers' homes. The situation has changed with government directives prohibiting all but licensed slaughter of poultry in urban areas. Hanoi and HCMC currently require poultry meat to be slaughtered in specified abattoirs as part of a closed production system, and then packaged and frozen before being sold either at supermarkets or Company "selling points". Slaughterers at live markets, most of which were affiliated with particular traders, lost their jobs. As of December 2005, HCMC, which responded earlier than Hanoi to the epidemic, had three licensed slaughterhouses that were permitted to continue selling their product within the cities, this down from the more than 50 facilities identified earlier in the year.<sup>16</sup> By 2007, government plans call for the construction of 14 slaughterhouses to meet the city's poultry demand (MARD 2006, p. 52, Table 20b). Hanoi authorities have proposed the construction of ten temporary emergency slaughterhouses in suburban districts, but these have not yet been built. In the longer term, they envisage construction of four factories and three slaughterhouses that would meet 70 percent of local demand.<sup>17</sup> This development is likely to privilege industrial producers able to produce large volumes of birds under biosecure conditions, and with direct access to an approved abattoir.

<sup>16</sup> HCMC had 52 slaughterhouses without proper waste treatment situated in residential areas in October 2005, according to Phan Xuan Thao, Deputy Director of the city's Animal Health Branch ("HCM City prepares to toughen up its anti-bird flu measures", *Vietnam News*, 31 October 2005).

<sup>17</sup> Dao Duy Tam, Deputy Director of Hanoi Department of Agriculture and Rural Development, in "Chicken consumers come back", *Vietnam news*, December 17, 2005. See also MARD (2006) which states that these three slaughterhouses will be built by the end of 2007 (p. 51, Table 20b).

16. A wide array of traders operating at various scales distribute inputs and poultry in Vietnam, including distributors of feed and breeding chicks, assemblers collecting live poultry at farm-gate, and wholesalers and retailers selling both live and processed birds. Most distributors of feed represent large companies, while most other traders operate independently. These traders generally transport their products over short distances by motorbike.<sup>18</sup> The AI epidemic has affected traders (in both urban and rural areas) particularly given the prohibitions on selling live poultry in cities, the general collapse of poultry production/demand and the consequent decline in market sales. Moreover, traders who extended credit to farmers before the epidemic were typically unable to recover these loans. In Hanoi, as of 2003, there were 5 major wholesale markets for poultry, four in Hanoi city and one in Thuongtin District, Ha Tay (Vu Thi Kim Mao 2003):

1. Ha Vi Market, Ha Tay (50 % of total supply)
2. Long Bien (25 % of supply)
3. Remaining 25%:
  - a. Linh Dam
  - b. Back Hoa
  - c. Dich Vong

17. As of December 2005, poultry sales had been banned in all but Ha Vi market, though some traders remained on the premises of the other markets hoping for a relaxation of the ban, and to deter traders of other products from occupying their space. At Long Bien market, traders estimated that about half their colleagues had found work trading other commodities, while the remainder was waiting for poultry sales to resume. Some traders were trying to sell rabbits, production of which was being encouraged by the authorities, but reported they could not sell many, and people preferred chicken still. A visit to Ha Vi market in Ha Tay, previously extremely vibrant, showed very few traders and the almost complete absence of trading activity.<sup>19</sup> In terms of trading too, there has been a shift toward high-value sales outlets. Before AI, HCMC had 134 wholesaler markets selling fresh eggs and 1,300 small shops and 250 markets selling chicken. As of December, following reorganization, the city possessed just 75 wholesale egg markets, 6 poultry “selling points” and one shop selling frozen poultry meat.<sup>20</sup> These markets are of course in addition to supermarkets, many of which stopped selling poultry at the peak of the crisis (October/November), particularly in the North, but as of mid to late December, found themselves unable to keep up with demand. A new sales channel also emerged in December 2005: industrial producers, particularly but not only those located outside provinces with cities they could supply, opened “selling points” to sell their frozen chickens and fresh eggs. The selling points we visited all reported strong sales.

18. Animal health and extension services are also important stakeholders. The animal health system is structured as follows. The Department of Animal Health (under MARD) coordinates national policy, while six Regional Veterinary Centers manage their particular territories. Each province has a sub-Department of Animal Health (PSDAH), and there are more than 600 District Veterinary Services (supervised by the PSDAHs). D’Andlau *et al.* (2004) find that that Vietnam, in contrast to many developing countries, has quite good geographical coverage with respect to animal health professionals. However, there is a

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<sup>18</sup> IFPRI’s 1998 survey of livestock in Vietnam found that 97 percent of poultry breeding stock was purchased from the nearest buyer, and that producers sold 88 percent of poultry to the nearest buyer, with 90 percent of these buyers located in the same district as the producer.

<sup>19</sup> Traders at Havi market were very reluctant to speak to team members about their sales and relationships with producers/buyers.

<sup>20</sup> Interview with Veterinary Inspectors.

lack of specialist knowledge, and their services are not used often, particularly for preventative care/vaccination.<sup>21</sup> Moreover, Delquigny *et al.* (2004) report a lack of coordination between central and provincial levels resulting in difficulty applying national decrees, while the animal health inspectors we met frequently reported a general lack of staff to keep up with inspection needs. The public veterinary workers are supplemented by a network of private paraveterinary practitioners, though there is little public-private coordination. The entrenchment of AI has made all these problems more acute. Extension services are of course prevalent throughout Vietnam, though a VSF (2004) study reported no organization in 30 percent of districts and 70 percent of villages, suggesting a serious lack of capacity. Also state extension services have traditionally not focused on poultry production because for most producers, it is an activity involving little outlay of capital or time.

19. Few groups unite poultry stakeholders. The main industry body is the Vietnam Poultry Association created in 2003 to disseminate technology and knowledge to stakeholders in the poultry sector, and lobby on their behalf. However, it is a membership-based organization requiring fees to join, and concerns itself principally with the interests of large companies and large-scale producers. Accordingly it does not directly represent smallholders nor other small-scale stakeholders. Producer groups include new cooperatives, breeders associations and farmer interest groups, but these exist only on a very small scale.

20. It was not easy to neatly classify farmers in terms of size and biosecurity, given that little existing research links the two factors. The existing literature classifies farm sizes very differently, and mostly without reference to risk management practices (Table 5).<sup>22</sup> The multiplicity of definitions and lack of a clear relationship between size and biosecurity suggests the need for more rigorous consideration of the links between the farm sizes of the amorphous category of semi-commercial farmers, and their risk management and marketing practices, a subject to which we return when outlining plans for Phase II of this study. For our purposes here, in the case of producers, we identified four types loosely corresponding to the FAO categorization (Box 2), which pertains to the scale and biosecurity of production. We begin with the GSO (2004) framework, which considers Sector 4 farmers to produce less than 50 birds per cycle and Sector 3 farmers to produce between 50 and 150 birds, Sector 2 farmers to produce 150 to 2,000 birds per cycle, and Sector 1 farmers to produce more than 2,000 birds. These distinctions have the merit of disaggregating the rather amorphous category of semi-commercial farmers. Such a nuanced view is useful because despite defining the sector differently,<sup>23</sup> most researchers agree it has been the most affected by AI because relatively large numbers of birds are kept with minimal biosecurity. Thus we adopt their definition of Sectors 3 and 4. However, their definitions of Sectors 2 and 1 is too broad to be useful, and conflate many differences between them. From our observation, the difference does not lie so much in the scale of production, with 2,000 birds as the dividing line, but rather in the degree of integration with an industrial producer. Therefore for our purposes, we consider Sector 2 farmers to be farmers that might be linked by contract to industrial producers or might be producing

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<sup>21</sup> IFPRI (1998) found that less than 1 percent of producers asked veterinary services for regular examination of their stock. Delquigny *et al.* (2004) write: “the cost of a visit of a paraveterinarian to treat a few birds is too high in relation to the value of the animals”. Rushton *et al.* (2006) report 145,200 birds per each veterinarian in Vietnam (p. 512).

<sup>22</sup> Note, moreover, these definitions themselves are problematic because they do not distinguish layers and broilers.

<sup>23</sup> For instance, World Bank defines this group as farmers with up to 1,000 birds, while Delquigny *et al.*, consider it to be farmers with 500 to 2,000 birds per flock.

independently, while we consider Sector 1 production to involve fully-integrated industrial production (still in its infancy in Vietnam).

### **3.3 Linkages within the Value Chain**

21. Overall, these farmers can be divided into two main channels, with little overlap between them. The first involves small-scale producers, both traditional backyard farmers who keep very small numbers of birds (Sector 4) and semi-commercial farmers who keep more birds but are not yet specialized poultry raisers (Sector 3). Together these sectors produce perhaps 70 percent of poultry, and can be grouped together because of their relatively small scale, lack of biosecure production methods and narrow range of market outlets with the onset of AI. The second channel involves specialized producers raising larger numbers of poultry under moderately to highly biosecure conditions, either independently on a smaller scale (Sector 2) or on a larger scale and intimately integrated with large companies (Sector 1). Stakeholders in this channel have lost from depressed production in the short term, but restructuring of the sector has bolstered their position in the longer term. Sector 1 and Sector 2 farms together account for about 20 percent of production. For now, we consider each sector separately because the scale of their production has different implications for market integration, the risk of AI, and the effects of AI upon their livelihoods.

#### **Box 2 FAO Categorization of Farmers into Four Sectors**

**Sector 4:** Village or backyard production with minimal bio-security and birds/products consumed locally.

**Sector 3:** Semi-commercial poultry production system with low to minimal bio-security and birds/products usually entering live bird markets (e.g. a caged layer farm with birds in open sheds; a farm with poultry spending time outside the shed; a farm producing chickens and waterfowl).

**Sector 2:** Commercial poultry production system with moderate to high bio-security and birds/products usually marketed commercially (e.g. farms with birds kept indoors continuously; strictly preventing contact with other poultry or wildlife).

**Sector 1:** Industrial integrated system with high level bio-security and birds/products marketed commercially (e.g. farms that are part of an integrated broiler production enterprise with clearly defined and implemented standard operating procedures for bio-security).

Source: FAO

**Table 5 Summary of Main Studies of Poultry and Risk Marketing**

Author	Location	Farm Categories	Risk Management	Main Relevant Findings
Delquigny <i>et al.</i> 2004	Thanh son district, Phu Tho province (Highlands)	Small (unspecified but seems to be under 500 birds per cycle), semiindustrial (1-3 cycles of 500 to 2,000 birds per year) and industrial farms (raising more than 2000 heads/cycle)	They overwhelmingly interview small farmers with an average of about 100 birds (a maximum of about 600 and median of about 70). They do not distinguish practices within group. Identify as risky the frequent movement of inhabitants btw farms & the sale of some sick of apparently healthy birds by farmers (owing to a lack of information or a wish to limit losses).	Barely 1/5 of farms visited bought DOCs, however "the exact origin of the poultry is rarely known to farmers, except when the purchase was made from neighbors or those close to them". Only half of farmers regularly sold their chickens, and sales circuits were relatively short. "Poultry farming in communes operates for the most part in a 'closed circuit'. Most poultry is produced, raised and consumed in the commune. These practices constitute an existing biosecurity barrier. Be this as it may, the few purchases of poultry from unknown origin and sanitary status make it entirely ineffective."
G.X. Tung 2005	Northern Vietnam (Highlands, midlands, lowlands)	Distinguishes semi-subsistence farms who keep less than 50 birds and do not use concentrate feed) and semi-commercial farms (who keep more than 50 birds & buy concentrate feed)	Among semi-subsistence farmers, in 2004, lowland farmers sold 75 % of output, midland farmers sold 60 %, and subsistence farmers under 25 % with implications for spread of AI. In 2004 after AI, share of marketed output of lowland farmers fell while that of other two groups rose - response to differential spread of AI?	Poultry production fell 40 percent with onset of AI. Semicommercial farmers sold about 80 percent of output and subsistence farmers, about 60%, with highest sales in lowlands and lowest sales in highlands. Farm gate sales dominated for subsistence & semi-commercial farmers in Midlands and Highlands, while local market sales prevalent in lowlands, esp. for subsistence farmers.
GSO 2004	In North, Ha Tay, in Central Coast, Thua Thien Hue and in MRD, Tien Giang	Use FAO Categories. Group 1 (FAO Sector 4) are farmers with less than 50 heads and minimal biosecurity; Group 2 (Sector 3) farmers have 51-150 birds and low biosecurity; Group 3 (Sector 2) have 151-2000 birds and minimal biosecurity, Group 4 (Sector 1) have 2000+ birds and high biosecurity.	Group 1 farmers employ risky scavenging techniques. Among Group 2 farmers, 25 percent of birds scavenge freely while in others they have some shelter but biosecurity generally minimal. For Group 3 farms, unclear for chicken farms and low for duck farms given ducks generally scavenge. For Group 4 farms, "despite their size, management is not very advanced: feed and drinking water supply are separated but quite basic; troughs are most commonly in cement, or in wood or bamboo; waste is usually not treated; & incoming birds are not quarantined."	Most DOCs obtained within the district with a small share (35 % of industrial & 15 % of commercial) come from out of the province. Overwhelming share of poultry sales take place at farm gate for all but backyard farmers. Half of backyard farmers sell at farmgate and the other half at the local market. For all but Group 1 producers, the main sales outlet is within the district. Group 1 producers sell about half of their products within the district, maybe 20 percent outside the district and about 30 percent outside the province. Group 3 farmers have been the most affected in absolute terms, have undergone the most drastic restructuring and also sold poultry at a higher rate than other Groups during the epidemic. Compensation has been inadequate.

### 3.4 Sector 4 Producers

22. The most dominant category – in terms of the number of farmers involved and the share of total production – involves traditional or ‘backyard’ (FAO Sector 4) farmers, who keep a small number of birds (on average 10-20, and typically less than 50). More than 70 percent of Vietnamese households and 95 percent of poultry farms fall into this category, though they are concentrated more in the North than South (Figure 4). According to the 2001 census these farms produce about 65 percent of Vietnam’s chicken stock and 60 percent of its duck. Most chicken – 92 percent – are broilers, with the remainder kept for eggs (GSO 2004, 13). These farmers keep local breeds of chicken that generally wander freely. They are fed household leftovers or locally procured inputs (paddy, bran, corn), perhaps supplemented with some industrial feed (GSO 2004, 14), and given little medical attention. The subsector is characterized by low levels of investment and technical performance, the absence of sanitary or technical monitoring, and very long farming cycles. Delquigny *et al.* (2004) point out, “for many farms [in this sector], the ‘presence’ of poultry is noted rather than a real farming activity” (p. 36). One effect of poor diet and free movement is susceptibility to a host of diseases, e.g., Avian pasteurellosis, Duck plague, Picoplasmas, E. coli, Gumboro, Newcastle disease, Salmonella and internal parasites. The mortality rate among normal backyard poultry is at least 50 percent.<sup>24</sup> A low productivity cycle is engendered whereby breeding chicks can be obtained and maintained so cheaply (in terms of time and money) that there is little economic incentive to invest in their wellbeing. If they survive, they provide an immediate source of cash or food, whereas their death represents little economic loss.

23. In this channel, smallholders are what is termed “unlinked”, meaning that poultry sales are derived solely through market-based relationships rather than any formal integrative linkages with other actors in the chain. Three recent surveys of market activity<sup>25</sup> give detail of smallholder marketing links, indicating a spatially-restricted marketing system for these producers. The GSO (2004) found that nearly 60 percent of traditional farmers obtained their DOCs from neighbors and 20 percent from retailers. Overall, 90 percent came from within the district, and the remainder, from other districts in the province. GSO (2004) reports that about half of traditional farmer sales occurred at the farm gate, and half on the local market (with 99 percent of these market sales occurring in the same district and all within the same province). D.X. Tung (2005) reports that among the semi-subsistence farmers<sup>26</sup> he surveyed in Northern Vietnam, 25 percent in the Lowlands and about 80 percent in the Midlands and Highlands sold their product at the farmgate, and that the decision was a function of distance from the market, road quality and the availability of transport.

24. The Tung (2005) study reveals that traditional farming households have varied types and degrees of integration with the market depending on their location. He reports that the majority of semi-subsistence farmers surveyed sold chicken rather than keeping them for home consumption, 68 percent in 2003. However, the geographic location of the farmers emerges as a key determinant of their marketing behavior. Before AI (in 2003), the levels

<sup>24</sup> Estimates range from 40-50 percent (Delquigny 2004, 43), to almost 50 percent (World Bank 2004), to 60-70 percent (Aini 2004).

<sup>25</sup> D.X. Tung (2005) surveyed producers and traders in Northern Vietnam; Delquigny *et al.* (2004) studied 3 communes in Phu Tho province, while GSO (2004) surveyed producers in Ha Tay (RRD), Thua Thien Hue (Central Coast) and Tien Giang (MRD).

<sup>26</sup> Defined here as smallholders with less than 50 birds who did not invest in concentrate feed.

of output that was marketed varied from 9 percent in the Highlands to 55 percent in the Midlands to 99 percent in the Lowlands, with implications for both risk management and AI control strategies. It is also interesting to note the changes that occurred with the emergence of AI in 2004. While overall poultry production dropped on average 40 percent in the areas Tung studied, midland farmers and particularly highland farmers increased their share of marketed output (from 55 to 58 percent, and from 9 to 23 percent, respectively), while lowland farmers reduced their share from 99 to 73 percent. Presumably these patterns are related to the spread of AI, however it would be worthwhile to ascertain this definitively. This finding of a closed system in highland areas is echoed by Delquigny *et al.* (2004) who conclude that in the three mountainous communes of Phu Tho that they study, "generally, the areas where [backyard] farming is practiced operate in a 'closed circuit': importations of day-old chicks and export of animals ready for slaughter represent a small proportion of the birds marketed and consumed" (p. 25).

25. From these surveys and the information gathered during our fieldwork, we can map the value chain for these "traditional" farmers before the AI outbreaks began and as of December, 2005 (Figure 6). Before the AI outbreaks, farmers typically sourced their inputs from the local market, family members or local farmers operating on a larger scale. Their output ended up either consumed by the household, sold at the local market, sold to neighbors at farm-gate, or bought by assemblers, typically at farm-gate. The assemblers sold these birds to consumers or transported them to wholesale markets, either locally or in Hanoi/HCMC. The wholesaler in turn sold the birds to a slaughterhouse, retailer or directly to the consumer. The slaughterhouse sold to the consumer or retailer, and the retailer to the consumer. Slaughter of birds sold live took place either at the market or at the consumers' home. Since the AI outbreaks, households in peri-urban and urban markets can no longer sell chicken, with a potential bearing on income and food security. Also, birds from most other provinces can no longer be transported into the cities for sale; IFPRI's 1998 survey found that one-third of Hanoi's chicken supplies came from outside the province, suggesting the change could be significant. Outside the cities, purchases of inputs have dropped markedly and fewer farmers are selling their output on the markets, owing to a lack of demand. The main sales channels are now neighbors and local markets, though the latter are much reduced in size. However, given that none of these households are specialized poultry producers, they appear to have felt the economic effects of the shock to the markets the least.

### **3.5 Sector 3 Producers**

26. Semi-commercial farms produce about 50 to 150 birds per cycle, usually as a secondary activity alongside rice farming. Arguably these farmers have been affected more by AI given that they are dedicated on a larger scale to poultry farming than traditional farmers, yet typically employ minimal bio-security. They exhibit greater market integration than smaller-scale producers and a wider marketing network, so the epidemic has led to a marked decrease in their market access. There is little information on these farmers. The GSO (2004) survey reports that on about on 25 percent of these farms, birds roamed freely while on the remainder, they were given some form of shelter. Breeding chicks were procured from neighboring farmers in 30 percent of cases, and from retailers in about 60 percent. The majority – perhaps 65 percent – bought their DOC within the district, another 20 percent went to other districts in the province, and the remaining roughly 15 percent sourced their DOC from other provinces. Nearly 80 percent of semi-commercial farmers sold their products to a buyer at farm gate, with about 15 percent selling on local markets and a tiny share selling to companies. Among farmers selling directly on the market, nearly 90 percent went to a market within the district, close to 10



percent went to other districts in the province, and the tiny remainder sold their products outside the province. About one-third of these households accessed formal loans for poultry-related activity.

27. Geography emerges as a somewhat less important determinant of marketing behavior for these farmers than the Sector 4 producers. Tung's (2005), which categorizes semi-commercial farmers in the North as all those producing more than 50 birds, reports that while overall about 80 percent of their poultry was marketed, the share before AI ranged from 60 percent in the highlands to 92 percent in the midlands to 99 percent in the lowlands. However, as before, AI had a differential impact on marketing patterns with lowland farmers and midland farmers reducing their marketed impact to 73 and 83 percent respectively, while highland semi-commercial farmers raised their output nearly 20 percent to 78 percent. Again this shift requires further investigation.

28. Figure 7 outlines the basic value chain for Sector 3 producers before the AI outbreaks and as of December 2005. They reveal a larger range of input supply and marketing channels than Sector 4 farmers. The impact of AI on this value chain has been to dampen demand for poultry while increasing competition for the little demand that remains. Also, while they could previously have supplied supermarkets, this is no longer an option owing to new standards regarding biosecure poultry production. In HCMC, informants reported that most semi-commercial producers – indeed, those with less than about 2,000 birds – has stopped producing poultry as it was too risky. Instead, they had mostly shifted to pig production to take advantage of the higher prices pork was commanding.<sup>27</sup> Semi-commercial farmers were often extended credit in kind by input retailers prior to AI, but these creditors lost substantial amounts of money when farmers were unable to repay their loans; the input suppliers we spoke to overwhelmingly indicated that they would no longer extend credit to their customers in the future.

### **3.6 Sector 2 and 1 Producers**

29. Sector 1 and 2 farmers produce higher volumes of poultry under quite high biosecurity since the AI epidemic with its new requirements for producing certified chicken. As noted above the distinction made here is between production that is independent/contracted vs. fully integrated industrial production. The usual categorization in terms of flock sizes seems fairly arbitrary.<sup>28</sup> Sector 2 farmers exhibit a marked increase in market integration and distance to markets, compared to their smaller scale counterparts, with a majority using industrial feed and buying their DOCs from large companies, state farms or Vietnamese hatcheries, sometimes in other provinces. Figure 8 and Figure 9 depict the value chains for these producers. Before AI, most of these farmers sold their product at farm-gate to assemblers, though some producing on a larger scale sold their birds or particularly eggs under contract to large companies. Contracted farmers have continued to find an outlet for their products though this has often required upgrading production standards further. The market structure for farmers selling on the open market has been restricted owing to depressed demand and the inability to transport birds directly into cities for sale.

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<sup>27</sup> The price per kilo of pork increased from 15,000 VND/kg before the outbreaks to 17,000 VND/kg, and had reached a peak of VND 24,000 in November/December (when poultry sales were at a low). Note that in the GSO (2004) survey, the share of their commercial farmers (raising 150-2,000 birds) also raising pigs climbed from 1 percent to 10 percent with the first wave of H5N1 outbreaks (p. 22).

<sup>28</sup> As noted above, GSO (2004), separates farmers producing 150-500 birds per cycle with those producing more than 500. Delquigny *et al.* (2004) in contrast separate those producing 500-2000, and those producing 2,000 and up.

30. Sector 1 production takes place on a much larger scale, according to high bio-security standards, and featuring a high degree of vertical integration. The largest stakeholders in this category are CP Group (Thailand), which produces 45 million chicks yearly; Cargill (USA), which produces 12 million; and JAPFA (Indonesia), which produces 4 to 5 million (d'Andlau *et al.* 2004, p. 16) (Figure 5). GSO (2002) reports that at least thirty percent of these birds are procured and/or sold outside of provincial borders, while nearly all use industrial feed and avail themselves of veterinary services frequently. Production can take place either onsite or via satellite contract farms that are highly integrated into the companies' production system and closely monitored. In this model, off-site producers are no longer separate entities selling their product for the highest price they can command, but rather tightly linked into the production process of large companies implementing a range of activities from input supply through to the sale of finished, processed poultry. Sector 1 farms are particularly numerous in Ha Tay and Hanoi provinces in the North, and in Lam Dong, Ho Chi Minh, Binh Duong, Dong Nai and Long An provinces in South. To become a satellite farmer for a large company, a farmer must agree to a fairly onerous set of conditions (see Box 3) that include the ability to construct a chicken coop according to prescribed standards, to build an access road to the farm if needed and to reach the levels of productivity dictated by the company. A CP Group contract farmer interviewed, who raised 5,000 birds per cycle, stated that he had borrowed VND 200 mn (USD 12,500) from the Company to make his farm operational, suggesting that becoming a satellite farmer for a large company is out of reach for all but a minority of farmers.

31. The onset of AI depressed production within this sector significantly – it is estimated that food processing companies lost 25 percent of their business on average (or about USD 55 mn<sup>29</sup>– and provoked changes in these companies' procurement. Huyuh Gia Huyuh De Company, in the South, for instance, had been producing 30,000 birds per month on its premises. In January 2005, when production dropped far beneath the plant's capacity, it decided instead to form contracts with 100 contract farmers in outlying provinces, each of which was raising between 2,000 and 20,000 birds per cycle.<sup>30</sup> Phuc Think company in the North, meanwhile, had raised a very small number of birds before AI. After AI came, they could not longer sell their breeding chicks so decided instead to start producing broilers onsite. The company now produces 10,000 broilers a day, while contracting farmers to produce eggs.<sup>31</sup> Over the last two years, large companies have also constructed on-site highly biosecure slaughter facilities to produce certified birds for sale in the cities.

32. Before the AI outbreaks, Sector 1 producers sold most of their products, often under contract, to large retailers or hotels/restaurants, with surplus directed to local wholesale or retail markets. Since the AI outbreaks, most would like to sell packaged meat to supermarkets but this is not yet possible for the majority located outside Hanoi and HCMC, owing to restrictions on the transport of meat between provinces. Those that are able to sell to supermarkets either do so directly or via a distributor (which might offer freezer space). However, in December 2005, many companies began opening "selling points" located in the same provinces as its farms to sell certified processed chicken and eggs, which proved extremely popular with local consumers. These chickens were very expensive compared to the live chicken being sold at markets, revealing a shift towards richer customers: in December, 2005, certified processed (exotic) chicken was selling at VND 25,000 per kilo at a CP Group selling point in Ha Tay while at Ha Vi Market in the

<sup>29</sup> Giao H. (2004), cited in GSO (2004), p.

<sup>30</sup> Interview with Company representative, December 2005.

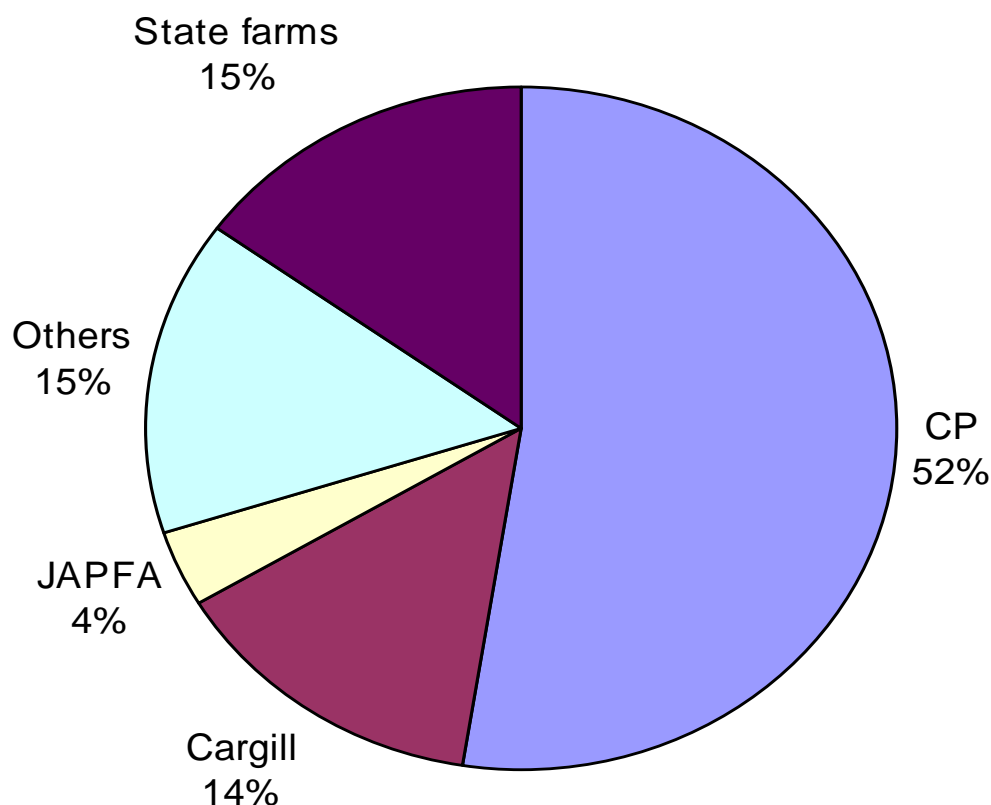
<sup>31</sup> Interview with Company representative, December 2005.

same province, live birds were selling for VND 6,000 per kilo (exotic chicken) and VND 10,000 per kilo (local chicken).

**Box 3 Prerequisites to become Contracted Chicken Producer, CP Group Company**

- Farmers must agree to:
- Comply with state environmental and hygiene standards
  - Construct coop on farm
  - Dedicate family labor to chicken production, except for vaccination and catching;
  - Build good road so that trucks can access the farm year-round
  - Provide chickens with clean water and light
  - Raise chickens, ducks and pigs apart from family residence
  - Reach production efficiency specified by Company
  - Make full payment to purchase inputs
  - Comply with contract

Source: CP Company Contract



Source: Delquigny 2004, p. 32.

**Figure 5 Structure of Industrial Production in Vietnam, 2004**

**3.7 Conclusions**

33. As noted above, while all poultry stakeholders have suffered in the short term from AI and the ensuing collapse in demand for poultry meat and eggs, the longer-term restructuring of the industry underway – especially in and around Hanoi and Ho Chi Minh City – is prompting a divergence in their future prospects. Farmers in Sectors 4 and 3 are likely to continue facing weaker demand in rural areas and an urban market that prohibits their produce. This will affect Sector 3 farmers particularly as they have a much greater

stake in poultry production and typically sell most of their poultry. It also appears to have affected small-scale stakeholders in the lowlands far more than their midland and highland counterparts because far more of their output was marketed prior to the epidemic. Meanwhile commercial producers in Sectors 1 and 2 face better growth prospects as the market for “certified” poultry grows and consumers become more accustomed to processed products. Already there are several signs that this sort of restructuring is occurring. As noted above, the reorganization of HCMC’s chicken and egg production to ensure only safe goods were being sold within the city led to a decline in the number of wholesale egg markets from 134 to 75, while the number of poultry markets fell from 1,550 to 7 (not including supermarkets). Of course the net effect on producers will depend on market volume rather than the number of outlets, but given that these new markets are entrusted with selling certified produce only,<sup>32</sup> this suggests a significant shrinking of the market for non-commercial farmers.

34. While market volumes remain below pre-AI levels, evidence suggests that stakeholders associated with industrial production are capturing higher prices than before, while the other stakeholders still face collapsed demand and prices that are significantly lower than before (Table 6).<sup>33</sup> There is evidence of a shift in the distribution of benefits downstream within each value chain toward slaughterers/companies, and toward the value chains associated with commercial production. In the short term, some companies have benefited relatively from the prohibitions on keeping poultry in the cities (November 2005) and ensuing slaughter of birds. The birds were bought in HCMC, for instance, by two designated slaughter houses – Phu An Sinh and Huynh Gia Huynh De – at below market prices, then slaughtered, frozen and stock-piled to sell when demand picked up during Tet. In the longer term, there are further indications of increasing market concentration, for instance, Phuc Thinh’s 2005 decision to raise broilers, slaughter and process broilers on a very large scale rather than simply sell chicks to local farmers;<sup>34</sup> or Phu An Sinh’s recent expansion of its contract farming network to include new farms in Southern Tay Ninh, Ba Ria-Vau Tau and Long Anh provinces.<sup>35</sup> In Hanoi, the Deputy Director of the Department of Agriculture and Rural Development recently announced plans to build three factories and four slaughter-houses in city limits to meet 70 percent of the city’s future demand for poultry, also signaling market concentration.<sup>36</sup>

35. As many previous studies have shown, there are tremendous challenges associated with smallholder production for high-value markets, even when their produce is not perceived to be associated with a potentially deadly disease. As suppliers to supermarkets for instance, small producers generally face problems arising from requirements for quality goods and large volumes, and supermarkets’ propensity to delay payments to suppliers (the supermarket suppliers we interviewed often received payment between two weeks and four weeks after sending their goods). Moustier *et al.* (2005) observe that “the poor can have profitable access to supermarket driven chains and other quality chains when they are able to supply niche products for which they hold a comparative advantage in terms of labor availability, location in areas which can specialize in certain commodities or

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<sup>32</sup> The certification process operates as follows: birds are examined on farms and certified to be disease free by the local animal health inspector. To maintain the certification, the birds must then be sent to a licensed slaughterhouse. The slaughterhouse should ensure that an animal health inspector be present to inspect the consignment upon its arrival. After being quarantined, slaughtered and packaged, the slaughterhouse must then affix a seal to their products attesting to their certification and then sell them.

<sup>33</sup> Of course some industrial producers may face higher production costs, but it was not possible to assess this systematically during this Phase of the study.

<sup>34</sup> Interview with Company representative..

<sup>35</sup> “Vietnamese poultry farmers struggle in aftermath”, *Thanh Nien News* 10 February, 2006.

<sup>36</sup> “Chicken consumers come back”, *Vietnam news*, December 17, 2005.

production seasons due to specific conditions of climate, soil or savoir-faire” (p. 3). These conditions are not associated with small-scale poultry production. The shift towards commercial forms of production and processing for poultry will also hurt poor consumers who cannot access or afford to shop at high-value outlets like supermarkets. For instance, it is reported that in Hanoi, more than 60 percent of poor households surveyed had never shopped in a supermarket while in HCMC 33 percent did not shop there (Moustier *et al.* 2005, p. 3).

#### Box 4 Impact of AI on Value Chains in HCMC

Before AI, about 200 trucks a day would bring about 40,000 birds into HCMC each day. Now demand has fallen so that just 10,000 to 12,000 birds enter the city each day. Egg demand used to be about 1.5 mn per day and has fallen to 800,000 per day, e.g., by about 50 percent.

After the 2004 outbreaks, the HCMC began to strictly regulate small-scale farming and the number of smallholders raising poultry fell a lot. Farmers raising 500-1,000 birds are considered small in the South. Small farmers were encouraged to change to other types of husbandry such as rabbit or goat, which requires low investment in comparison to other types of livestock. They also promoted cultivation of orchids and safe vegetables. The government provided technical assistance and low-interest loans for poor farmers trying to diversify their production. Large-scale farmers have emptied their farms and are awaiting the new government guidelines.

Before 20 October 2005, 18,000 farm households in HCMC were producing about 700,000 birds, now no poultry at all is being produced. A lot of large scale production (e.g., 10,000 or more birds per farm) for CP Group was taking place, but stopped on October 20. They have forbidden husbandry in HCMC, even the rural districts. They paid compensation of 8,000 per bird, higher than in other areas. This cost the government a total of VND 70 bn (USD \$4.4 mn) in 2004 and VND 55 bn (USD 3.5 mn) in 2005, and in addition, they had to pay other expenses to protect health. On 15 December, the city government issued regulations to stop poultry husbandry until the government produces new guidelines (expected in February 2006).

The only places authorized to sell processed chicken in the city are supermarkets, authorized company selling points and certain restaurants. Before AI, HCMC had 134 egg wholesalers selling fresh eggs, now just 75 markets remain. Similarly 1,300 small shops and 250 markets sold chicken meat before the new regulations; now there are just six Company selling points and one shop selling frozen poultry meat.

The city's GDP fell sharply in 2004/2005 as a result of the shock. People's living standards were reduced, and their consumption patterns changed. There developed an awareness of the need to change the production structure, and in particular, poultry slaughter.

Before AI, the city had 57 slaughterhouses with capacity that ranged from 100-20,000 birds per day. Slaughter was monitored, but mostly carried out by hand, and animal health staff increasingly recognized that the system was not working. On 28 November, the city decided to authorize three industrial slaughterhouses only: An Nhon (12,000 head/day), Huynh Gia Huyuh Da (20,000 head/day) and Phu An Sinh (8,000/day), and dictated that other slaughterhouses only kill other types of livestock.

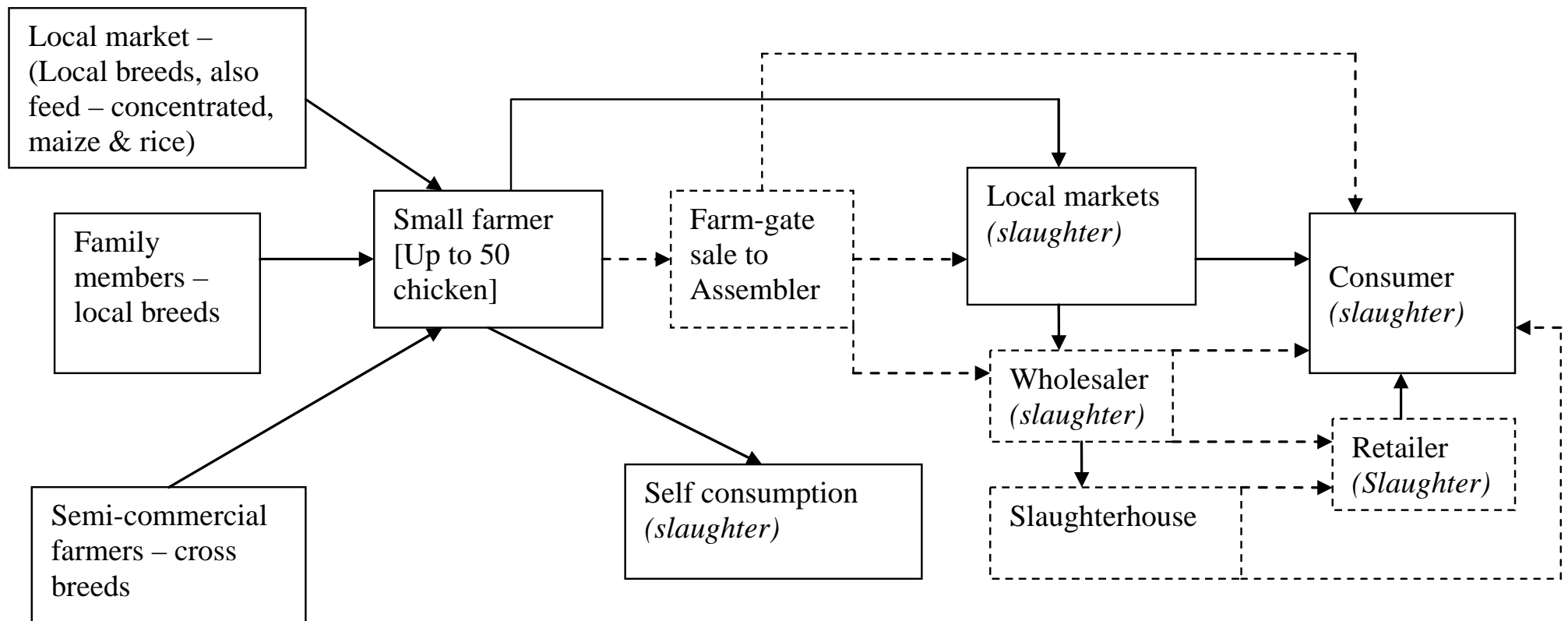
The city now permits movement of livestock through two gates in the East and West of the city. It dictates that poultry must be transported in special trucks and submit their travel plans in advance. All farms supplying chicken to the city's three slaughterhouses must have contracts with them, with each slaughterhouse controlling on-farm production. Huy Gia Huynh Da even provides breeding stock, feed and technical assistance to its duck farmers.

Interview with City Animal Health Officials

**Table 6 Volumes and Prices for Selected Stakeholders, Before AI and December, 2005**

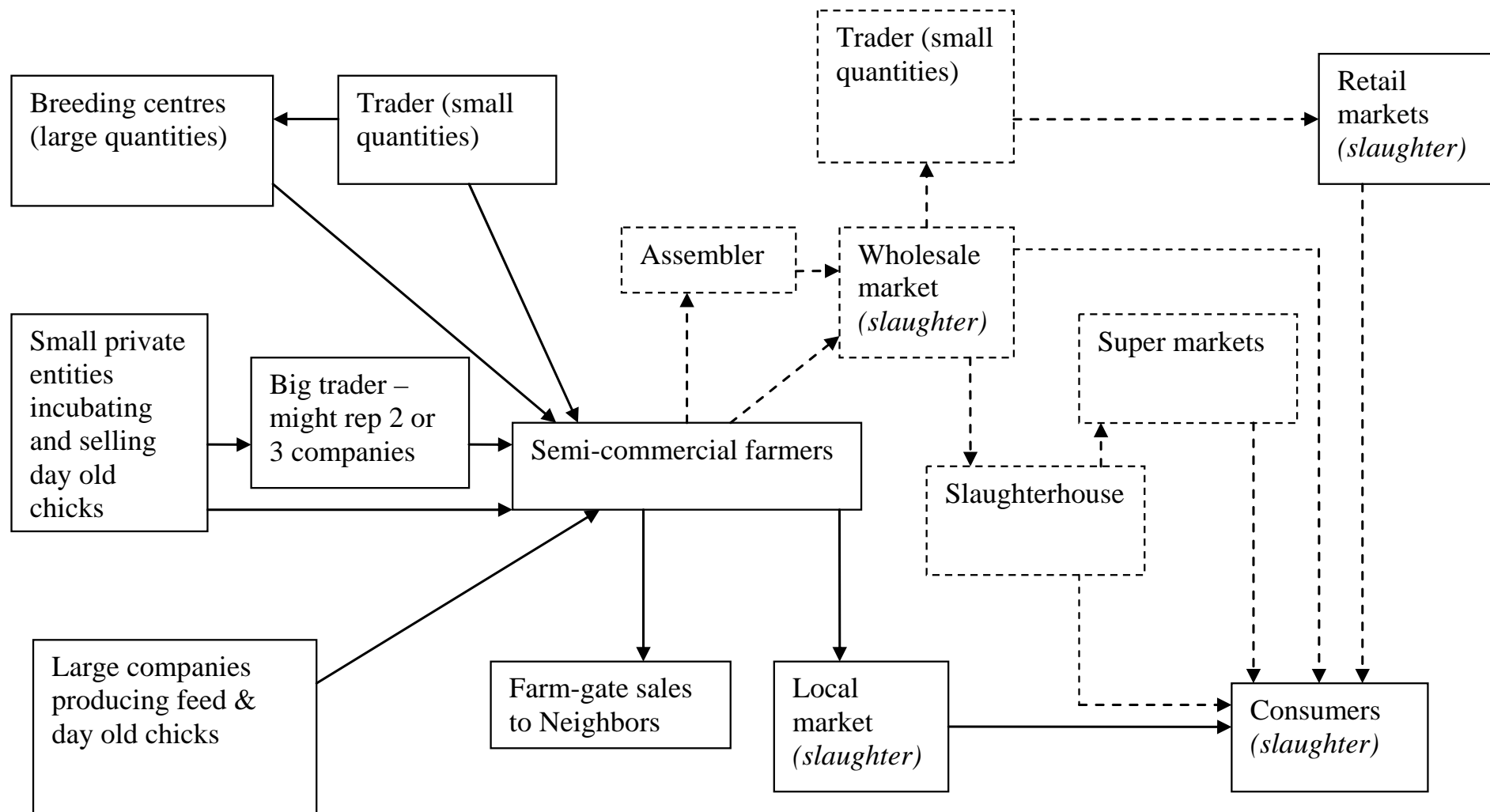
<b>STAKEHOLDER</b>	<b>Before AI</b>	<b>Oct/Nov 2005</b>	<b>Dec-05</b>	<b>Difference, before AI and Dec. 05, (%)</b>
<b>Semi-Commercial Duck Farmer, Ha Tay Province</b>				
Volumes Sold (Ducks Per Cycle)	1000		333	-67
Price Received (Vnd/Kg)	15,000-17,000	6,000-7,000	10,000	-38
<b>Semi-Commercial 'Unlinked' Chicken Farmer, Bac Ninh Province</b>				
Volume Sold (Per Cycle)	n.a. (sold DOCs)		minimal	
Price Received (Vnd/Kg)	10,000	Couldn't sell	5,000	-50
<b>Havi Market, Ha Tay Province</b>				
Local Chicken				
PRICE (VND/Kg)	13,000-14,000	6,000	10,000	-26
Volume	Unknown	Unknown	unknown	
<b>Egg Contract Farmer</b>				
Volume Sold (Eggs)	ALL PRODUCTION	ALL PRODUCTION	ALL PRODUCTION	
Price Received (Vnd/Egg)	1000	550	1000	0
<b>Cp Company Selling Points, Ha Tay Province</b>				
Industrial Chicken	N.A.	N.A.		
Daily Volume			500	
Price			25,000	
<b>Egg Wholesaler, Hcmc</b>				
Daily Sales (Eggs)	500,000	10,000	100,000-150,000	-75
Price (Per Egg)	1,200	300	1,200	0
<b>Coop Supermarket, Ho Chi Minh City</b>				
Chicken Meat	Before AI	Oct/Nov 2005	Dec-05	
Daily Volume (Kg)	500-600	50	300-400	-36
Price - Local (VND/Kg)	26,000	26,000	35,000	+35
Price - Industrial (VND/Kg)	15,000	15,000	18,500	+23
Eggs				
Daily Volume (Eggs)	9,000-10,000	500	9,000-10,000	0
Price Per 10 Eggs	9,000		11,000	+22

Source: Interviews with stakeholders.



Note: Dashed lines indicate activities/linkages in evidence before AI, while the straight lines indicate the value chain as of December 2005.

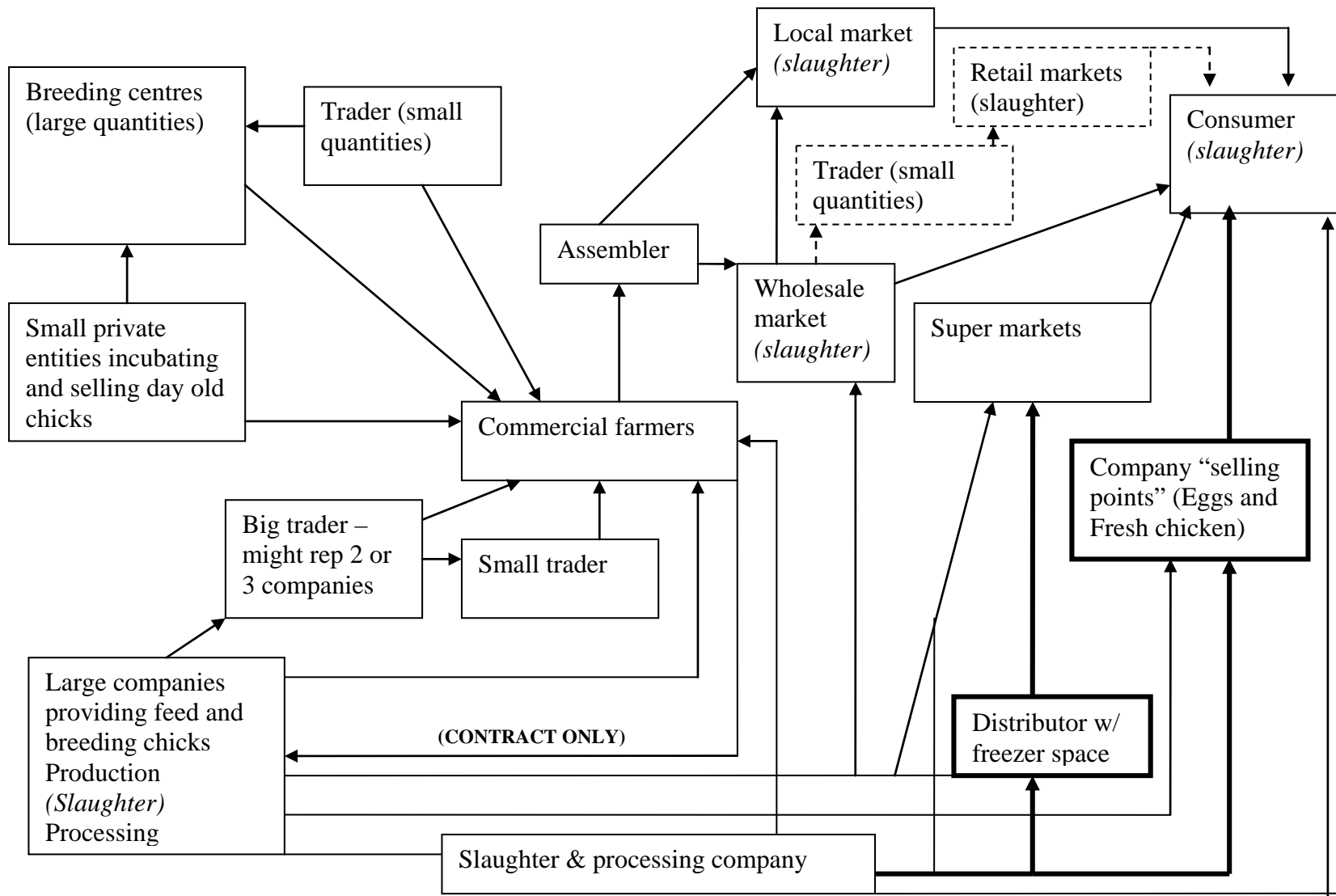
**Figure 6 Value Chain for Sector 4 Producers Before AI and December 2005**



Note: Dashed lines indicate activities/linkages in evidence before AI, while the straight lines indicate the value chain as of December 2005.

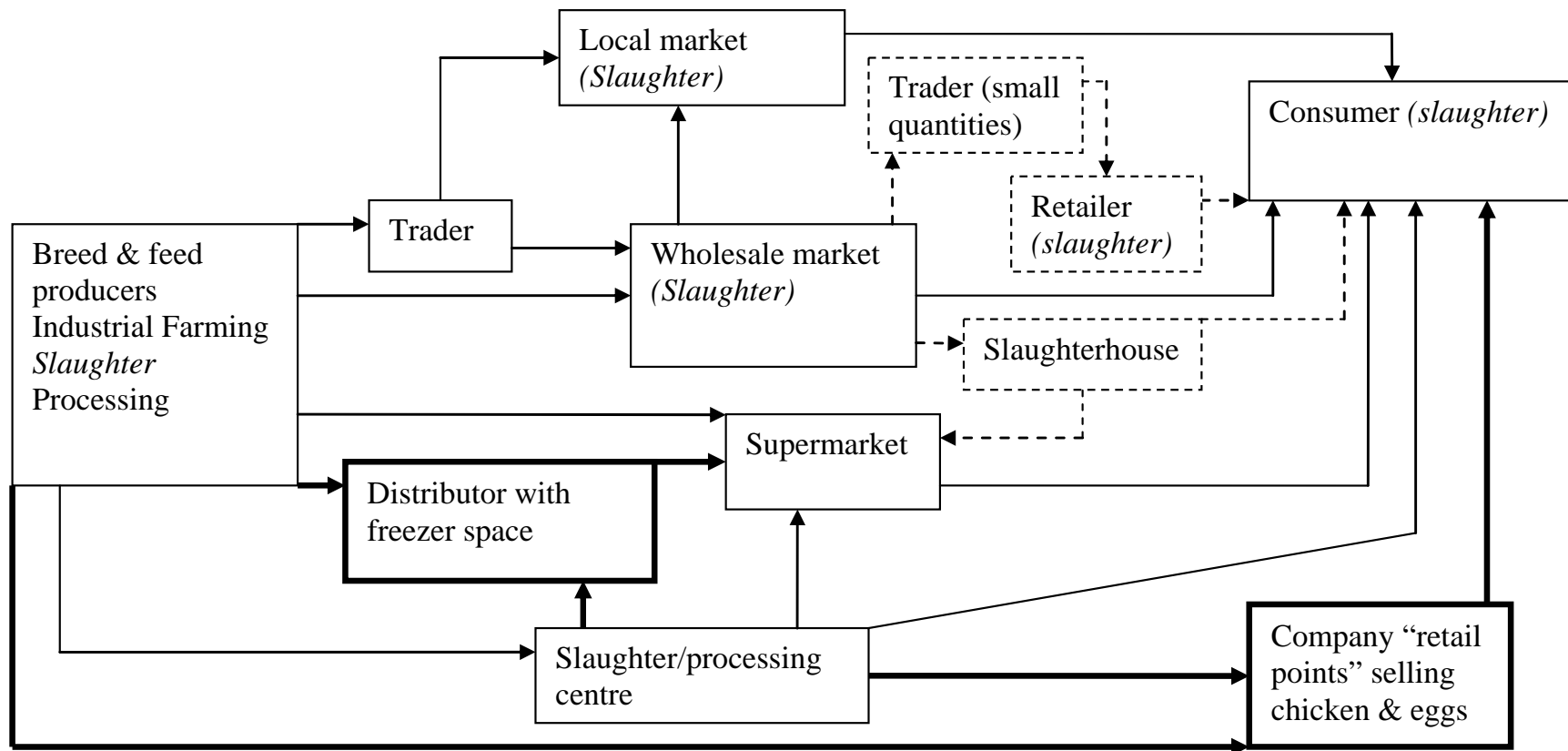
**Figure 7 Value Chain for Sector 3 Producers Before AI and December 2005**





Note: The straight lines indicate the value chain before AI and in December 2005, dashed lines indicate activities/linkages no longer in evidence as of December, while the bold lines indicate new activities/linkages as of December.

**Figure 8 Value Chain for Sector 2 Producers Before AI and December 2005**



Note: The straight lines indicate the value chain before AI and in December 2005, dashed lines indicate activities/linkages no longer in evidence as of December, while the bold lines indicate new activities/linkages as of December.

**Figure 9 Value Chain for Sector 1 Producers Before AI (mostly in HCMC) and December 2005 (HCMC and Hanoi)**

## 4 Risks of AI Infection for Livestock and People

36. This section will present a preliminary identification of the points and linkages along the value chains identified above that may present risks of AI infection to livestock and to people. We begin with some background on the AI outbreaks in Vietnam, which began in 2003, then briefly describe the clinical manifestations of AI in birds and in humans, and the mechanisms by which it is spread. Finally we integrate this information with the value chains mapped in the previous sector, to illustrate the manner in which the various value chains contribute to the spread of AI.

### 4.1 Background on HPAI in Vietnam

37. HPAI has become endemic to Vietnam since the H5N1 virus was first identified in the country in 2003,<sup>37</sup> with outbreaks having occurred each winter since. WHO recently signaled that the outbreaks could take years to end definitively. The spread of HPAI can be categorized into three waves (see WHO 2006). The **first wave** of the disease lasted from December 2003 until March 2004. The virus was initially found on two poultry breeding farms in Vinh Phu and Ha Tay provinces in RRD in June/July 2003, and spread through these two provinces and to Hoa Binh, Hanoi and Bac Ninh. The disease was mostly stamped out quickly, though evidence suggests small outbreaks continued before it emerged on a large scale in December 2003 (Delquiny *et al.* 2004). In December 2003 and January 2004, the disease spread to 57 of Vietnam's 64 provinces, where it prompted the culling of 44 million birds (18 percent of the national flock) and the death of 16 people (World Bank 2004).<sup>38</sup> By February 2003, H5N1 was again contained. The **second wave**, which was mainly confined to the MRD, began in April 2004 and lasted through November, 2004. In this period, the disease emerged in 17 provinces. This time AI resulted in the culling of 84,000 poultry, all of which were clinically affected, and claimed four lives. A **third wave** of the disease began in December 2004 and has lasted through the present. During this outbreak, about 500,000 chicken, 830,000 ducks and 550,000 quails have been slaughtered, and twenty two people have died. In early 2006, the epidemic again waned; as of the end of March, there had been no new outbreaks for three months.

38. Concern has arisen over the fact that the virus appears to be mutating in a way that facilitates its transmission, both within and also between species, and that it is becoming progressively more harmful.<sup>39</sup> As of February 2006, the disease had been reported mostly in migrant wild birds not only in Asia but in Canada, several European countries, the Middle East and Nigeria (WHO 2006). In addition to its direct impact on poultry producers and other stakeholders in the value chain, HPAI poses an increasing threat to human health. To date, it has been confirmed as the cause of death in more than 60 people in Asia since 2003, with the highest number of recorded deaths (42 persons) in Vietnam

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<sup>37</sup> H5N1 was first isolated on a farmed goose in Guandong province, China in 1996, and emerged on a larger scale in Hong Kong in 1997, after which it did not emerge again until 2003 (WHO, 2006).

<sup>38</sup> Note that the number of outbreaks confirmed by laboratory analysis is small, with most reports based on the emergence of HPAI characteristics – however confusion with other disease, notably Newcastle Disease, is possible (Delquiny 2004).

<sup>39</sup> Research in the first half of 2004 found that H5N1 had established “a new ecological niche in poultry”, that it had become more lethal in mammals, and that it could kill wild fowl, long considered an asymptomatic host. In August and September, 2004, researchers reported the disease could be identified in pigs and cats (WHO 2006, p. 2).

(Table 7). Most of these deaths have been attributed to direct contact with live poultry or consumption of undercooked poultry products, though scientists have not ruled out human to human transmission in a very small number of cases (WHO 2006). A bigger threat still is posed by the possibility of the virus mutating in a way that fosters human to human transmission. Research indicates that the viruses which caused the three biggest flu pandemics of the past century (1918, 1957, 1968) were likely derived, at least in part, from avian strains. Particularly in winter, scientists have posited that the coincidence of human and avian influenza could facilitate a genetic exchange between the two types of virus culminating in human to human transmission, with potentially severe consequences for public health. The only existing treatment, Tamiflu, restrains development of the virus in the first 48 hours after infection but is not a cure. Vietnam has insufficient supplies of Tamiflu to deal with a human pandemic, but in late 2005, entered into an agreement with Swiss pharmaceutical company Roche to produce a generic variant of the drug. The country's health infrastructure is acutely ill-equipped to deal with a pandemic, drugs notwithstanding; for instance, it has just one-quarter of the hospital beds that could be needed in the event of a human outbreak.<sup>40</sup>

**Table 7 Cumulative Number of Confirmed Human Cases of Avian Influenza A/(H5N1) Reported to WHO**

Country	2003		2004		2005		2006		Total	
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths
Cambodia	0	0	0	0	4	4	0	0	4	4
China	0	0	0	0	8	5	2	2	10	7
Indonesia	0	0	0	0	17	11	6	5	23	16
Iraq	0	0	0	0	0	0	1	1	1	1
Thailand	0	0	17	12	5	2	0	0	22	14
Turkey	0	0	0	0	0	0	12	4	12	4
Viet Nam	3	3	29	20	61	19	0	0	93	42
Total	3	3	46	32	95	41	21	12	165	88

Source: World Health Organization,

[http://www.who.int/csr/disease/avian\\_influenza/country/cases\\_table\\_2006\\_02\\_06/en/index.html](http://www.who.int/csr/disease/avian_influenza/country/cases_table_2006_02_06/en/index.html)

## 4.2 Origin, Manifestation and Transmission of HPAI

39. Wild birds are the primordial reservoir of AI virus but are typically asymptomatic. In domestic birds, HPAI typically is associated with a range of symptoms that range from asymptomatic infection (usually in ducks) to respiratory disease, drops in egg production and severe systemic disease (Swayne and Halverson 2003, p. 135). Morbidity and mortality in affected birds approaches 100 percent. Infected chickens usually excrete virus for less than 48 hours between infection and death, while ducks can excrete virus for 7 days or more. Virus can last longer in feces and contaminated water, particularly in cold weather, a key reason most AI outbreaks occur in the winter months. In feces, virus can last up to 35 days at 4 degrees centigrade but just 4 days at 25 degrees centigrade. In water, it can persist more than 30 days at zero degrees centigrade and up to four days at 22 degrees centigrade. Incubation typically lasts up to three days for individual birds, and up to fourteen days for a flock.

40. Virus can be excreted from the nares, mouth, conjunctiva and cloaca of infected birds into the environment because of the virus' ability to replicate in respiratory, intestinal, renal and/or reproductive organs (Swayne and Halverson 2003). The disease can be transmitted directly though contact with the contaminated nasal, respiratory or fecal matter

<sup>40</sup> "Health ministry asks for Tamiflu license", *Vietnam News*, 28 October, 2005.

of infected birds. Though the viral load is higher in aerosol, the larger volumes of lower concentration AI virus in feces make fomites a major transmission mechanism (Swane and Halverson 2003, p. 146).<sup>41</sup> Accordingly, within poultry houses, transmission between birds seems to take place by aerosol and ingestion, while between flocks the major transmission vehicle is contaminated poultry manure (*ibid.* p. 151). It is estimated that one gram of chicken manure can contain enough viral particles to infect 1 mn birds with AI (Calnek et al. 1991, p. 10). The disease can be transmitted indirectly though contact with contaminated surfaces (dirt/cages) or materials like water/feed. The areas most affected are paddy lands with dense networks of rivers and canals: 87 percent of HPAI outbreaks occurred in MRD, HCMC, South East and RRD (Rushton *et al.* 2005, p. 505).

41. It is difficult to pinpoint the exact cause of H5N1 in Vietnam. The virus was first identified on large closed poultry breeding farms, leading observers to speculate that it was probably introduced by imported chicks incubating the disease (Delquigny *et al.* 2004). However, as noted above, backyard poultry mortality is extremely high in Vietnam, so industrial producers would be far more likely to notice an exotic disease, to report it to the authorities, and to have the disease confirmed through serological testing. H5N1 might also have emerged through the mutation of a mildly pathogenic AI strain or from migratory birds.

### **4.3 Elements of Risk For AI in and along the Value Chain**

42. Returning to the value chains mapped above, we are now in a position to identify the points and linkages along the various channels that may present risks of AI infection, which are summarized in Table 8 (general risks) and Table 9 (risks posed by stakeholder attempts to circumvent AI control measures). In terms of general risks, we separately examine risks for on-farm infection, practices that pose a risk of infection throughout the value chain, and issues of concern to human health. After presenting this information, we then seek to assess the channels within the value chain that pose the greatest threats to animal and human health, based on the information on biosecurity practices currently available.

### **4.4 Farm Management Practices**

43. We first explore risks relating to farm management practices. The first risk involves the introduction of contaminated breeding chicks and/or feed onto farms, and the practice of using surrogate birds to incubate eggs of different species (Table 8, items 1-3). The introduction of contaminated breeding chicks in particular is a significant mode of transmission. As discussed above, most small farmers obtain breeding chicks from neighbors or distributors in the local area. However, even among farms operating mostly in a spatially closed circuit, such as those studied by Delquigny *et al.* (2004) in Phu Tho, the emergence of AI was traced to the import of infected DOCs: “The introduction of the virus into the village was almost certainly linked to the purchase of chicks by a farmer traveling by motorbike; the chicks came from a farm in Ha Tay province” (p. 24). More generally, they report: “There is a very significant movement of poultry throughout the whole country by distributors who supply producers with day old chicks, and by collectors who buy poultry to sell at market. These movements are mostly carried out by motorbike. Such

<sup>41</sup> For instance, experiments involving air sampling during the 1983-84 outbreak of HPAI H5N2 in the US failed to yield flu virus when samples were taken more than 45 meters downwind of an infected farm (p. 146).

movements of birds appear very difficult to control” (p. 6). Moreover, farmers purchasing DOCs are rarely aware of the sanitary status or exact origin of their poultry, making traceability of infected birds all but impossible (*ibid.*).

44. On the farm, AI can be contracted through contact with the aerosol or feces of infected birds, or contaminated feed/water (Table 8, items 4 and 5). This is a particular risk for the large majority of poultry farms in which small flocks scavenge freely and therefore can contract and spread the disease more readily than poultry contained within dedicated shelters, through exposure to wild birds or infected domestic poultry from other farms. This is a particular risk for ducks that scavenge, which typically wander on open ponds where the risk of contracting the virus from water fowl is high; GSO (2004) points to a particularly dangerous management system in the South where “farmers periodically shift ducks around harvested rice fields with a cycle so wide that it can sometimes cross provincial borders. By doing so, ducks would become affected and then spread the virus into a wide area before returning to their site of origin” (GSO 2004, p. 11). Indeed most of the provinces with high risks of infection are found in MRD, where 70 percent of waterfowl possess the virus (USDA 2005, p. 5). Moreover, some farmers use untreated poultry faeces as fertilizer, posing an additional potential threat (Table 8, item 6).

45. A related risk derives from the mixing of poultry and other livestock, notably pigs (Table 8, item 7). The fear is that pigs may contract the disease from birds, and potentially act as a “mixing vessel” for coinfection by flu viruses for birds and mammals, thereby facilitating the development of a new human influenza virus (Swayne and Halverson 2003, p. 138). About 10 percent of backyard poultry farmers keep pigs, a number that is likely to increase as many bird farmers attempt to diversify their production by keeping pigs alongside chickens. It is recommended that farmers keep their chicken sheds away from other animal shelters, and from human residences, a practice that was not followed by the Sector 3 and 4 farmers we visited.

46. Small-scale farmers – at least until recently – typically did not consider it important to vaccinate their birds or practice preventative health care given the low cost of replacement chicks coupled with the scant economic importance given to poultry (Table 8, item 8). For instance, a 1999 study of Thanh Hoa province reported the vaccination of just 5-10 percent of poultry. Also some farmers have been reluctant to vaccinate their birds because of the mandatory waiting period between vaccination and sale.

#### **4.5 Risks for Spread of Infection throughout the Value Chain**

47. The next point pertains to the need for the adequate containment of poultry, and the cleaning and disinfection of any premises that house them; it applies not only to farms but also to markets, slaughterhouses and transport vehicles (Table 8, items 9 and 10). AI can be spread through any contaminated poultry remains that adhere to any enclosure used for shelter or transport. Generally, shelters that are poorly ventilated, floors that do not permit thorough washing and disinfection, and feeding systems liable to contamination by litter and feces increase the possibility of disease transmission through aerosol and feces (Calnek *et al.* 1991). In our fieldwork among Sector 3 and 4 farms, and in live markets, we found little evidence of feeding systems designed to avoid such contamination. Use of bamboo or wood cages for transport adds an additional risk given they cannot be easily disinfected. The absence of systems to treat water and waste adequately is also problematic (Table 8, item 11).

48. It is highly inadvisable to mix birds of different sources, ages and/or species; the interaction of birds of the same species from different sources/of different ages increases the possibility of spreading infection while introducing different species also raises the possibility of intra-species transmission (Table 8, item 12). For this reason, industrial producers practice “all in-all out” production systems. However, in smaller farms, Delquigny *et al.* (2004) reports significant mixing of birds of different ages and values. Further, GSO (2004) reports that the mixing of poultry species occurs in 16 percent of farms (p. 11). This has the strong economic merit of spreading income and risk, but is dangerous from a health perspective. Assemblers and traders generally mix birds the most, hence the current prohibition on live markets in urban areas. Assemblers usually travel from farm to farm, keeping the produce they collect from several producers in the same cage. Market traders typically mix birds from several sources at the market, keeping unsold birds together until their sale (and possibly taking them to their homes at night).<sup>42</sup> In addition, market traders operate in very close proximity, so disease from any one consignment might be expected to contaminate the others. It has been speculated that one source of disease might be the return of unsold birds from traders to the farms that they came from, but we did not find any evidence of this occurring.<sup>43</sup>

49. Given the significance of fomites in transmitting disease, the movement of contaminated people and/or equipment between farms presents a significant element of risk, of which small-scale farmers did not seem sufficiently aware (Table 8, item 13).<sup>44</sup> AI can be readily transmitted on shoes and clothing, as well as equipment shared in production and/or marketing. In fact, Swayne and Halverson (2003) observe that “people in direct contact with birds or their manure have been the cause of most [influenza] transmission between houses or premises” (p. 151). Given that much of traded Sector 3 and 4 poultry is collected by traders on motorbikes who then place the birds into semi-open cages, there is concern that their feces could fall onto the road and tires, and thereby be transmitted between birds. The intense movement of veterinarians and paraveterinarians between farms may also have heightened the problem. Finally, the disposal in the environment of dead or dying birds raises an additional risk, particularly for farming systems characterized by free-roaming birds, given tendencies toward predation and/or cannibalism (Table 8, item 14).

50. The institutional climate relating to veterinary services, inspection and government implementation of policies to control AI is another area that appears to have permitted the spread of AI. Lack of veterinary capacity – both in terms of adequate staffing and of veterinary knowledge has been frequently cited, both by animal health workers and government officials interviewed in the course of this study, and in earlier reports on the spread of AI (Table 8, item 15). Delquigny *et al.* (2004) observe that veterinarians and paraveterinarians “often have a very superficial knowledge of poultry diseases and their treatment. They are not familiar with simple diagnostic techniques, particularly autopsy techniques” (p. 44). The burden of controlling the disease placed a strain on animal health workers by imposing numerous additional responsibilities. Animal health workers reported considerable difficulties in adequately inspecting poultry from farm to market (Table 8, item 16). A structural absence of coordination between the various animal health stakeholders and producers also emerged as a problem (World Bank 2004). All these factors

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<sup>42</sup> Interview with traders.

<sup>43</sup> Interviews with (former) traders, Ha Noi and HCMC. Traders stated that they instead kept birds till they were sold, and simply did not purchase more in the meantime.

<sup>44</sup> The Sector 3 and 4 farmers we interviewed nearly always took us to see their birds without expressing any reservations about our coming near them. Sector 2 farmers insisted we wear protective overshoes, while Sector 1 farmers did not offer any opportunity to see their flocks.

contributed to delays in diagnosing AI and in receiving laboratory confirmation (in part because the diagnostic laboratories were overwhelmed). World Bank (2004) comments: “The epidemic has highlighted several weaknesses in the animal health services system... The lack of epidemiological resources prevented strategic culling and control measures, with the result that culling was likely to have been higher than required. Operating budgets proved to be inadequate to bear the additional cost of physical and human resources to deal with the outbreak, a compensation policy for affected smallholders was lacking and underfunded, and the communications linkages between the central government and its 64 provinces were very weak”. Lack of coordination between the central government and provinces raises the final institutional point of risk, given that it has resulted in heterogeneous approaches taken to control AI (Table 8, item 17).

51. For human beings, there are presently four points of risk. The first is direct contact with infected birds or areas heavily laden with virus, which has led to the transmission of the virus in a very small number of cases (93 since 2003) (Table 8, item 18). Second, in slaughterhouses there is the possibility of transmission through exposure to infected blood (Table 8, item 19). The third is consumption of poorly cooked or raw infected bird or eggs (Table 8, item 20). Finally, there is very limited evidence of human-human transmission of the virus between family members, but this has yet to be established conclusively (Table 8, item 21).

52. A final set of risks, particularly in the first wave of AI, emerged from poor knowledge of the disease and how it was spread (though this is less prevalent now), and from stakeholders efforts to circumvent the control measures imposed (see Section 5). First, both farmers and traders kept sick poultry and/or undertook reflex sales to limit losses caused by the epidemic (Table 9 item 22). There are numerous stories of farmers and traders selling sick or potentially sick birds on the markets to avoid their slaughter. For instance, Delquigny *et al.* (2004) report that 5 percent of the farmers in their study area sold sick birds once the culling policy was announced (p. 59). Similarly, the GSO (2004) survey finds that despite bans on sales in areas undergoing outbreaks, 8 percent of backyard farmers (<50 birds), 40 percent of semi-commercial farmers (50-150 birds), 13 percent of commercial farmers (151-2,000 birds) and 5 percent of industrial farmers (2,000+ birds) continued to sell their products (p. 41).

53. In part these “reflex sales” may be attributable to the compensation policy, which is generally agreed to have been inadequate; following the 2004 outbreak, farmers were compensated just 10-15 percent of the market value of the poultry, while in June 2005, this level was raised to 50 percent (World Bank 2005, p. 5). Also compensation was only offered in areas where official outbreaks had been declared. Differences in culling and compensation policies between areas undoubtedly provoked the movement of birds across provincial borders to benefit from the more generous policies (Table 9 item 23). In addition, the home slaughter of birds probably increased following market closure (Table 9 item 24).

54. Fieldwork in Hanoi and Ho Chi Minh revealed some “illegal” sales of uncertified poultry products in the markets, while veterinary inspectors in both cities commented on many associated difficulties: the staffing of all the check-points into the cities; the possibility of farmers or traders smuggling small hidden lots of chicken into the city or using certificates from one batch of poultry to bring in another; and the counterfeiting of “certified” seals (though a new seal was developed in 2005 that was felt to be more difficult to copy) (Table 9 items 25 and 26). Informants often commented on the lack of thorough inspection at markets and slaughterhouses, and of veterinary staff at checkpoints. Further,



animal health workers commented on the difficulty of enforcing the ban on poultry production in urban and peri-urban areas in the immediate aftermath of the prohibition, reporting that some households had tried to hide poultry in their homes, though they said that such illicit production was no longer an issue. Efforts to circumvent the control measures have become less common with the general collapse in demand provoked by widespread media and government campaigns against H5N1.

## **4.6 Conclusions**

55. Returning to the value chain, the risks presented in Sectors 1 and 2 (commercial producers) are presently relatively small. Both these sectors specialize in production of poultry, and due to economic imperatives, have maintained or improved further already-high levels of biosecurity. None can afford the risk of their flock being decimated. Indeed, USDA (2005) reports that in the third wave of HPAI, outbreaks mostly occurred on small household farms and no large farms were affected (p. 9). In Sectors 3 and 4, the situation is different. As observed above, for Sector 4 producers, poultry exists in a low-cost, low-productivity cycle; it is not economical to keep a small flock of birds under highly bio-secure conditions. High mortality rates represent little loss, and are moreover, expected, so the primary risks to these producers are that they contract the disease, or that the spread of the disease increases the risk of human-human transmission. Sector 3 farmers also face the dilemma that improving biosecurity might not be cost effective. In Vietnam, the World Bank estimated that the cost of enclosing birds and building a bamboo night shed on a Sector 4 farm could cost USD 50-75 per farm.

56. The report comments that if half of backyard producers did so, the national aggregated cost would be USD 562 mn. It concludes that it is not economically feasible to make such an investment for a small flock. For sector 3 farms, the cost of adding netting and better fencing might cost USD 50-75 for chicken, and about twice that for ducks. But then, the report points out, the birds would need to be provided with feed rather than scavenging, leading to a dramatic increase in costs. It is unclear whether it would be ultimately economically viable for Sector 3 farmers to implement biosecure production techniques, but in any event, such a development would require high levels of investment at a time when lenders are very reluctant to lend to the poultry stakeholders in general, and “unlinked” producers in particular. Moreover, it is unclear that local markets will place a price premium on bio-securely produced chicken that then enters traditional channels for distribution and slaughter.

57. For small producers, accessing “safe” chicken markets would presuppose the development of linkages with slaughterers and processors, as well as put them into direct competition with industrial manufacturers producing more cost-effectively and reaping large economies of scale. For large stakeholders, dealing with small producers would raise a host of transaction costs. Given that semi-commercial producers will no longer be able to raise fairly large numbers of chicken under conditions that have been shown to be extremely risky, the most likely scenario seems to be that these producers will follow the path of those that had previously farmed birds semi-commercially in HCMC and its surroundings, and diversify into other types of production.

**Table 8 Points and Linkages along the Value Chain Presenting Risk of AI Infection**

ITEM no.	RISK FACTOR FOR AI INFECTION	VALUE CHAIN POINT OF LINKAGE	MEANS OF INFECTION
	<b>POULTRY</b>		
(1)	Introduction of contaminated breeding chicks/pullets onto farms	Breeder to Farm	Aerosol, feces (directly or through contamination of feed/water)
(2)	Introduction on contaminated feed onto farms	Feed provider to Farm	Fecal contamination of feed by wild birds
(3)	Use of surrogate birds to incubate eggs of different species	Farm	
(4)	Free-roaming birds	Farm	Aerosol/feces, contamination of feed/water, mixing with wild birds or sick domestic birds
(5)	Keeping ducks over rice fields or fish ponds	Farm	Fecal contamination
(6)	Use of untreated poultry feces as fertilizer or livestock feed	Farm	Fecal contamination
(7)	Contact between wild birds, domestic poultry, and swine	Farm	Contamination either directly (air/feces) or through feed/water
(8)	Lack of vaccination/routine veterinary care	Farm	Increased susceptibility to virus
(9)	Poorly constructed/maintained poultry housing	Farm, Market	Aerosol, feces [E.g., poor ventilation, floors that do not permit thorough washing and disinfection, litter contaminating feed, fecal contamination of feed.]
(10)	Inadequate cleaning and disinfection of poultry houses, transport vehicles, slaughter establishments and wet markets	Farm, Transport, Slaughter Market	
(11)	Lack of appropriate systems to clear waste	Farm, Transport, Slaughter Market	
(12)	Mixing of birds of different ages/species/sources	Farm, Transport, Market	Aerosol, feces (directly or through contamination of feed/water)
(13)	Movement of contaminated people or equipment between farms/slaughter places/markets/feed industries	Farm, Transport, Slaughter Market	Feces [Contamination of shoes/footwear/equipment/vehicles e.g., work crews traveling btw farms for blood testing, beak trimming, vaccination, insemination, sexing, weighing and moving birds]
14	Improper disposal of dead/dying birds	Farm, Slaughter, Market	Blood
15	Inadequate veterinary capacity	Institutional	Delays in diagnosing and responding to infection
16	Difficulties in adequately inspecting birds coming into/leaving farms, or entering markets	Farm to Market	Aerosol, feces
17	Different regulations between provinces	Institutional	Difficult to implement uniform control measures
	<b>HUMANS</b>		
18	Contact with infected birds or areas heavily contaminated by virus.	Farm, slaughter, vaccinators, cullers, veterinarians	Inhalation of virus from birds/air/faeces
19	Slaughter	Slaughter	Aereosol, feces, blood

**Table 8 Points and Linkages along the Value Chain Presenting Risk of AI Infection**

ITEM no.	RISK FACTOR FOR AI INFECTION	VALUE CHAIN POINT OF LINKAGE	MEANS OF INFECTION
20	Consumption of poorly cooked infected bird or egg	Market to Consumer, Self-consumption	Human ingestion of virus
21	Contact with infected family members (v. limited evidence)		Mechanisms unclear

**Table 9 Risk Factors Increased by Stakeholder Responses to AI Control Measures**

ITEM no.	RISK FACTOR FOR AI INFECTION	VALUE CHAIN POINT OF LINKAGE	MEANS OF INFECTION
22	Wish to limit losses, insufficient compensation	Farm, Market, Slaughter, Consumer	Raising, marketing and circulation of sick birds
23	Different compensation and culling policies between provinces		Movement of birds across provinces to benefit from more generous policy
24	Home slaughter as markets close	Slaughter	Aerosol, feces, blood
25	(Illegal) sales of uncertified poultry in urban markets	Farm, Market, Slaughter, Consumer	Aerosol, feces
26	Smuggling of birds into cities	Farm to Market	Aerosol, feces

## 5 Proposed Control Measures

58. The government's strong measures to curtail the latest outbreak of AI have been applauded by the international community. In November, 2005, the Deputy Prime Minister indicated the extent to which the country was willing to go to stamp out bird flu: "No matter what it costs, and even if we have to readjust the growth rate, the entire nation should try to fight the epidemic".<sup>45</sup> As of February 2006, the World Health Organization singled out Vietnam as the first country in the world to successfully contain the disease, noting that "a combination of vaccination, culling and public communication had proved the disease could be halted", even in such a poor country.<sup>46</sup>

59. This section undertakes a preliminary review of the regulations that have been introduced or have been proposed in the poultry sector to reduce the risk of AI (see Appendix D for a list of reviewed legislation). Here we undertake to summarize these regulations in the following manner. First we separate measures aimed at controlling AI in the short-term and those aimed at longer term restructuring. Under control measures, we distinguish immediate measures to deal with outbreaks of AI and measures aimed at preventing a recurrence of the disease. Under restructuring measures, we distinguish policies relating to farming, markets, slaughter and the institutional climate. Finally we give a tentative indication of the regulations that have had the greatest impact on stakeholders, which should serve to inform the design of Phase II of the study. It should be noted that the focus here is on national level regulations and those that pertain to Hanoi and HCMC, and their surroundings.

60. We first describe the institutional structure underlying veterinary services in Vietnam. The government exercises uniform management over veterinary services. The Veterinary Service System is organized hierarchically into five levels through MARD and the Department of Animal Health (DAH) at the ministerial level, to the sub-Departments of Animal Health at the provincial level (SDAH), to the District Veterinary Stations (DVS) at the district level. At the commune level, Animal Health Worker Teams (CAHWT) administer veterinary services. In addition, the People's Committees at all levels manage government policy within their respective localities.

61. MARD is responsible for veterinary services for terrestrial animals nationwide, and for organizing the quarantine of animals/animal products for export and for domestic consumption.

62. The DAH assists the Ministry in controlling and conducting animal quarantine, slaughter control and hygiene inspection of products destined for export and for domestic consumption; and in organizing the cleaning and disinfection of enterprises and transport vehicles involved in livestock-related activity.

63. The DAH structures its activity through its Animal Quarantine and Inspection Division and Regional Veterinary Centres. Provincial SDAHs organize movement control, slaughter and inspection in their respective areas, and are responsible for ensuring Animal Health Regulations (which relate to drugs, vaccine control, inspection and disease control strategies) are implemented in accordance with DAH guidelines.

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<sup>45</sup> "Vietnam increases efforts to control bird flu outbreak", *Washington Post*, 18 November, 2005.

<sup>46</sup> "From the Far East, a lesson in how to beat bird flu", *Independent*, 20 February, 2006.

64. DVS carry out similar functions in their districts, and CAHWT, within their communes. Note that CAHWT are responsible for detecting and reporting the occurrence of any disease within their areas and implementing directives from above regarding vaccination, culling, other disease control strategies, treatment of sick animals and other veterinary services.

### **5.1 Measures Aimed at Controlling AI<sup>47</sup>**

65. To combat HPAI outbreaks, the DAH has set up a National HPAI Control Section, which operates under the National Steering Committee for Avian Influenza Control. The Control Section is an emergency operation unit that implements instructions from the Steering Committee for coordinating all activities relating to the control and eradication of AI, assisting the DAH Director in developing outbreak control policies, and guiding provincial HPAI sections in implementing control policies. The HPAI Control Sections of Provinces and Cities, in turn, are responsible for implementing field activities through the DVS to detect, prevent, control and eradicate HPAI in the relevant provinces/cities following guidelines from the National HPAI Control Section and relevant Provincial Steering Committee for Avian Influenza Control.

66. The government at the national and provincial level has put in place numerous measures to combat HPAI outbreaks. Areas classified as being infected with HPAI are immediately subject to quarantine notification and the application of control and eradication procedures. The Procedures for culling and destruction of infected poultry, and for disinfection and decontamination of infected areas (Decision 3400 QD/BNN-TY, 5 December 2005) specify requirements for cleaning and disinfecting clothes, implements, facilities, vehicles, buildings, carcasses and any other parts of the surrounding environment that come into contact with AI pathogens. In areas with declared outbreaks, the local animal inspectors are expected to promptly contain the infected sites by creating temporary veterinary checking stations to monitor movement, and check and disinfect persons and materials entering or leaving. They are expected to superintend the disinfection of all contaminated areas, the burial or incineration of waste/feces and disinfection of any transport vehicles having been in contact with contaminated areas. They should also distribute protective equipment to persons involved in destruction/disinfection. Dead birds should be either incinerated or buried with quicklime.

67. The general policy is to cull any birds found on an infected site and also all those within a radius of roughly 1 km (although this varies by province).<sup>48</sup> In addition, all farms infected before April 2005 are to be disinfected weekly, and all those infected since April 2005 are to be disinfected twice weekly. Transport of live poultry and unprocessed products is banned within 21 days of the last outbreak day (Circular 69/2005). Article 21 of Decree 33/2005 forbids introducing into or removing from epidemic areas any livestock, livestock products, animal feed, tools used for livestock and animal waste. Exception can be made with permission of the Provincial People's Committee for transport vehicles to pass through epidemic areas on the provision that they do not stop in the epidemic area, use roads specified by the provincial disease prevention authorities, and that they disinfect their vehicle as soon as it leaves the epidemic area.

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<sup>47</sup> This section draws heavily on Albissini and Tung (2006).

<sup>48</sup> A recent VSF study argues it would be more constructive to instead identify farms linked to the outbreak and cull more selectively (d'Andlauer *et al.* 2004, p. 22).

68. Compensation policies have been cited as inadequate (d'Andlau *et al.* 2004, Delquigny *et al.* 2004, World Bank 2005), both in giving farmers an incentive to report suspected AI cases and in helping them cope in the aftermath of outbreaks. While policies need to strike a balance between encouraging reporting of the disease and deterring false reporting, it is widely argued that Vietnam has been overly conservative, which probably slowed control of the outbreaks. Additionally, many delays were experienced in the payment of compensation. Further, each province can apply its own compensation policy, a factor that has encouraged the trafficking of potentially diseased birds across borders to benefit from more relatively more generous policy.

69. During the 2004 outbreak,<sup>49</sup> the government announced it would compensate farmers losing their flock at a rate of VND 5,000 per mature bird, VND 2,000 per bird for other poultry, VND 500 for quail and VND 300 per egg. It also announced payment of VND 1,000 per bird to cover costs of cleaning and environmental protection, and payment of between VND 50,000 and 100,000 per day to finance the clean-up. In 2005, the government responded to the need for higher amounts of compensation,<sup>50</sup> signaling its intention to provide average support of VND 15,000 per bird culled owing to its being infected or present in a compulsory culling area; and support of 10,000 per bird culled at the request of the owner. It further announced it would give VND 3,000 per bird to deal with the costs of culling.

70. Government dictates have also sought to support breeding centers deprived of their stock.<sup>51</sup> In 2004 and again in 2005, the government also announced it would fund the entire feed cost of state breeding centers between December and March of the following year, and the entire cost of diagnosing the virus on private and state farms. To promote recovery, it announced budgetary support for cleaning government facilities needing restocking, and for replacement breeding stock, and low-interest loans to small and large enterprises to help with restocking. The 2005 legislation also announced that poultry producers' loan payments would be suspended for a year, during which time they would be entitled to access additional loans for the purpose of changing their occupations.

71. The government has concurrently enacted legislation aimed at preventing new AI outbreaks. The first controls relate to the hatching of eggs, particularly those of waterfowl. In late November 2005, legislation sought to halt egg incubation, ensure no new flocks were developed and to concentrate on preserving parent breeds. The rules prohibited the hatching of all poultry eggs for at least three months. In February 2006, MARD put in place a directive to allow chicken breeders at large-scale farms to resume egg hatching, but the hatching of ducks and geese was to remain banned through February 2007. Under the same directive, breeders are required to vaccinate all their DOCs before sale.

72. The next set of controls pertain to production. A main element of the strategy to prevent the spread of AI in heavily populated areas was the ban on poultry farming in 15 towns and cities enacted on 26 October 2005. The government further prohibited sales of live poultry in towns and cities, and dictated that all incoming birds be monitored and quarantined at licensed slaughterhouses prior to slaughter and sale. Disease-free industrial poultry raised in the outskirts was to be quarantined and slaughtered in concentrated slaughter areas. In addition, Vietnam initiated a compulsory vaccination

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<sup>49</sup> Official Letter No. 452/BNN-KH, March 2004.

<sup>50</sup> Decision on financial support to Avian Influenza Prevention and Control (No. 309/2005/QD-TTg), 26 November, 2005.

<sup>51</sup> Official Letter No. 452/BNN-KH, March 2004 and Decision on financial support to Avian Influenza Prevention and Control (No. 309/2005/QD-TTg), 26 November, 2005.

campaign, which began on a limited scale in two provinces in July 2005, then expanded between August and December, 2005 to cover 46 provinces. The policy is said to have placed a crucial role in ending the outbreaks.

73. With each outbreak of AI, the national government has sought to prohibit the movement of birds by enacting directives that place a national ban on the movement, collection and sale of poultry between provinces. For movement within provinces, rules apply pertaining to quarantine, transport and inspection. Veterinary Ordinance 2004 and Decree 33/2005 together specify that animals and their products, when being transported in large quantities or volumes out of districts, must be declared by their owners to the competent veterinary agencies, quarantined at the places of departure and inspected. The volumes requiring inspection (as per Decision No. 47/2005) are defined as more than 50 poultry destined for slaughter, more than 100 chicks destined for raising, more than 30 kg or fresh eggs or 500 kg of egg powder. Any farmers or traders transporting less than these quantities is not required to declare their goods. To declare transport, the responsible person must apply to the local authority for inspection between 3 and 30 days in advance, depending on the circumstances, and the inspector should respond promptly to arrange the inspection of the poultry/eggs. The quarantine procedure involves the checking of relevant documents, physical isolation and inspection of birds, and the bestowal of a quarantine certificate if the birds are determined to be disease free. For eggs, the inspector should ensure they come from disease-free areas and are placed in clean containers, and issue a certificate of safety. Finally, the transport and destination of products is subject to inspection. Such inspections should involve ensuring hygienic transport conditions, granting inspection certificates for animal and animal products that meet safety requirements and sealing off transport vehicles/containers containing certified produce.

74. In urban areas, transport of live poultry is only permitted with a disease inspection certificate granted by local veterinary authorities attesting that the birds are healthy and come from disease-free areas. Moreover, the veterinary authority in the arrival area must check the certificates upon arrival of the birds. Transport of poultry products is only permissible if they come from concentrated slaughter and processing establishments that are under surveillance of the veterinary offices; moreover, they must also carry a disease inspection certificate, be slaughtered in establishments that carry veterinary hygiene certificates, be packaged and stored following hygiene requirements; and carry a seal certifying veterinary hygiene.

75. To monitor the circulation of poultry and poultry products among provinces and cities, Circular N.69 provides for the establishment of permanent quarantine operating stations – to be permanently staffed – at the entrance of each province, urban area, district and village. Quarantine stations should include veterinary staff, police and market administrators and have sufficient capacity to implement inspection and disinfection. Moreover, mobile quarantine teams should be set up to control poultry transport that does not pass across fixed quarantine stations.

76. An additional set of regulations (Article 3, Decree 33/2005) applies not to the animals and animal products being transported but rather to the inputs used in raising animals, and the areas in which animals are bred, assembled, transported and sold. These items/areas are subject to the Veterinary Hygiene Standards promulgated in the Veterinary Ordinance 2004. Assembly places (Article 44, Decree 33/2005) should ensure cleanliness sufficient isolation for the animals/products from surrounding buildings and other livestock; suitable space for inspection; a special bridge to the transport vehicle; adequate water and waste

treatment; and clean storage. Transport vehicles should be safe, water-tight, provide adequate animal containers/storage, allow for easy disinfection, and be maintained at an appropriate temperature for the animal/product being transported. Further (Article 11, Decision 3065/QD-BNN-NN, 07/11/05), transport vehicles should prevent the dispersal of any waste materials and be cleaned before and after each transport batch.

77. Finally, Article 51 of Decree 33/2005 stipulates the responsibilities of the owners of birds/poultry products and/or establishments, noting that they are obliged to implement hygienic regulations, facilitate relevant inspections, inform the nearest authority in the event of suspected or actual disease, adhere to the certification procedures and follow transport guidelines.

78. Animal slaughter must be carried out at slaughterhouses or slaughterpoints in receipt of a license granted by a Districts People's Committee.<sup>52</sup> It is illegal to slaughter animals elsewhere or to slaughter animals that could spread disease.<sup>53</sup> Individuals or organizations wishing to operate slaughter establishments should apply to veterinary authorities for hygiene inspection, and inform authorized veterinary services 15 days before the establishment begins operating so they can check hygiene conditions.<sup>54</sup> If hygienic conditions are satisfactory, the veterinary authority will issue a veterinary certificate for the establishment, at which point the local authorities will grant permission for operations to proceed.<sup>55</sup> The SDAH are then responsible for inspecting establishments granted permission to operate.<sup>56</sup> The slaughter of animals must follow protocols and procedures prescribed by MARD, as set out in the Veterinary Hygiene Standards (Vietnamese Veterinary Hygiene Standards and Profession Veterinary Hygiene Standards).<sup>57</sup> Animal slaughter control requires examining compliance with veterinary hygiene standards, checking animal quarantine certificates, ensuring animals to be slaughtered are not diseased, performing ante-mortem examination of animals and post-mortem examination of carcasses to detect illness; identifying and treating any sick animals; and affixing slaughter control stamps.<sup>58</sup>

79. A further set of regulations specify how animals must be classified and controlled before and during the slaughter process.<sup>59</sup> Before slaughter, inspectors must check animal certificates issued at the place of departure to the slaughter establishment and ensure the compliance of people involved in slaughter and equipment/tools/facilities with hygiene

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<sup>52</sup> Per Article 2 of the Regulations on the veterinary hygiene of animal slaughterhouses and slaughter points, issued under Ministerial Decision 99 NN-TY/QD, dated 20 February, 1995.

<sup>53</sup> Per Article 4 of the Regulations, also Article 15 of Decision 3065/QD-BNN-NN, Promulgation of regulations on conditions for poultry production, incubation, transport, slaughter and trade of poultry and poultry products, 07/11/05.

<sup>54</sup> Article 51, Decree 33/2005.

<sup>55</sup> Per Article 4 of the Regulations, issued in conjunction with ministerial Decision 389 NN-TY/QD – 15/4/94 – on the procedures for quarantine, slaughter control and veterinary hygiene inspection of animals and animal products.

<sup>56</sup> Per Article 3 of the Regulations, issued under Ministerial Decision 67/1999/QD/BNN-Ty, dated 20/4/99, on the Veterinary Hygiene requirements and inspection of animal product processing and trading establishments.

<sup>57</sup> Article 31 of Veterinary Ordinance 2004. However, note the latest veterinary hygiene standards for slaughtering establishments, their location and the maintenance of workshops, equipment and tools are provided for in several other pieces of legislation, notably Decree 33/2005, Decision 3065/QD-BNN-NN, Guidelines on Prevention and Control Measures for Avian Influenza in Intensive Poultry Farms, and earlier legislation promulgated to implement the Veterinary Ordinance of 1993. This earlier legislation is still applicable because the set of legislative provisions required to enact hygiene standards in the Veterinary Ordinance of 2004 have not yet been issued.

<sup>58</sup> Article 32 of Veterinary Ordinance 2004.

<sup>59</sup> Articles 40 and 41 of Veterinary Ordinance 2004.



standards. Animals must first be classified as 1) healthy, 2) weak/thin or 3) sick or suspected of being diseased; sick animals must be taken to specialized treatment sections of the slaughterhouse, and weak/thin animals must be slaughtered apart from healthy animals. Animals must be cleaned and re-checked every 12 to 24 hours, depending on the species, if they have not yet been slaughtered.

80. Finally, legislative provisions apply to how slaughterhouses should be constructed and maintained.<sup>60</sup> They should be located apart from residential areas, public buildings, main transport routes and polluted and waterlogged areas. New slaughter establishments should be constructed outside cities/towns. They must be fenced with separate gates for incoming animals and outgoing animal products, and these gates must disinfect what passes through. Internal roads must be made with cement or concrete. The establishments must provide separate dirty and clean sections, waiting pens, an isolated area for sick animals, and areas for treating animal products that do not conform to hygiene standards. They must provide space of testing samples, and treatment systems for waste water and animal waste. Slaughterhouses must provide adequate storage for animal products and for all equipment used in the slaughter process. Equipment and water used must meet veterinary requirements. The establishment and all its contents should be cleaned and disinfected daily. Additional rules pertain to the ceilings, floor, drainage, wall height, windows and lighting, and specify the need for sites for veterinary hygiene inspectors, cleaning and disinfecting transport vehicles.

81. Legislation enacted to control AI puts in additional controls, namely the need for areas within the slaughterhouses to be separated by doors, that the origins of incoming poultry be recorded, that all equipment be cleaned prior to being moved in or out of establishments; that slaughterhouses be 1000 m away from any poultry farms and that slaughter premises located within 3 km of an infected area suspend their operations until the outbreak has been stopped.<sup>61</sup> Legislation promulgated in November 2005 dictates that the planning and reorganization of slaughterhouses must take place in such a way that “concentrated slaughtering is integrated with industrial poultry rearing” following appropriate veterinary and food safety standards. A final set of regulations pertain to slaughterhouse employees, who should be healthy and have regular health checks, possess documents attesting to their health and wear protective clothing that permits easy disinfection. Also protective clothing should be made available to any visitors to slaughtering enterprises.

82. Numerous pieces of legislation pertain to food safety standards in trade. The Ordinance of Food Hygiene and Safety standards dictates that food be processed and sold hygienically. In particular, Article 3 prohibits trade in animals infected with pathogenic agents, any degenerated or contaminated food, any uninspected animals or animal products, any poultry that died of unclear causes or any food contaminated in the course of processing/transport.<sup>62</sup> Further, poultry sold must be healthy, clearly sourced and inspected by the veterinary authority, and the sale of poultry blood curds is forbidden.<sup>63</sup> Article 17 of Decision 3065/QD-BNN-NN forbids trade of live poultry and wild birds in urban areas, while government Resolution No. 15/2005/NQ-CP specifies that only slaughtered birds can be marketed in urban areas, and bans trade in live birds or their slaughter at the market place. Decision 48/2005/QD-BNN prohibits the sale of any animal

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<sup>60</sup> Decree 33/2005 (Article 46) which implements Article 33 of Veterinary Ordinance 2004 and Article 14 of Decision 3065/QD-BNN-NN, also earlier still applicable Veterinary Hygiene Standards.

<sup>61</sup> Guidelines on prevention and control measures for avian influenza in intensive poultry farms.

<sup>62</sup> Similar regulations are specified in Decision No. 41/2005/QD-BYT and Decree 33/2005.

<sup>63</sup> Article 1 of Decision 3065/QD-BNN-NN.

products that do not carry the veterinary hygiene seal. Finally, the AI guidelines dictate that where poultry or poultry products are sold at market, health certificates issued by the authority from the place of origin should be present.<sup>64</sup>

83. Additional rules pertain to the location and structure of market places, dictating that they be clean, far from inhabited areas and public works, and that livestock must be separated from other goods.<sup>65</sup> Further, they specify rules pertaining to adequate water, sewerage systems, waste containment; and the need for well-maintained toilets and hand basins.<sup>66</sup> Food must not be kept on the ground and slaughter areas must be kept separate from selling areas. Selling facilities and animal product containers must be made of not-eroded material and be easy to clean/disinfect, while waste water should be treated before being discharged into the environment.<sup>67</sup> Inspectors are entrusted with ensuring adherence to the laws and standards on food hygiene and safety, handling any violations of the legislation and developing further legislation to maintain food safety.<sup>68</sup>

84. In terms of poultry,<sup>69</sup> live birds and poultry products must be isolated from other commodities and birds must be confined. There must be places for the collection and treatment of waste, and trading areas must be cleaned and disinfected daily. HPAI control measures add that waterfowl and chicken should be kept apart and slaughtered apart, and slaughtered by different individuals.<sup>70</sup> Further, market places selling live birds should be disinfected daily;<sup>71</sup> and poultry products should be placed on a clean surface at least 80 cm above the ground for sale.<sup>72</sup> Finally, the government has sought to raise awareness of HPAI and discourage unsafe consumption practices, notably consumption of improperly cooked poultry (and particularly raw duck blood).

## **5.2 Measures Aimed at Restructuring the Poultry Sector**

85. The government has put together a detailed vision for the future of the sector that seeks to bring about the centralization and industrialization of poultry farming, while reducing the role played by small-scale stakeholders in the value chain. As MARD Minister Phat stated in January 2006: “The country’s farming will need to be restructured into a modern, large-scale industry in terms of farming, slaughter and consumption”.<sup>73</sup> Two recent documents (MARD 2005, 2006) outline government aims and a timetable for these efforts, however little attention is given to the future of small-scale stakeholders apart from the comment that a “large number” of households that had produced poultry on a small scale “shall change to other, more profitable jobs” and brief mention of the jobs that will be created by large-scale slaughtering and processing enterprises (MARD 2006, p. 27) The overall goal of the government is to move toward a modern system such that by 2015, “industrialized and semi-industrialized poultry farming shall account for 80 percent [of production]; scattered small-scale households [shall account for] only 20 percent” (*ibid.*, p. 26). Free pasturage of ducks in rice fields is to be abolished.

<sup>64</sup> Article 3 of the Guidelines on Prevention and Control Measures against HPAI.

<sup>65</sup> Ordinance of Food Hygiene and Safety (Articles 9 and 12) and Decree 33/2005.

<sup>66</sup> Article 23 of Decision No. 41/2005/QD-BYT

<sup>67</sup> Article 47 of Decree 33/2005.

<sup>68</sup> Articles 45 and 46 of the Ordinance on Food Hygiene and Safety.

<sup>69</sup> Decision 3065/QD-BNN-BNN.

<sup>70</sup> Guidelines on Prevention and Control Measures against HPAI.

<sup>71</sup> Article 10 of Circular No. 69/2005.

<sup>72</sup> Article 4 of Circular No. 69/2005.

<sup>73</sup> “No panic measures in bird flu fight: Vietnam”, *Thanh Nien news*, 2 January 2006.

86. In terms of breeding and farming, the government envisions the planning of breeding farms and large-scale centralized poultry farming areas (MARD 2006, p. 12). The government intends to make investments to improve domestic breeds, to facilitate the import of exotic breeds and to promote the production of high quality and productive cross-breeds that are suited to Vietnam's ecological conditions.

87. Vietnam is including the concept of poultry production zones in its restructuring plans. It intends for poultry production to be conducted in certain specified areas to capitalize on economies of scale and more easily ensure biosecure production. By 2006, each district and commune is expected to put aside land, if available, for centralized poultry farming that is located far from residential quarters, public buildings, markets and main roads and where hygienic conditions can be ensured. Farms with more than 500 birds should be located in these areas. Those households continuing to farm small flocks will no longer be permitted to allow their flocks to wander freely, but rather must provide cages surrounded by fences or walls for isolation purposes. Farmers practicing a duck management system that allows free roaming in rice fields shall have to shift to a system based on dry farming. Finally, poultry husbandry in towns and cities will be abolished. Large-scale industrial farming is to be given priority in the Southeast Provinces, Red River Delta, the South Central Coast and the Northeast and Northwest. Controlled waterfowl farming on a planned basis is to be developed in MRD and RRD, and in coastal districts of the North Central and South Central provinces. Big poultry farming enterprises are to be encouraged to develop complete production systems that include breeding, commercial raising and centralized slaughter/processing of poultry.

88. Government plans also aim to restructure the institutional environment relating to poultry farming, in particular the veterinary and animal extension systems. In terms of veterinary reform, the government stresses the following needs:

1. To closely monitor AI;
2. Enhance the monitoring of farms to ensure hygiene and quarantine of products, and to track their circulation;
3. Improve the rate of vaccination to 80-85 percent of the national poultry flock;
4. Maintain and reinforce quarantine stations;
5. Develop domestic influenza vaccines and import them from abroad as needed; and
6. Reinforce local veterinary services by encouraging the private sector, and further developing epidemiological monitoring capacity and information exchange between local farms and veterinary organizations and those at the centre.

89. For animal extension, the government plans to expand and improve the quality of technical training given to poultry farmers, particularly in terms of disease prevention.

90. A further set of plans relate to the cages and feed to be used in bird raising. The government intends to promote the design of cages with "cooling, automatic feeding and watering systems, according to the 'all in all out' process" (MARD 2006, p. 17). Given that feed use will increase under this system, policy further aims to shift some areas of rice cultivation to maize and bean, encourage the construction of feed processing plants mainly in the MRD and RRD to coincide with location of large industrial farms, to increase the capacity of feed plants, to reduce the import duties on the raw materials for feed processing and to increase the quality of manufactured feed.

91. In terms of slaughter and marketing, the government's plans are equally ambitious. It intends to "put an end to slaughter...inside the towns and cities or in temporary bazaars

that cannot meet hygienic conditions” (MARD 2006, p. 18). Rather slaughter is to take place only in approved locales, under regulations that ensure the slaughter of healthy and quarantined birds, and the appropriate waste treatment. Localities and especially cities are urged to “develop immediately...and adopt incentive policies (such as favorable loans) toward the establishment of some centralized slaughtering units” (*ibid.*). By 2015, the government plans envisage construction of 170 processing and processing units with a capacity of 600 mn fowl per year. The marketing system plans are designed to complement a system based on industrial raising and centralized slaughter. Live poultry sales are to be moved outside of cities and towns, and to be concentrated in 1-3 sites outside urban areas where they can be readily inspected.

### **5.3 Implications of Control and Restructuring**

92. Finally, we briefly outline the policies with greatest impact on the various channels within the value chain, for use in Phase II of the study. A challenge is posed by the fact that much of the legislation is not adhered to, and that the restructuring plans are very ambitious in relation to the current situation, making the extent to which they will translate into concrete outcomes questionable. Moreover, there is a need to separate stakeholders that have been directly affected by HPAI from the larger population, as well as urban and rural stakeholders. Given that the effects of HPAI on farmers that were affected directly have been addressed by GSO (2004), and the focus of this study on longer-term restructuring, our principal concern is with the impact of HPAI on the larger population. Our preliminary evidence suggests that the following regulations have been most important for each stakeholder:

1. Ban on hatching (Sectors 1 and 2, and particularly duck producers);
2. Regulations on transport (Sectors 1 and 2 directly, and other stakeholders indirectly to the extent that they experience the indirect economic effects of larger scale stakeholders’ reliance on local markets).
3. Prohibitions on live marketing (all stakeholders that had been associated with live marketing living inside urban catchment zones);
4. Prohibitions on slaughter in marketplace (Sectors 3 and 4, mostly in urban areas).

93. The policies have had the greatest effect in urban areas and on those that had supplied these areas. In rural areas outside urban catchment zones, production and marketing continue (although at much lower levels than previously), and our evidence suggests that the rules on slaughter have not had a great impact for small-scale stakeholders, though, as discussed above, large-scale stakeholders have built or are building their own slaughter facilities. The plans for restructuring will clearly affect small-scale stakeholders crucially, though only to the extent that the plans translate into concrete action, an aspect that requires further study. Further consideration of the impact of the regulations by sector and stakeholder will be deferred for Phase II of the study.

## 6 Socio-Economic Impact of HPAI

94. It is difficult to ascertain the impact of AI with certainty given the limited information currently at our disposal, so a more precise assessment will be deferred until Phase II of this study. The goal of this Section will be to tentatively present the likely socio-economic consequences based on the information available to date.

95. Assessing the aggregate cost of the AI outbreaks – in terms of direct control measures (both one-off and recurrent) and indirect (namely the cost of foregone production and spill-over effects onto other industries/markets) – is an extremely complicated exercise dependent on a host of factors and counterfactual scenarios. World Bank (2004), considering the first wave of AI, suggests that the total economic cost may have been between .3 and 1.2 percent of GDP, while Giao H. (2004) suggests it amounted to about .5 percent of GDP.<sup>74</sup> In the second wave of AI, the costs were smaller owing to a less drastic approach to culling in which clinically infected birds only were slaughtered, and because the disease spread less; the cost was estimated at .12 percent of GDP in 2004 (World Bank 2005). Estimates of the impact of the third wave are not yet available.

96. The quantification of costs gives at best a very rough estimate of the impact of an outbreak. Moreover, it does not consider their distribution which is arguably more important. It is evident that large stakeholders lost absolutely far more from the outbreaks than smaller producers, though the relative losses seem to be highest for the middle range of semi-commercial/small commercial farmers.<sup>75</sup> However, it is difficult to go beyond these general statements. In part, this reflects a lack of sound epidemiological data; Delquigny *et al.* (2004) point to a “lack of detailed and consistent records” and “large disparities in the information collected at the provincial level”. However, Rushton *et al.* (2006, p. 505-506) give a profile of the losses disaggregated by region (Table 10) and province. They find that 87 percent of HPAI losses occurred in the MRD, HCMC, the Southeast and RRD. Moreover, within these regions some provinces were particularly affected. In RRD, these included Hanoi (loss of 41 percent of poultry), Vin Phuc (21 percent), Ha Tay (18 percent), Tai Binh (16 percent) and Nam Binh (14 percent). In HCMC/South east, they included HCMC (99 percent), Ba Ria-Vung Tau (81 percent), Binh Duong (79 percent) and Ninh Thuan (35 percent). In Mekong Valley, they included Long An (87 percent), Tien Giang (66 percent), An Giang (70 percent) and Dong Thap (29 percent).

97. In part the lack of distributional data also reflects the scarcity of surveys of affected households. The one exception is the survey by GSO (2004) which focuses on the immediate aftermath of the first wave of AI outbreaks upon producers in three Vietnamese provinces in which the losses were fairly heavy – Ha Tay in Northeast, Thua Thien Hue in Central Coast and Tien Giang in the Mekong River Delta. First, the survey reports that poultry farming before AI made up 85 percent of the income of industrial producers (2000+ birds), 50 percent of the income of commercial producers (150-2,000 birds), about 1/3 of the income of semi-commercial producers (50-150 birds), and less than ten percent of the income of backyard farmers (less than 50 birds). It also finds that 45 percent of backyard farms and 52 percent of Sector 3 farms (defined as those raising 50-150 birds) in these

<sup>74</sup> Giao H. study cited in GSO (2004), p. 5.

<sup>75</sup> According to World Bank (2004), “There are some indications that semi-intensive poultry units (keeping 50-1,000 birds) were hardest hit by the disease”. GSO finds that farms with about 150-2,000 birds suffered the heaviest impact and most dramatic restructuring.

provinces were culled.<sup>76</sup> They report that HPAI lowered food intake and raised poverty among affected farms: the absolute decrease in food intake was higher among bigger farms “but probably more dramatic in smaller farms, among which, in normal circumstances, several already have a minimal intake” (p. 4). They judge that before the outbreaks 14 percent of backyard farmers were food poor and 25 percent poor, but with the outbreaks, these figures rose to 17 percent and 28 percent respectively. The survey also considered lost employment in the poultry sector, and concluded it was not very marked, amounting to perhaps 13,500 jobs nationally (p. 28-29).

**Table 10 Regional Losses due to HPAI as of 2005**

	Poultry lost (%)	Estimated losses in USD (%)
North Central	14	4.4
Northern Mountains	16.1	3.9
Mekong Delta	22.3	42.3
HCMC and South East	9.6	23.4
South Central	6.2	2.4
Red River Delta	25	21.1
North West	3.1	1.1
Central Highlands	3.7	1.3
Vietnam	100	100

Source: Rushton *et al.* (2006), p. 506, Table 16.

98. Our fieldwork suggests farmers in urban and peri-urban areas forced to slaughter their birds faced a particularly heavy loss. Farmers in Cu Chi district of HCMC in which poultry production had been banned, identified the following problems (in ranked order) as a consequence of the prohibitions: the loss of income, fall in demand for poultry, inability to plan future production because of uncertainty, many people losing jobs, and disruption of the village economy – whereas before farmers could buy chicken in the immediate vicinity, now they had to go to the city.<sup>77</sup> In rural areas, recovery is underway but it is slow and uneven. Producers and traders express many doubts about what the future will bring. Group interviews with semi-commercial poultry farmers in HCMC revealed that they perceive some improvement but it is halting. Moreover, they do not feel it is economically viable to implement biosecurity measures nor do they have the money to do so. They were waiting for AI to pass to resume chicken farming as before, or hoping to shift to other forms of production – notably pork, cattle or rabbit. In general farmers, and particularly larger farmers, reported a lot of uncertainty and frustration over their inability to plan ahead. They also felt a lot of resentment toward the government, whom they blamed for making people so afraid to eat poultry.

99. Despite the large losses suffered by the larger stakeholders in the value chain, a longer term view suggests that as the market recovers, larger producers are gaining relatively more than their smaller-scale counterparts, and that this segmentation may become more pronounced in the longer term. One way to assess the socio-economic impact especially in light of longer term restructuring of the sector is to consider the question of relative gains and losses. The evidence collected in the course of this project suggests the following stakeholders, while having have lost a great deal in absolute terms, gained relatively with the market recovery and will likely continue to do so as the restructuring continues.

1. Industrial producers/processors located in urban areas benefited from becoming oligopolistic suppliers of poultry products; they gain from producing a product for

<sup>76</sup> Their data is not statistically represented for larger farms given that they were not randomly sampled.

<sup>77</sup> Meeting of farmers, Cu Chi district, December.

which there is high demand and for which they are able to charge a premium, coupled with the current prohibitions on the transport of poultry products across provinces and the ban on live poultry markets in cities.

2. Industrial producers located in provinces away from urban areas who are currently lobbying for changes in the law to permit their transport of poultry over provincial borders and thereby benefit from the new market for “certified” poultry in the cities.
3. Licensed slaughterhouses who are now in a position to dominate the market on sales to cities, given the prohibition on illegal small-scale slaughter.
4. Wealthier consumers are now able to obtain a supply of high quality safe poultry in a convenient manner. As more producers begin to supply this market, prices may fall.
5. Supermarkets and other high value retailers.
6. Suppliers of quality DOC that may find an increased market for their sales as more producers adopt biosecure production methods and care more about the origins of their breeding stock.
7. Feed suppliers, potentially, if the aftermath of the outbreaks causes a) an upsurge in industrially produced poultry and/or b) more semi-commercial farmers to adopt biosecure production that involves enclosed stock and therefore the need to purchase feed.
8. Private veterinarians may find more demand for their services.
9. Contract farmers affiliated with industrial producers (this depends on whether industrial producers have passed on gains to farmers or simply increased the number of farmers with which they affiliate; our very limited evidence suggests the latter).
10. Producers of other livestock for which demand is rising (though mitigated to extent to which the shift of poultry producers into other forms of livestock production exerting downward pressure on prices).
11. Traders of other livestock.
12. Employees of large companies.

100. The study also suggests the following stakeholders lost not only in absolute terms, but also relatively too:

1. Farmers losing poultry to HPAI.
2. Farmers in urban areas no longer able to raise poultry.
3. Producers in urban areas who had their stocks culled (particularly those that received little or no compensation for their loss).
4. Suppliers of farmers in urban areas no longer able to raise poultry.

5. Live market retailers in particularly those in urban areas where sales were prohibited, and for retailers that sold just poultry.
6. People engaged in slaughter of birds in live markets or small-scale slaughterhouses.
7. Collectors, particularly those specialized in poultry.
8. Sector 3 farmers in particular and sector 4 farmers somewhat, owing to limited market demand for their produce.
9. Sector 2 producers unaffiliated with slaughterhouses/industrial producers.
10. Poor consumers who cannot afford “safe chicken”, do not trust uncertified supplies, and had to pay increased prices for other meat.<sup>78</sup>
11. Farmers unable to access formal credit.<sup>79</sup>
12. Farmers no longer able to access informal credit – e.g., buy inputs on credit from traders.
13. Rural poor, to extent that produced more poultry than other livestock for which demand was rising.

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<sup>78</sup> Pork prices went up as much as thirty percent.

<sup>79</sup> Delquigny *et al.* (2004) report that the availability of credit is not a problem but access to it is – credit providers are reticent to lend money where there is no guarantee whatsoever of technical and economic success, and the risk of non-reimbursement is therefore relatively high. GSO (2004) find that only a fraction of farmers who had accessed loans before suffering a culling were able to access new credit – 38 percent of big farms, 31 percent for small commercial farms and 12 percent for semi-commercial farms (p. 30).



## 7 Preliminary Conclusions

101. Before outlining a design for Phase II of this study, we briefly provide a very tentative exploration of the coincidence of risk, regulations and stakeholder vulnerability (in terms of value chain sector, position and location). The primary risks emerged as:

1. Farm management practices based on scavenging;
2. The keeping of multiple species together;
3. The raising of fowl near pigs;
4. An inability to trace inputs – especially breeds – to their source; and
5. The mixing of birds in transport and live markets.

102. The control measures imposed do not directly address these farm management practices but rather seek to prohibit the marketing and sale of potentially diseased birds, particularly in cities where the threats to human health are particularly high. Accordingly there is a need to investigate in greater depth the impact on stakeholders and what has been their response. In terms of sectors, we recommend the following prioritization:

1. Sector 3 stakeholders (who appear the most affected);
2. Sector 4 stakeholders;
3. Sector 2 stakeholders, particularly non-contract farmers; and
4. Sector 1 stakeholders.

103. In terms of stakeholders, farmers, traders and live market retailers appear to be the most vulnerable actors in the value chains, as the ability to control the value chain and capture returns seems to be shifting downstream. The second phase of this study will address the relationships between risks, control measures and socioeconomic and health impacts. We propose a design for Phase II of the study in the following section.

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## Appendix A Terms of Reference

The contracted work is a study on poultry market chains.

### Objectives:

1. Map the main poultry market chains in Vietnam
2. Make a preliminary identification of points and linkages along the chain that may present risks of AI infection to livestock and to people
3. Make a preliminary collection of information on proposed control measures (including plans, policies, legislation, vaccination campaigns etc...)
4. Make a preliminary identification of the socio-economic impacts that control strategies may have on livelihoods of producers, traders, processors or retailers
5. Draft design of Phase II of the study

### Outputs:

1. A written report that describes the main types of poultry market chain in Vietnam, their location, their governance, and the risks to human and animal health that can be expected at each part of the chain. It should provide an overview of all of the most important chains, but give the most emphasis and provide the most detail for chains that represent an important market for production systems defined by FAO as sectors 3 and 4. The report will also identify important questions to be asked during Phase 2 of the study and indicate which chains, and parts of each chain, may be most strongly affected by biosecurity measures and restructuring, and those where human health is most at risk.
2. Preliminary design for phase 2.

### Activities:

1. Initial literature review on existing value chains in poultry
2. Initial review of proposed control measures
3. A participatory market chain mapping exercise using formal and informal, qualitative and quantitative tools as appropriate.
  - The study will focus on the Red River Delta and Mekong Delta areas, particularly where there is a high density of poultry keepers.
  - It should provide an overview of all of the most important types of chain, but give the most emphasis and provide the most detail for chains that represent an important market for production systems defined by FAO as sectors 3 and 4.
  - The study will use examples of the most important chains in the two study areas to describe the structure of the chains (e.g. who is involved, the physical length of chains and the number of points, the concentration at each point in the chain) and their governance (the type of relationship between different actors in the chain, regulations and contractual arrangements that are imposed and who imposes them). It will identify points in the chains where management practices may create conditions of high risk to birds and humans (e.g. from close contacts, mixing of birds from many sources). It will also identify changes in chains that are taking place, whether as a result of AI control measures or for other reasons, and their impact of the livelihoods of various stakeholders in the market.
4. A workshop to present preliminary findings to major stakeholders
5. Initial design of second phase of study

### Human resources

1. International expert on livestock economics
2. Domestic expert on poultry production
3. Domestic expert on social issues

The contractor will be supported by an advisory panel constituted by representatives of: DA, DAH and MoH, one FAO economist, one FAO epidemiologist, one WHO human health specialist and a representative from the FAO office in Hanoi.

The panel will be responsible to provide technical expertise, face to face and through email, to enhance the technical quality of the study. Their responsibilities will include

- Making available documented material for the consultants relevant to the subject of the study
- Making, within three days from receipt of the drafts, inputs to the design of the study including advice on methodology, sampling and questions to be asked
- Participating in the participatory mapping chain exercise
- Reviewing reports produced by the contractor

### SCHEDULE OF REPORTS AND/OR DOCUMENTS

The Contractor shall submit in the English language the reports set out below with respect to work and services performed under this contract:

Title of Reports	No. of Copies	Time limit for submission from effective date	Consignees
Poultry market chains in Vietnam and implications for AI	3	30 days	A. Rychener, FAOR A. Mc Leod, Senior Economist
			A+B+C

A	CONSIGNEES Mr. A. Rychener FAOR
B	Ms. Anni Mc Leod Senior Economist, AGAL

### SERVICES AND FACILITIES PROVIDED BY THE ORGANIZATION

The Organization has undertaken to provide the following:  
Facilitate the Advisory Panel in providing technical support.

### SCHEDULE OF CONTRACT PERFORMANCE

The Contractor shall execute this contract within 30 days from effective date of this contract according to the Schedule set out below.

1. Day 3: submission of methodology to the Advisory panel
2. Day 20: submission of draft report
3. Day 23: holding of final workshop
4. Day 30: submission of final report

## Appendix B Principal Informants in Hanoi and Ho Chi Minh City

Informant	Position	Interview date	Interview location
Ms. N.	Chicken Trader	7/12/05	Long Bien market, Hanoi
Mr. N.	Agent selling poultry feed and breeding chicks	8/12/05	Ha Vi Commune, Thong Tin District, Ha Tay Province
Mr. V.	Technician, Vietnam Feed Company	8/12/05	Ha Vi Commune, Ha Tay Province
Mr. N. & Mrs. T.	Duck farmers	8/12/05	Ha Vi Commune, Ha Tay province
Mr. C.	Duck farmer	8/12/05	Ha Vi Commune, Ha Tay province
Mr. Vu Minh Phu	Chairman, Ha Noi Supermarkets Association	8/12/05	Mr. Phu's home, Ha Noi.
Mr. T.	Representative, Phuc Thinh Joint Stock Company	9/12/05	Office of Phuc Thinh Company
Mr. A.	Representative, Big C supermarket	12/12/05	Office of Big C supermarket, Ha Noi Province
Mr. T.	Sales representative, CP Group	13/12/05	CP Group Retail point, Ha Tay Province
Mr. N.	Representative of broiler program, CP company	13/12/05	Farm in Chuong My District, Ha Tay Province
Mr. X.	Contracted chicken farmer	13/12/05	Farm in Chung My District, Ha Tay Province
Mr. T.	Inspector, Veterinary Section, district of Hanoi	13/12/05	ACI Office, Hanoi.
Mr. L.	Representative, Citimart Vinicom	14/12/05	Citimart Vinicom
Mr. T.	Owner of private hatchery	16/12/05	Tu Son District, Bac Ninh
Mr. T.	Chicken and goose farmer	16/12/05	Tu Son District, Bac Ninh
Mr. Thien Tu Minh	Director, HCMC Center for Agricultural Consultancy and Support	19/12/05	District 1, HCMC
Mr. Tran Phuong Dong	Agriculture Division, HCMC Department of Agriculture and Rural Development	19/12/05	District 1, HCMC
Mr. Truong Thi Kim Chau	Vice Director, sub-Department of Animal Health of HCMC	19/12/05	District 11, HCMC
Mr. Nguyen Van Dung	Veterinary Officer and Vice Director, Veterinary Diagnostic Laboratory, sub-Dept of Animal Health of HCMC	19/12/05	District 11, HCMC
Mr. La Van Kinh	Vice Director and Research Animal Nutritionist, Institute of Ag Sciences of South Vietnam	19/12/05	District 1, HCMC
Mr. V.	Representative, Phat Nghia Company	19/12/05	Office of Phat Nghia Company, HCMC
Mr. H.	Phat Nghia Company	19/12/05	Office of Phat Nghia Company, HCMC
Various	Retailers of safe chickens and eggs	20/12/05	Ben Thanh Market, District 1, HCMC
Ms. N.	Egg retailer	20/12/05	An Dong Market, District 5, HCMC
Various	Egg wholesaler and egg retailers	20/12/05	Binh Tay Market, District 5, HCMC
Mr. H.	Cu Chi Veterinary Station	20/12/05	Cu Chi District
Mr. X.	Chicken farmer	20/12/05	An Nhon Tay commune, Cu Chi district
Ms. H.	Egg wholesaler	21/12/05	District 6, HCMC
Mr. X.	Representative, Huyuh Gia Huyuh De Co., Ltd.	21/12/05	Binh Chanh District,

<b>Informant</b>	<b>Position</b>	<b>Interview date</b>	<b>Interview location</b>
			HCMC
Mr. N.	Egg farmer	21/12/05	Hiep Thanh Commune, Chau Thanh District, Long An
Mr. C.	Chicken farmer	21/12/05	Hiep Thanh Commune, Chau Thanh District, Long An
Mr. T	Chicken farmer	21/12/05	Hiep Thanh Commune, Chau Thanh District, Long An
Mr. V	Chicken farmer	21/12/05	Hiep Thanh Commune, Chau Thanh District, Long An
Ms. Nguyen Thi Dam	Director, Long An Economics Division	21/12/05	Chau Thanh District, Long An

## Appendix C Excerpts from Stakeholder Interviews

### Box 5 Interview with Owner of Private Hatchery

Mr. T. has been farming chickens and geese since 1993. At the beginning, he raised broilers, but since 1996 has produced layer hens and breeding chicks. He invested in three sheds for his birds, two for layers and one for chicks, each with a capacity of 1,000 birds. He also has two electric incubators. Owing to limited land, his chicken sheds are next to his home and those of his neighbors. Currently, Mr. T. raises about 1,000 parent chickens and 1,000 chicks, all exotic breeds. He also raises 200 wild geese in a fish pond. He employs four family members to look after the birds. Chicken farming accounts for 70-80 percent of his family's income.

Before AI, Mr. T would incubate about 20,000 chicks each month for sale to wholesalers, poultry agencies and local households, earning about VND 60 mn (USD 3,800). However for the past two months, he has stopped incubating chicks but must feed the parent stock, at a cost of VND 1 mn per day (USD 63, or 1,900 monthly).

In total, he estimates that he has lost VND 150 mn (USD 9, 420) in the past two months. He would like to have his stock slaughtered in order to receive a compensation payment, but this is impossible since his village is out of the announced outbreak area. Mr. T. cannot sell his parent birds for meat either. At the beginning of the outbreak, he sold his chickens for 10,000 VND (USD .60) per kilo. Now he tries to sell them for VND 5,000 (USD .30) per kilo but no one will buy them.

Prior to AI, Mr. T. bought commercial feed from his stock from Proconco and Dabaco feed companies via agencies where farmers could obtain inputs on credit and make deferred payments. But now everything has changed. Farmers must pay immediately in cash if they want to have feed for their chickens. Chicken are dying of starvation in many farms, reflecting the fact that farmers cannot afford feed.

To some extent, Mr. T. feels the dissemination of information about AI has been successful. Television, newspapers and even school teachers have improved people's awareness of the epidemic. However, the outbreak has also caused excessive fear among people, leading them to boycott chicken and egg.

To maintain his poultry stock, Mr. T. has borrowed more than VND 100 mn (USD 6,300) at a rate of one percent per month, but he cannot borrow any more money. Other smaller farms to which he gave chicks on credit owe him about VND 40 mn (USD 2,500). These farmers have either lost their chickens or cannot sell them, so have become bankrupt. At one neighboring farm, all the birds died of hunger, but the farmer told the vets the birds had AI to try and get compensation money.

Mr. T. has no clear plan for the future. Demand for chicken is starting to pick up, so he is selling some of his laying hens as meat chickens to neighbors, who know his production is safe. However, the local authorities do not want to continue animal husbandry in residential areas anymore. They have stated that farmers should move their poultry sheds to faraway fields but it is not yet clear where. Mr. T. does not want to stop farming poultry, as it is more profitable than pig or cow husbandry. However, he also thinks that continuing to be involved in poultry will be risky, and require new investments in sheds and equipment that he may not be able to make.

Dong Quang commune, Tu Son district, Bac Ninh (December, 2005).



### **Box 6 Interview with Mr. S., Semi-Commercial Chicken Farmer**

Mr. S. started poultry farming in 1998. He raises broilers in a shed just in front of his house. Before the AI outbreak, he raised 1,000 exotic chickens, now he has just 700 chickens. He also raises 300 wild geese, and pigs in a separate pig shed. Mr. S. and his wife raise the birds, sometimes with the help of their children.

Before AI, Mr. S. sold his chickens to wholesalers who bought at his farm and transported the chickens to retailers in Hanoi. When AI came, he tried to sell about 300 birds at VND 10,000 (USD .60) per head. But now, although he very much wants to sell the remainder of his stock, no traders come to buy and he must feed his flock at a survival level only.

Mr. S. used to buy concentrated feeds from feed agencies on credit, but now things have changed and agents require immediate payment. Now he instead buys bran and maize to produce his own feed. He knows it is not as good as factory-made feed, but he has no other way to keep his birds alive and reduce costs. So far he has lost VND 30 mn (USD 1,900) in two months. To cope with the loss he has borrowed VND 20 mn (USD 1260) from a local lender at a rate of 1.2 percent monthly, and his wife as borrowed VND 5 mn (USD 315) from the Women's Association. He has spent all this money to ensure his chickens survive in the hopes he will be able to sell them.

Although Mr. S. feels poultry farming is more profitable than pig farming (his poultry stock would yield about VND 2 to 2.5 mn per month – USD 125-160 – while pig raising brings in just about VND 1 mn per month – USD 60), it is more risky. If AI returns in the coming years, he will go bankrupt. Therefore, he has taken the decision to completely quit farming chicken once he has sold his stock. He has no intention of moving to a far-off field to build a closed shed as he does not have the money for such a big investment. Instead he will convert his chicken shed to a pig shed and further develop his pig husbandry. He is also thinking to raise cattle as demand for beef is growing.

Dong Quang Commune, Tu Son District, Bac Ninh (December, 2005).

### **Box 7 Interview with Private Feed and Chick Distributor**

Mr. N. is a private feed and chick distributor located next to Ha Vi wholesale market. Before the AI outbreak, he would sell 60-70 tons of feed a month – for a profit of VND 5-6 mn (USD 315-375) and about 10,000 breeding chicks, for a profit of between VND 2 and 5 mn (USD 125-315). Now he cannot sell any breeding chicks, and sells just 1-2 tons of feed monthly, so is facing big losses. Also, to promote his business, he had extended VND 100 mn (USD 6,300) worth of feed on credit to surrounding farmers, but they cannot repay him.

In the future, he will no longer give credit but rather insist on immediate payment. He thinks that AI will be very difficult for farmers to get over. Many lost their chickens and are afraid to start raising again. Others who cannot sell their chickens do not have money to invest in production. He anticipates that after AI, his business will not go very well. He thinks perhaps people might shift to pig husbandry, but there is no tradition of pig raising in the area so it is unlikely. Before he sold about 10 tons of pig feed a month, while now he sells slightly more, but he is not very hopeful about future prospects.

Ha Vi (December, 2005)

### **Box 8 Interview with Mr. C., Semi-Commercial Duck Raiser**

Mr. C. keeps 300 laying ducks in a pond on his farm in Ha Vi, next to his pig shed. Before AI, his ducks would lay 250-270 eggs per day, giving him a daily profit of VND 50,000 (USD 3). A breeder would come to his house every Friday to collect his eggs. However, since the latest outbreak, the breeder no longer comes so he cannot sell eggs, and he must feed 20 kg of grain to his ducks each day. Now he is losing VND 50,000 (USD 3) per day. Mr. C. is currently using savings to keep feeding his birds. He expects AI will pass quickly this time, and that he will be able to resume selling his eggs.

Ha Vi (December, 2005)

### **Box 9 Interview with Industrial Chicken Farmers**

The main income source of farmers in Hiep Thanh commune is poultry production, which provides about 70-90 percent of their cash income. Pig and cattle production are also important for farmers, and is being encouraged by the government, but it is still developing slowly. About 2,500 households in the commune keep chicken while about 1,200 keep ducks. About 1,000 households keep 5,000-7000 broiler chicken; 1,500 keep 200-500 layers; 200 farmers keep between 200-300 layer ducks, and about 1,000 farmers keep between 200 and 300 ducks grazing in their rice fields.

In 2003 and 2004, AI affected nearly all districts of the commune, and nearly all poultry were killed. In 2005, AI did not occur in the commune but did reach nearby districts, and has still affected farmers in Hiep Thanh.

The farmers interviewed have raised broiler chicken for about 7-9 years. Before 2003, they raised about 5,000 to 6,000 broiler chicken each, while in 2004 and 2005, they raised just 1,500 birds, all of local varieties. In 2006, they plan to raise just a few hundred each. They buy breeding chicks from a village hatchery and sell them to local traders, who either sell them at the local market or in HCMC.

In 2003, the farmers estimated losses of VND 25-40 mn (\$1,600 - \$2,500 per household), in 2004 they lost much more because chickens were culled and they were given just VND 5000 (.30) per head; and in 2005, they were not able to sell any chicken because AI arrived so early.

The farmers were unhappy because they have no choice but to give their birds starvation rations (2-3 kg for 400 chicken, in contrast to the 50kg they would give normally). As a result, their chickens are hungry, susceptible to other disease, and dying at a rate of 10 heads per day. Some farmers in the village plan to continue farming poultry, while others hope to move instead to cattle or pig husbandry.

Hiep Thanh Commune, Chau Thanh District, Long An Province (December, 2005)

### Box 10 Interview with Mr. T., Representative of Phuc Think Joint Stock Company

Before the AI outbreaks, Phuc Think Company's main business was selling Day Old Chicks of many breeds, both broiler and layer. They imported parent stock from many countries including the US and Europe. Before the outbreak in 2005, they had 110,000 parent birds (broilers, pullets, layers), and raised a relatively small number of broilers (about 2,000/day). They also sold eggs raised by contact farmers. When AI came, they couldn't

Their main retailer is Big C supermarket in Hanoi, with whom it has a contract to fulfill the quantities Big C demands. Big C had been selling 200-300 of their chickens daily during the outbreak. However, the week of the interview, which took place just after the Minister of MARD announced that certified chicken was safe to eat at an event that was widely publicized in the media, sales had gone up to 700 chickens per day at Big C. To meet the upsurge in demand, the Company was also planning to open 10 direct selling points in Hanoi within the next three or four days to sell frozen chicken and fresh eggs, and was further planning to open 1-2 selling points in each district of the city.

The chickens are raised in a building on Company premises, under strict biosecure conditions. For instance, the premises are disinfected daily, and workers are only allowed to return home every two weeks. The Company obtains its eggs - 30,000 per day - from twenty contracted farmers (who farm between 500 and 7,000 birds apiece). To obtain a contract, farmers must have a certain amount of land, labor, electricity and water, and be able to follow strict bio-secure production. For this, they receive above-market rates for the eggs they supply the company (at the time of the interview, the Company paid VND 550 per egg, as opposed to an open market price of VND 320). The company monitors their farming closely, selling them inputs and sending veterinary workers to monitor all aspects of production. The content of the contracts with both Big C and satellite farmers has not changed since the AI outbreak, only practices have become more stringent. Also, now the local authorities must certify that the product is safe. Before, the Company would buy eggs on the free market to sell to retailers, but it no longer will do this.

As of December 2005, the company is producing 10,000 broilers each day, as opposed to 2,000 each day prior to the most recent outbreak. In the future, Mr. T. expects his business to improve and production to climb further. He expects tight regulation of the poultry sector to continue and that the changes the Company has made to its business will persist. Mr. T. expects to charge a premium for his chicken, given its safe production. He will stay in market despite higher production costs because he thinks there will be strong demand for safe birds.

Mr. T. believes the future of poultry in Vietnam lies in concentrated husbandry, and he hopes the government will learn lessons from countries like Thailand and promote large-scale production. "Anyone can raise 10 or 20 chickens" he comments, "but it is not safe". He suggests the government help smallholders put out of business by AI to find new things to do. He began any breeding chicks and so began to expand on-site production.

The AI epidemic has wrought many wholesale changes to the Company, leading to the adoption of on-site production and processing for broilers, and much tighter integration with egg suppliers. In May 2005, the Company built an abattoir to ensure hygienic slaughter. Upon slaughter, it now packages the birds and gives them to a distributor in Hanoi. When demand was low, it paid the distributor for the use of its cold storage. To finance all these investments, the Company borrowed money at a low interest rate from the government.

Phuc Think Joint Stock Company (December, 2005)

### Box 11 Interview with Representatives of CP Company and Contracted Farmer

The CP group has contracts with about 350 farmers in Vietnam. About 200 of these farms are in Ha Tay province, about 60 are in Hai Phong, and smaller numbers are in Nghe An (16), Thanh Hon (20), Thai Nguyen (21), Quang Ninh (16) and Ha Nam (16). Each farm produces about 5,000 to 8,000 birds at a time. Before AI, the Company did not sell many products domestically; it exported some chickens to Thailand and sold others on local markets. They did not have links with supermarkets, which only would have demanded small amounts of poultry. Now they can no longer export any poultry.

All CP chicken in Vietnam are produced under contract. When CP Group began contracting farmers in 1997, it was with just 20 or 30 farms, and the Company did not require closed production. Now production requirements have become much more stringent and the sizes of the farms with which it contracts have increased. The Company monitors production on its farms strictly, and arranges for all inputs and for the transport of finished birds. Prior to AI, the Company was increasing the number of contract farmers at about 20 percent per year, but now it is not signing any new contracts. It is also advising its farmers to keep their chickens alive longer than normal, owing to a lack of demand.

Before AI, CP group would sell its chickens produced in Ha Tay live to traders, who would buy about 200-300 birds per day. Now, it instead collects them for slaughter at a slaughterhouse it finished constructing in early December.

Currently, CP group is producing certified safe chicken, but cannot sell its products to major retailers in Hanoi, because of the ban on transporting poultry. They continue to buy all chicken from the contract farmers, per the terms of their contracts, but at a lower price (before the recent outbreak, they would pay VND 10,000 to 12,000 per kilo, now the price is VND 8,000 per kilo). Accordingly they are losing VND 1.3 bn (USD 820,000) per month. They slaughter the chicken they purchase and freeze it in their own cold storage. Before AI, they would sell eggs to breeders, but this market has dried up too.

The requirements to be a CP Group contract farmer are quite onerous; the farmer must, among other requirements, agree to construct a chicken coop on the farm according to Company specifications, build a good access road to the farm if needed, and reach the production efficiency specified by the Company. The producer we visited, who raised about 5,000 birds per cycle, had started contract farming in 2001, and had borrowed VND 200 mn (USD 12,500) from the Company at 1.25 percent interest in order to organize his premises in conformity with company standards. At the time of our visit, he was making further improvements to his premises to increase biosecurity, including construction of a shower at the entrance.

Ha Tay Province (December, 2005)

### Box 12 Interview with Representative of Big C Supermarket, Hanoi

Before the AI outbreak, Big C was selling 2,000 to 3,000 kilos of chicken a day, which it purchased from local slaughterhouses, and was not officially certified. The supermarket's technicians visited the slaughterhouse to check that production was hygienic. It did not trace the products back to producers. However, with the onset of AI, it sources certified chicken and eggs only from Phuc Thinh Company, the only Company that is certified to produce poultry for sale in Hanoi.

As of mid-December, 2005, Big C would sell just 350 kilos of chicken daily, though this marked an improvement from previous weeks. On the previous Sunday, following media publicity encouraging people to eat chicken, they had tried to obtain 500 kg of chicken, but its supplier, Phuc Thinh Company, could not deliver the amount requested. Mr. D. feels that the supermarket needs to reorganize its sourcing as Vietnam returns to the consumption of chicken. In addition, he believes that the supplier is trying to profit from the situation, because it is the only certified producer of safe chicken in the area; Phuc Thinh wants to raise prices and not the quantity it will supply. Big C would like to obtain another supplier but this is not currently possible owing to restrictions on transport of any type of poultry between provinces, though he hopes this situation will change soon. The supermarket sets the price it will pay its suppliers and reserves the right to specify the quantity of poultry it will purchase at any given time.

Hanoi (December, 2005)

### **Box 13 Interview with Veterinary Inspector, Hanoi**

Mr. T. is a veterinary inspector employed by a district of Hanoi. At present, Phuc Think company has asked his district for permission to install retail points to sell certified chicken and eggs. He observes that local authorities are reluctant to grant this permission because residents of the area have complained, and because they do not perceive any benefits from allowing the sales. If there are no problems, they do not benefit. If there are problems, they will suffer. Moreover the Veterinary Services are understaffed, so they worry that they will not have enough capacity to maintain inspections. It is easier to ban sales rather than have trouble in the future.

From his experience, the greatest risk for AI was the live markets. Each trader would handle about 1,000 chickens per day, purchased from various provinces, and would mix the birds and then slaughter them onsite. However, while the city wants the private sector to build centralized slaughter houses in three designated areas, there are not yet any concrete plans for this to occur.

In the future, he expects live chicken sales in Hanoi will continue to be banned but that people could obtain live chicken from surrounding areas. The new inspection procedures for certification require a new seal which is more difficult to copy than old ones.

However, Mr. T. faces many problems in his work. He has not observed any illegal sales of chicken in Hanoi, but is worried that chicken could be processed illegally in surrounding provinces then transported to Hanoi for sale. Also supermarkets are now petitioning to sell certified chicken, creating additional inspection needs.

Hanoi (December, 2005)

### **Box 14 Interview with Representative of Huyuh Gia Huyuh De Co., Ltd. Slaughterhouse, HCMC**

Mr. X. has been in business for over thirty years. Along with his brothers, he breeds and incubates chicks, raises ducks and slaughters them. Before AI, their slaughter operations were conducted on a small scale, but since February 2005, they have been running an industrial-scale abattoir. Before AI, they raised 30,000 birds each month on the premises, but as of January 2005, since production had dropped far beneath the plant's capacity, they decided instead to form contracts with 100 contract farmers in outlying provinces. The smallest farms raise 2,000-3,000 birds, while the largest raise 15,000-20,000 birds. In the plant itself, Mr. X. employs 120 people.

In 2005, the business lost VND 2 bn (USD 125,000), but despite the crisis, their production has grown. As of December, they were producing 100,000 ducks monthly. They have a freezer with 150 ton capacity, so during the crisis they would kill birds and then freeze them (at a cost of UDS 1.2 per day per ton of meat). The company has 13 selling points selling, as of December 2005, 2,000 ducks per day.

Because of the new laws, Mr. X. can no longer breed ducks and so he is unsure of his future plans. At present, he is selling the birds he has frozen, but they will run out within 3 months. At that point, his production may shut down entirely. He is hoping to resume production once the ban on the hatching of duck eggs is lifted, perhaps in February 2006.

Ho Chi Minh City (December, 2005)

### **Box 15 Interview with Ms. H, Egg Wholesaler, HCMC**

Ms. H. has been in the egg business more than 30 years. She now runs a highly successful enterprise. She owns 20 trucks that collect eggs from small-scale suppliers in adjoining provinces with which she has long-standing relationships. She is able to extend credit to her suppliers, and since AI, has extended credit without interest to help them recover. Ms. H. is concerned about the plight of small farmers, so she always pays her suppliers straight away for their eggs and buys all their produce.

In 2003, with the AI outbreak, she lost VND 5 bn (USD 314,000) and in 2005, during the period in which she could not sell eggs, she lost VND 1 bn (USD 63,000). She had been looking into entering a completely new business when the veterinary authorities contacted her and informed her she could resume selling eggs if she were willing to implement stricter sanitary controls, e.g., investing in an ozone machine and in new packing technology.

Ms. H. has set up a hygienic procurement station in each surrounding province with rafts to travel between suppliers and purchase eggs. When eggs are to be delivered, she advises the local veterinary services who go and fumigate the eggs. Then, the eggs are packed into trucks and transported to the city. A veterinary officer lives at her premises and inspects all incoming produce. Upon reaching her premises in HCMC, the eggs are disinfected once again and then packaged for sale to a host of supermarkets and 40 or 50 local markets.

Before the latest AI outbreak, Ms. H. could sell 50,000-100,000 eggs per day but now she sells 10,000. Prices have recovered though. Before the AI epidemic, she received VND 1,200 per egg. In October 2005, prices fell to VND 300 per egg. By November, they had climbed back to 1,100-1,200 per egg. Supermarkets generally delay their payment to her, sometimes by 15 days, sometimes by one month.

Ms. H. now plans to stay in the egg wholesale business. In fact she wants to build a bigger site, and her brother, who lives in the US, is going to help her import an automatic packaging machine. She feels the government should do more to advertise the fact that eggs like the ones she sells are safe.

Ho Chi Minh City (December, 2005)

## **Appendix D List of Reviewed Legislation**

Circular No. 84/2005/TT-BNN guiding the reorganization of the raising of water birds for prevention and control of avian influenza (H5N1) epidemic, dated 23/12/05

Circular No. 85/2005/TT-BNN guiding the quarantine in transportation, slaughtering and trading of poultry and poultry products, dated 23/12/05

Decision No. 309/2005/QĐ-TTg on financial support to avian influenza prevention and control, dated 26/11/05.

Veterinary Ordinance No.18/2004/PL-UBTVQH, dated 29/04/04

Decree of Government No. 33/2005/ND-CP, on detailed stipulation about some articles of the Veterinary Ordinance, dated 15/03/05

Decision, No. 45/2005/QĐ-BNN, on promulgation of list of objects liable to the animals, animal product inspection, dated 25/07/05

Decision, No. 46/2005/QĐ-BNN, on promulgation of list of objects liable to the veterinary hygiene control, dated 25/07/05

Decision, No. 47/2005/QĐ-BNN, on stipulation of number of animals, animal product volume liable to be inspected when is being transported out of the district, dated 25/07/05

Decision, No. 48/2005/QĐ-BNN, on forms for slaughter control, stamps for veterinary hygiene control, dated 25/07/05

Decision, No. 64/2005/QĐ-BNN, on list of diseases of declaration diseases; dangerous animal diseases; diseases must be compulsorily vaccinated, dated 13/10/2005

Decision No. 39/2005/QĐ-BYT of Ministry of Health, on promulgation of the regulations on general hygiene conditions for food production establishments, dated 28/11/05

Decision No.41/2005/QĐ-BYT of Ministry of Health, on stipulations on food safety hygiene conditions for trading establishment of food services, dated 08/12/05

Directive of MARD, No.47/2004/CT-BNN of MARD, on further enhancing activities on bird flu prevention and control, dated 05/10/04

Directive No.34/2005/ CT-TTg of Prime Minister, on comprehensive and efficient implementation of urgent action plan on prevention and control of bird flu, dated 15/10/05

Decision No.15/2005/NQ-CP of Government, on some urgent solutions for preventing of Avian Influenza (H5N1) and Human influenza pandemics, dated 04/11/05

Circular No 69/2005-TT-BNN-NN of MARD, on guidelines of implementation some urgent solutions preventing avian influenza outbreaks, dated 07/11/05

Decision No. 3065/QD-BNN-NN of MARD on promulgation of regulation on conditions for poultry production, incubation, transport, slaughter, trade of poultry and poultry products, dated 07/11/05

Guidelines on Prevention and Control Measures against Highly Pathogenic Avian Influenza applicable by poultry traders and transporters, and small poultry householders (issued under Decision 3400 QD/BNN-TY of MARD, dated 05/12/05)

Guidelines on prevention and control measures for avian influenza on intensive poultry farms (issued under Decision 3400 QD/BNN-TY of MARD, dated 05/12/05)

Procedures for culling and destruction of infected poultry, and for disinfection and decontamination of infected areas, issued under Decision 3400 QD/BNN-TY of MARD 05/12/05)

Ordinance on Food Hygiene and Safety No.12/2003/PL-UNTVQH11, dated 26/07/03

Regulations on the procedures for quarantine, slaughter control, and veterinary hygiene inspection of animals and animal products, issued in conjunction with ministerial Decision 389 NN-TY/QD, dated 15/04/94

Regulations on the veterinary hygiene requirements and inspection of animal product processing and trading establishments, issued under Ministerial Decision 67/1999/QD/BNN-Ty, dated 20/04/99

Governmental Decree 73/CP, on functions, duties, powers, and organisation of the Ministry of Agriculture and Foodstuff, dated 01/11/95

Decision 348/TTg of the Prime Minister, on functions and duties of the Department of Animal Health under the direct management of the MARD, dated 28/5/96

Ministerial Decision 747 NN-TCCB/QD, on functions, duties, powers, organizational structure of the Department of Animal Health, dated 30/12/93

Ministerial Decision 875/NN-TCCB, on the specific functions, powers, and organisational structure of Department of Animal Health, dated 24/5/96

Rule on quarantine, slaughter control and veterinary hygiene inspection of animals and animal products, under Decree 93/CP

Decision 02 TY/TCCB/QD of the Director of Department of Animal Health on the organisation, responsibilities and powers of the Assistant units of the Director, dated 06/01/94

Ministerial Decision 1605 NN-TCCB/QD, on the setting up the Vinh Regional Veterinary Centre, dated 12/12/94

Regulation, promulgated under Ministerial Decision 694 NN-TY/QD, on the functions, duties, powers and organisational structure of provincial and Municipal Sub-department of Animal Health and of the field of Animal Health Services System, dated 11/12/93



Decision 99 NN-TY/QD on the veterinary hygiene of animal slaughterhouses and slaughter points, dated 20/02/95

Directive 403/TTg of the Prime Minister on strengthening animals slaughter control and veterinary hygiene Inspection of food of animal origin, dated 11/07/95

Regulations, issued under Ministerial Decision 67/1999/QD/BNN-TY, on veterinary hygiene requirements and inspection of animal product processing and trading establishments, dated 20/04/99

## Appendix E Participants in Interim Workshop

ACI office, Hanoi, 23 Dec 2005

Project team: Emma Samman, Ton That Son, Pham Quang Trung

No	Name	Work place
1	Nguyen Van Vinh	Deputy Manager, Agriculture Project Management Unit (APMU)
2	Hoang Van Tieu	Deputy Director, National Institute of Animal Husbandry (NIAH)
3	Nguyen Xuan Khoa	National Institute of Animal Husbandry (NIAH)
4	Dinh Xuan Tung	National Institute of Animal Husbandry (NIAH)
5	Nguyen Van Song	Department of Economics, Hanoi Agriculture University (HAU)
6	Mr. Hung	Hanoi Agriculture University (HAU)
7	Doan Xuan Truc	Chairman of Board of director, Vietnam National Livestock Corporation
8	Tran Cong Xuan	President, Vietnam National Poultry Association
9	Le Hong Man	Vice President, Vietnam National Livestock Association
10	Pham Tung Lam	Department of Science and Technology, Ministry of agriculture and Rural Development (MARD)
11	Nguyen Quang Cach	Deputy Director, Bac Ninh Agricultural Product Company
12	Mr. Nguyen	Director, Seed Enterprise
13	Ngo Van Dung	Deputy Director, Phuc Thinh Joint-stock Company
14	Bach Trong Tao	Bac Ninh French Duck Enterprise
15	Nguyen Xuan Dang	Ha Tay Department of Animal Health