



# The Political Economy of Avian Influenza in Thailand

Rachel Safman

# Thailand



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Thailand is centrally located relative to the Avian Influenza epidemic and her response to the disease has important implications for disease control efforts both regionally and globally. A middle-income country with a large and economically significant export-oriented poultry sector, Thailand has made protection of the broiler industry and preservation of international market access the primary focus of her response. At the same time, policy-makers have needed to assuage small-scale poultry producers, including cockfighting enthusiasts, who have borne the brunt of movement controls and stricter biosecurity standards. Consequently, the government has re-evaluated its absolute ban on livestock vaccination and implemented innovative strategies such as "bird passports" to reduce the burden of compliance on small producers. Another significant dimension of the Thai epidemic is the recent emergence of open-grazing duck production, which may have provided a reservoir and vector for the H5N1 virus. Niche producers, including duck farmers, carry increasing weight in political and economic spheres in Thailand. Finally, the Thai public health community has advocated for more aggressive measures to prevent additional animal-to-human transmission of disease. The human health dimensions of the Avian Influenza epidemic have ultimately strengthened Thailand's position in the international health debate and resulted in increased funding for infrastructure development and capacity-building.

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# **The Political Economy of Avian Influenza in Thailand**

**Rachel M. Safman**

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## About the STEPS Avian Flu project

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## STEPS Avian Flu project publications (available to download free from [www.steps-centre.org](http://www.steps-centre.org))

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## INTRODUCTION

The rapid and widespread propagation of highly pathogenic avian influenza (HPAI) through the poultry (and on a much smaller and slower scale, human) population in Thailand was significant not only in national but also international terms, owing both to the geographic, political and technological centrality of Thailand in the Southeast Asian region (itself, in turn, the epicenter of the global epidemic), and to the country's prominent position (fourth internationally in terms of both value and volume) in the international poultry trade. For these reasons, an understanding of the dynamics of the Thai HPAI epidemic and the measures taken to bring it under control are of interest to an audience much larger than just those focused on issues of livestock production and/or emergent (human) disease threats in this part of the world. In addition, the history of the HPAI epidemic in Thailand and the response at both the local and national levels provide an interesting and informative vantage point to those seeking a nuanced understanding of contemporary political, social and economic forces within Thai society, as many of the fissure points which were visible in the debates on HPAI and its control are, in fact, reflective of the sweeping changes taking place in the Thai economy and Thai politics. This article will attempt both to describe the important features of the epidemic from a disease control perspective and to explain their significance ethnographically. While this two-sided focus will inevitably mean that there are aspects of each narrative that are given short shrift or treated too extensively for the needs of specific audiences, it is hoped that in general the article provides a sufficiently comprehensive overview of the epidemic's development and the government's response so as to be of benefit to technical advisors, policy-makers and scholars of the epidemic.

The story of HPAI in Thailand is intertwined with other significant narratives. The epidemic, which had its onset in late 2002 or early 2003, came on the heels of the Asian economic crisis, which had sent the baht into free-fall, displaced tens of thousands of workers and undermined confidence in the country's financial management. It was also a time when the political system was in transition. The 2000/2001 elections had ushered in a populist government, headed by Thaksin Shinawatra, a telecommunications tycoon who was strongly oriented towards the needs of the business community. Thaksin's ascent, and the forces which propelled it, signaled a realignment in the balance of power between rural areas and the Bangkok metropolis, and between new commercial interests and the established political elite. Finally, of more proximate interest to this analysis, the early 21<sup>st</sup> century was a period of sweeping changes in Thailand's poultry sector. The sector, which only twenty years earlier had been an insignificant contributor to national accounts, was, at the time of the epidemic's outbreak, among the country's top-twenty sources of export earnings, with large industrial producers – a class which had not even existed two decades earlier – now supplying close to 10% of the world poultry export market. The arrival of HPAI both shaped and accelerated changes going on in the poultry sector and, perhaps, changes going on in the country more generally, just as these secular trends affected the speed and manner in which the Thai government responded to the crisis.

To elucidate the role which not only the commercial poultry sector but also other interests played in shaping the national debate on HPAI, this article will analyze the epidemic from the perspective of four major stakeholder groups: industrialized poultry producers, cock-fighting enthusiasts, duck farmers, and (human) health professionals (in particular members of the public health community). Each of these groups played a central role in shaping the government's perceptions of and responses to the epidemic, and each furthermore represents a slightly different window on Thai society and the Thai economy, as a whole.

Industrial poultry producers, whose interests held more sway in the Thai government's response to HPAI than those of any other group, are in many respects representative of the "modern sector" of the Thai economy and, more specifically, of export-oriented agribusinesses, which have come to play a key role in Thailand's economic growth. Technologically sophisticated and increasingly self-contained in terms of their production process, these firms were well positioned to attend to the bio-physical dimensions of disease control internally (at least in terms of their own facilities). However, they were dependent on the government to manage the disease control efforts beyond their gates and sought its assistance in shaping (for the better) perceptions of the HPAI situation among consumers, both domestically and internationally. As such, these politically well-connected entrepreneurs exerted a strong influence on the technical management of the epidemic and on the way in which information about the epidemic was released.

Cock-fighting enthusiasts, including both those who rear and train the birds directly and those who attend matches and/or wager on their outcomes, might be seen (and consciously positioned themselves in this debate) as the "everyman" in the Thai political landscape. They came to serve as proxies for the vast rural population, whose more traditional approaches to animal husbandry and economic survival, more generally, were felt to be under siege as larger commercial interests came to dominate agricultural production. Not to be overlooked in this equation is the fact that the rural electorate provided the largest and most consistent basis of support for Prime Minister Thaksin and his Thai Rak Thai (TRT) party.

Duck farmers had seldom, if ever, been regarded as a distinct agricultural subpopulation and would not have entered the government's radar on this issue (nor this author's) had it not been for epidemiological evidence which strongly implicated free-ranging ducks in the conservation and transmission of the H5N1 virus. This led to the promulgation of a set of specialized policies and support mechanisms and also illuminated the existence of an emergent class of specialized "niche" producers, who may represent an important trend in Thai agriculture as the sector becomes more sophisticated and diversified.

Finally, the public health community, which encompasses health educators, health policymakers, and pharmaceutical interests, as well as persons directly involved in the administration and provision of health services, represents the interest group which is most orthogonally positioned relative to the others. The human health implications of the spread of H5N1, which clearly defined the epidemic in the mind of the international community (including many of the international actors who provided assistance to or funding for Thai initiatives), played a less central but nevertheless important role in the way in which the Thai public and Thai policymakers regarded the disease. Prevention of human cases was, in fact, the "gold standard" by which the success of the overall disease containment effort was judged. That said, the interests of the public health community in the HPAI epidemic went far beyond the immediate concern for disease control, extending into issues of technical capacity-building, organizational restructuring and the legitimation and promotion of Thai science on the international stage.

In terms of the organization of this paper, the various thematic analyses outlined above will be preceded by a brief overview of the context of the epidemic and a short history of key events and followed by some concluding comments. A description of the process by which the information on which this report is based was obtained is contained in a methodological appendix (Appendix A), which describes both the author's approach to ethnographic investigation and the primary source material (particularly news accounts) incorporated.



## I. SETTING THE STAGE: THAI SOCIETY AND POLITICS AT THE DAWN OF THE TWENTY-FIRST CENTURY

Thailand is a country of approximately 61 million people situated at the geographical heart of mainland Southeast Asia. Traditionally an agricultural society with an economy based particularly mainly on rice cultivation, the country has, since the first part of the twentieth century been engaged in an ambitious program of modernization and development, built to a significant degree around the recruitment of foreign capital and development of export-oriented enterprises.

### **Thailand's Economic Growth and Modernization in the Late 20th Century**

In most respects Thailand has been remarkably successful in her economic development efforts, and is one of the few countries to have made the transition from being a low- to a middle-income country. Her real growth rates from the 1960s through the mid-1990s were among the highest in the world (Warr, 2007), and since this growth was paired with a dramatic reduction in the birthrate resulted in palpable, qualitative improvements in the quality of life for almost all Thailand's residents. That said, the majority of Thailand's growth occurred in the industrial and service sectors,<sup>1</sup> leaving agriculture, which is still the economy's biggest employer, as something of a poor stepchild.

In the mid-1990s Thailand's impressive economic growth faltered under the weight of excessive commercial debt (most denominated in foreign currencies) and ill-conceived monetary policy (Fry, 2004). Foreign investors pulled their money out en masse during a two week panic in mid-1997, leading to a collapse of the Thai currency, the baht. The government was forced to seek emergency loans from the International Monetary Fund, under terms which the Thais found humiliating.<sup>2</sup> There was also a general contraction of the economy, resulting in massive layoffs and a tightening of credit markets.

Thai politics was also in turmoil in the closing years of the 20<sup>th</sup> century. Throughout the period when Thailand's economy was growing, the country was also making bumpy progress towards the establishment of a stable, participatory democracy. Repressive military regimes, which had been the mainstay of governance in the years of the Indochinese Wars, gave way first to more permissive military-led governments and then, in 1988, to the election of a civilian government headed by Prime Minister Chatichai Choonhavan.

In the eyes of most of the Thai middle class, the ascension of a civilian administration by democratic means marked a qualitative – and presumably irreversible – development in Thai politics (Kurlantzick, 2003). They were thus aghast when, in 1991, the Chatchai administration

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<sup>1</sup> From 1960 to 1990 agriculture's share in the total economy declined from 40% to 17%. However, the proportion of the population employed in agriculture in 1990 still exceeded 60%. While these figures would suggest an underperformance in the agricultural sector, Warr (2007) has pointed out that since the 1970s agriculture has enjoyed the biggest growth in factor productivity (returns to a given unit of input) of any sector of the Thai economy.

<sup>2</sup> During the 19<sup>th</sup> and early 20<sup>th</sup> centuries Thailand had escaped colonization by a Western power, an accomplishment matched by no other country in Southeast Asia and a source of considerable national pride. The Thai public was thus exceptionally chagrined to find the country's monetary and fiscal policies being subject to review by international experts.

was brought down by a military coup. Although the military leadership which sought to replace Chatchai was ultimately unsuccessful wresting control of the state from civilian hands, the events of this period, which included a bloody confrontation between the military and unarmed protestors in May 1992, left members of the electorate and, in particular, members of the business community, convinced that structural reforms were needed to preclude state capture by anti-democratic forces.<sup>3</sup> They began the process of drafting a new “People’s Constitution” which was ultimately promulgated in November 1997.

### **The Thai Economy and Thai Politics in the Wake of the Asian Economic Crisis**

The elections of January 2001, which were the first to be carried out under the new constitution,<sup>4</sup> provided the Thai electorate with their first opportunity to respond to the disturbing developments of the late 1990s. By a margin so large as to grant the party a near simple-majority, voters sided with the highly nationalist, increasingly populist platform of the Thai Rak Thai party<sup>5</sup> headed by Northern business tycoon, Thaksin Shinawatra.

Thaksin, himself a billionaire who had earned a considerable portion of his wealth through the timely – and some would argue, questionable – purchase of a government telecommunications monopoly, sold off during a wave of privatization, was nevertheless the darling of the Thai masses who saw him as their champion vis-à-vis the Bangkok elite.<sup>6</sup> Throughout his period in office, which ended with a bloodless coup in October 2006, Thaksin remained a strong backer of pro-poor legislation such as low-cost health care and direct government investment in rural areas.

Somewhat ironically, given what a distant pole it represented in Thailand’s social and (traditional) political landscape, Thaksin’s other big source of support was big business. Although Thaksin himself had managed to avoid sustaining significant losses during the currency collapse of the 1990s, he recognized the bruising impact which the economic crisis had had on the economy as a whole and was convinced that the fastest avenue to recovery was by assisting domestically controlled firms to make inroads in international markets. He thus provided significant protection and assistance to export-oriented businesses and also fought hard to gain them favorable to overseas markets.

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<sup>3</sup> The concerns of the academics, business leaders and Bangkok elite, who dominated the constitution-drafting process, extended beyond concerns about future intervention by the military, whom they realized could not be completely controlled by legal means, extended also to a desire to circumscribe the influence of up-country politicians who were seen as corrupt and excessively parochial.

<sup>4</sup> The fact that Thaksin came to power under the new constitution is important, since this document, designed to consolidate the hold of the Bangkok elite, set strict limits on who could run for office and curbed the level of autonomy exercised by party members (Prasirtsuk, 2007). These measures greatly strengthened the hand of the chief executive and enhanced his ability to enforce party discipline.

<sup>5</sup> “Thai Rak Thai” can be variously translated as “Thais Love Thais” or “Thais Love Thailand”. In either case, the strong nationalist overtones of the party’s platform are clear. The thrust of their policies was to create a favorable environment for the growth and regeneration of Thai business interests through the creation (where necessary) of protected market spaces and the provision of direct government support to and intervention on behalf of large export-oriented concerned, in particular.

<sup>6</sup> Pongpaichit and Baker (2008) claim that Thaksin’s populist credentials were established during his protracted and very public battle in court against the National Counter-Corruption Commission, which tried to disqualify him as a candidate for public office, citing irregularities in the operations of his political campaign and failure to disclose assets.

Apart from effecting a shift in political alignments in Thailand, Thaksin also had a transformative impact on the culture of governance. His leadership style was centralized and autocratic, bringing not only elected officials but also government bureaucrats under his control.<sup>7</sup> He also sent an unambiguous message to the media and civil society that, unlike previous administrations, he was not threatened by their power.<sup>8</sup>

## II. THE STRUCTURE AND RESTRUCTURING OF THE THAI POULTRY SECTOR PRIOR TO HPAI

Before proceeding with a discussion of the HPAI epidemic, as such, it is important to develop one more area of background so that the reader can understand why the HPAI outbreak cut so deeply through the fabric of Thai society. Of all the sectors of the agricultural economy which might have been affected by an epidemic affecting the exportability of products, the poultry sector was amongst the most sensitive in terms of Thailand's overall economy and society.

The poultry sector in Thailand is large. Estimates place the standing population of chickens in Thailand at about 250 million<sup>9</sup> (Burgos, et al., 2008) with approximately 80% of households in rural areas raising poultry on at least an informal basis (Rushton, et al., 2004). At a more formal level, it is estimated that more than 400,000 Thai jobs are related the poultry and poultry processing (Tiensin, et al., 2005).

As important from a political perspective is the contribution which the poultry sector makes to national accounts.<sup>10</sup> Poultry sales constituted more than half the total value added by livestock, which in turn comprised about 10% of the agricultural GDP (Costales 2004, NaRanong 2007). Export sales are a significant source of this value. In 2003, the last year in which production and export figures were unaffected by the epidemic, Thailand was the world's fourth largest poultry exporter, commanding a 7.5% share of the world's broiler export sales. Poultry exports from Thailand (primarily, broilers) totaling some 546,000 metric tonnes were estimated to have contributed 48.4 billion baht (1.21 million USD) to the Thai economy (Thai Broiler Processing Exporters Association).<sup>11</sup>

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<sup>7</sup> The conventional wisdom in the study of Thai politics had long been that the elected elements of government and the bureaucracy functioned essentially as isolated and unrelated components, with the high level executives issuing broad policy directives and the bureaucrats determining how these policies would actually be interpreted and enacted (Painter, 2006).

<sup>8</sup> In 2003 Thaksin directed a crackdown on the illegal drug trade which resulted in the disappearance and extrajudicial killing of hundreds if not thousands of accused drug dealers. In many instances those targeted were believed to have been implicated for political rather than criminal reasons. In addition, Thaksin attempted to silence opponents in the press by buying out or attempting to shutdown or bankrupt media outlets which reported unfavorably on his administration (Kurlantzick, 2003).

<sup>9</sup> Chickens (including broilers, layers, and native chickens) represent about 91% of all poultry holdings in Thailand (Tiensin, et al. 2005)

<sup>10</sup> Prior to the advent of HPAI the broiler sector in Thailand was growing at an annual rate of between 5 and 6% (McSherry and Preechajarn, 2005).

<sup>11</sup> This figure includes both cooked and uncooked chicken products. There is also a small but growing (pre-HPAI) overseas market for duck meat and a negligible sale of eggs and egg products overseas. However, neither of these contribute significantly to the total value or volume of exports.

Significant as the export market is, it accounts for only about 40% of total poultry meat production, the remainder is destined for local consumption (NaRanong 2007). Thais consume an average of about 14 kilograms of chicken meat per capita per year and poultry consumption is rising (or was prior to the HPAI outbreak) relative to the consumption of other sources of animal protein (Costales, 2004). The domestic market for eggs is also considerable. Thais consume approximately 150 eggs per person per year, leading to a total annual sales of approximately 615,700 metric tonnes valued at 21.03 billion baht (Thailand National Statistics Office, NaRanong, 2007).

Poultry production in Thailand takes place under a variety of circumstances. Most descriptions of the sector segment it into four constituent categories based on size of the operations and/or the markets they serve. These include: informal or backyard producers, small to medium-scale commercial producers, large commercial producers and vertically integrated industrial producers.

By far the most common form of poultry rearing (as measured by number of farms) is backyard chicken production. These operations are too small and informal to be enumerated in the Thai agricultural census, which only registers farms of one hundred birds or larger, and as such estimates of their size and number vary greatly. But a reliable recent assessment claims that backyard farms comprise about three-quarters of all poultry flocks in Thailand (i.e., about 2.175 million flocks) and average about thirty birds in size (Otte, et al., 2006).

Whatever the numbers used, there seems to be general agreement on the characteristics of these small, informal producers, most of whom are raising birds of native stock (Haitook, et al. 2003). Backyard producers tend to rely on a low-input, low-tech approach to animal husbandry in which the birds are allowed to forage freely or subject to minimal enclosure and feed supplements and medicaments are limited. The birds (and eggs) produced in this fashion are typically destined for home consumption or for sale at local wet-markets.

An important subset of the backyard poultry sector is the fighting cock industry, which while equally small in scale (in terms of the number of birds produced per operation) and also reliant on native or native-hybrid stock, tends to employ significantly more sophisticated (if not technological) approaches to breeding, rearing and training. A more involved discussion of the fighting cock industry is included elsewhere in this report, but it deserves mention here that between 1 million to 6 million birds are assumed to be being raised for this purpose.

Small to medium scale commercial farms, which in 2003 constituted only 6.6% of all poultry holdings, are generally a bit more sophisticated in their operations and better linked into centralized supply and marketing chains than are the backyard producers.<sup>12</sup> They range in size from 100 to 500 birds (by some definitions, up to 1,000 birds). The majority of operations in this size range focus on (chicken) egg production, although farms of this size also include those producing birds for specialty niche markets including native chickens, quail, ducks and geese.<sup>13</sup>

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<sup>12</sup> Small commercial producers are likely to buy their stock (day-old chicks) from an outside supplier and to market their products through a regional distributor.

<sup>13</sup> Production of birds other than chickens is limited in Thailand and none of these alternative species will be covered in this report with the exception of free-grazing ducks, which are believed to have played a central role in the propagation of the H5N1 virus.

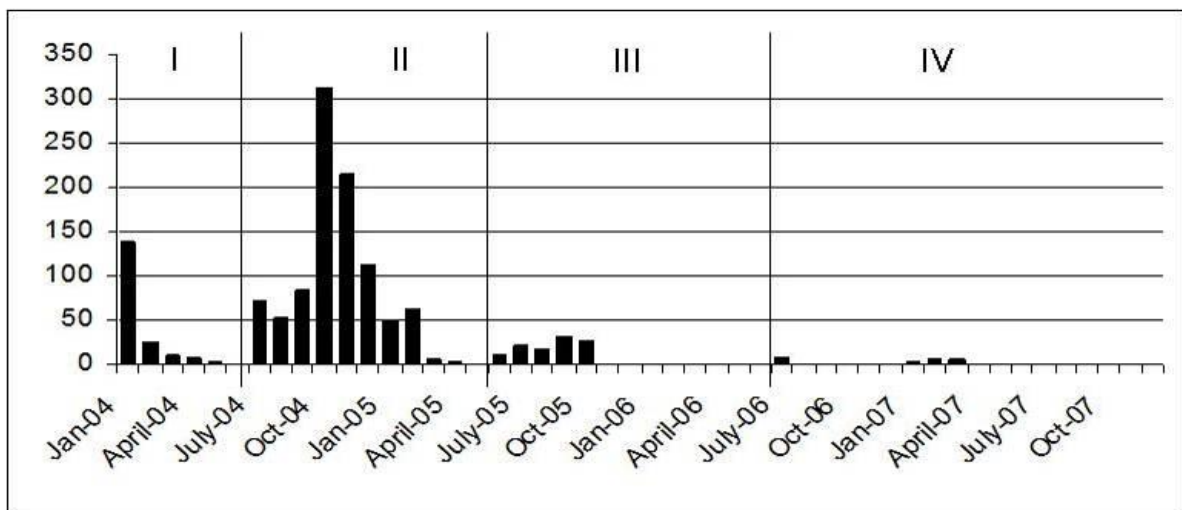
Large-scale farms are typically operated under contract to agro-processors who may be selling their products to domestic or overseas markets. Farms in this category, which range in size from 1,000 to 5,000 birds, typically employ quite modern husbandry practices, including standardized feeding and medical regimens, contained housing units with at least modest bio-security and controlled environmental conditions achieved through the use of evaporative cooling systems, a technology which has significantly improved survival and reduced costs associated with rearing birds in Thailand’s tropical environment (NaRanong, 2007).

The last class of producers, presumed to number no more than a few hundred facilities but to nevertheless account for a large and growing share of total poultry production, are the vertically integrated farms owned and operated directly by the agro-exporters. These highly bio-secure facilities, which more closely resemble integrated poultry processing factories than farms, may house upwards of 10,000 birds at a single site. In addition to sealed, environmentally contained chicken houses, the integrated facilities oftentimes contain on-site hatcheries, slaughter houses, and post-slaughter processing facilities (for the conversion of carcasses to finished, cooked poultry products).

### III. THE HISTORY OF HIGHLY PATHOGENIC AVIAN INFLUENZA IN THAILAND: TRACING THE EMERGENCE OF THE EPIDEMIC

The HPAI epidemic struck Thailand in four more or less distinct waves (see Figure 1), each with a somewhat different pattern of infections and distinct policy response. The first two waves of infection, occurring in late 2003/early 2004 and mid- to late 2004, respectively, resulted in widespread infection of poultry flocks with mass die-offs and extensive culls, while the later two waves, the first of which occurred during the latter half of 2005 and extended through 2006 and the latter in late-2007 (persisting arguably through the present) tended to be better contained and more localized in their manifestation.

**Figure 1. Reported Cases of HPAI in Poultry in Thailand, Jan 2004 – Dec 2007 (adapted from Gilbert, et al., 2008)**



Human cases of H5N1 infection have a periodicity which has tended to follow that of the avian epidemic, coinciding with the lead edge of the poultry outbreaks.<sup>14</sup> Although there were substantial numbers of human infections (a total of 25 cases resulting in 17 deaths) during the early years of the epidemic, by late 2006 Thai public health officials appear to have been successful in decoupling the spread of infections in humans from poultry outbreaks, and since 2007 no human cases of the disease have been recorded (WHO, 2008).

### **The Initial Outbreak of HPAI in Thailand**

The appearance of avian influenza (AI) in Thailand in the waning months of 2003<sup>15</sup> was neither a novel nor an unprecedented occurrence. Influenza strains affecting both human beings and poultry have long been endemic to the Southeast Asia region, including Thailand.<sup>16</sup> But what made this outbreak noteworthy was its chronological and geographic context. In the preceding months outbreaks of a highly pathogenic strain of avian influenza (HPAI) based on the H5N1 strain of the virus had been confirmed in a number of Asian countries, including Hong Kong, China, Cambodia and Vietnam, giving rise to fears that an HPAI outbreak might also occur among Thailand's billion dollar poultry export industry (OIE, 2004).

These epidemiological warning flags notwithstanding, the Thai authorities chose to treat the earliest instances of mass die-offs reported by poultry producers in Central and lower Northern Thailand as isolated point-source outbreaks, rather than as indicators of a more widespread epidemic (Tiensin, et al. 2005). In response to a constellation of political and economic factors, which will be discussed in greater detail later in this report, the authorities both suppressed information of the virus' appearance and also responded to the epidemiological challenge that these outbreaks posed with highly localized disease eradication measures which were ultimately unsuccessful -- both in terms of their most immediate goal of disease containment and in terms of their larger goal of impression management and minimizing the impact of the outbreak on poultry exports.

By January 2004 the number of "point outbreaks" and the pressure being applied by both domestic (*The Nation*, Jan 15, 16, 17) and international constituencies (Nicely and Preechajarn 2004a) to acknowledge and respond to the problem was such that the government launched a systematic national surveillance program which revealed that the H5N1 strain of influenza had spread to almost half (32 of 76) the provinces in Thailand (Tiensin, et al., 2005). Successive waves of surveillance tracked the epidemic's expansion across 89 districts in 42 provinces, which extended from the far north of the country to the South and East (towards the borders with Laos and Cambodia) with concentrations in the Central provinces where poultry production was most intensive.<sup>17</sup>

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<sup>14</sup> Indeed, at one point, public health authorities complaining about the poor state of surveillance commented that humans were serving as a sentinel species for detection of HPAI outbreaks in poultry.

<sup>15</sup> McSherry and Preechajarn (2005) date the onset of the HPAI epidemic in Thailand to November 2003, an estimate which is consistent with that of Tiensin and colleagues (2005). However, according to official sources, the HPAI outbreak dates only to January 23, 2004, when the first diagnoses of H5N1 infection were confirmed.

<sup>16</sup> For a more detailed discussion of the epidemiology of influenza in Southeast Asia, including Thailand, see Simmerman (2004), WHO Global Influenza Program (2005), and Li et al. (2004).

<sup>17</sup> Evidence that the cases caught by these successive waves of active surveillance excluded the leading edge of the epidemic is provided by the infection incidence curves themselves which peaked in late January (Avian Influenza Control Operating Centre, 2004).

Compounding the political and economic impact of the zoonotic outbreak was the near simultaneous appearance of the first human cases of HPAI-associated influenza in Thailand. Two children, both of whom had been in close contact with infected birds, were hospitalized for, and ultimately died as a result of, influenza infections resulting from the H5N1 strain of the virus (Ministry of Public Health, 23 January 2004).<sup>18</sup> These deaths, reported not only within Thailand (Bangkok Post, 23 January) but also internationally (World Health Organization, 2004), led to calls from the Thai public and the international community for a rapid and concerted government response, and indeed, such a campaign was soon forthcoming.

Just three days after the appearance of H5N1 in Thailand was publically acknowledged, Prime Minister Thaksin Shinawatra convened a ministerial meeting at which four government ministries were represented, namely: the Ministry of Agriculture and Cooperatives (which subsequently administered their disease control efforts through the Department of Livestock Development or DLD), the Ministry of Public Health (MOPH), the Ministry of Commerce, and the Ministry of Foreign Affairs. The inclusion of these last two parties, whose portfolios had little if any direct bearing on disease control efforts, but rather focused on the communication of government policies to audiences both within the country and beyond illustrates the degree to which the HPAI epidemic was viewed from the outset as a threat to the country's economic interests (both in terms of its direct impact on poultry sales domestically and internationally and, by extension, through its potentially dampening effect on tourist arrivals) with secondary concerns relating to the impact which disclosure and containment policies might have on Thailand's relations with neighboring countries and with the international community.<sup>19</sup>

The measures adopted for disease containment did indeed adhere closely to the provisions laid out by such international bodies as the FAO, WHO and OIE. Among the steps taken was a comprehensive cull of all susceptible poultry from farms located within a 5 kilometers radius of the site of a confirmed H5N1 outbreak. Not only were the animals themselves killed and their carcasses either burned or buried, but all housing, feed and other potentially infectious materials associated with the animals was also destroyed and the premises thoroughly cleaned and disinfected.

In addition, movement restrictions were imposed within a 50 kilometers radius of the outbreak site. Some 65 checkpoints were established along the roads leading to and from disease-affected areas, and vehicles passing through these nodes were inspected to ensure that no susceptible animals were being taken from or through the quarantine zones where they might come in contact with infectious agents (Nicely and Preechajarn, 2004a).

Finally a 90-day ban was imposed on the exportation of poultry from the affected areas, a step which was in actuality redundant as most overseas markets, including the European Union and Japan, almost immediately applied their own prohibitions on the importation of all poultry (raw

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<sup>18</sup> Eventually the number of human cases of H5N1-associated influenza diagnosed during between January and March 2004 would climb to 12, with 8 fatalities resulting. In all cases, the patients infected by the virus had been in direct contact with (potentially) infected poultry (Tawee Chotpitayasonondh, et al. 2004).

<sup>19</sup> International organizations including the FAO, WHO, OIE, and JICA are, in fact, expressly mentioned in the government's official communiqué on its HPAI response released in July 2004 (Avian Influenza Control Operating Centre).

and cooked) originating in Thailand (*The Nation*, 23 January 2004).<sup>20</sup> These bans, intended to be short-lived, in fact remained in effect with respect to raw meat through the time of this writing in 2008, and even cooked meat products were given only limited access to Japanese and European markets through the end of 2005.

Although the Thai public was scornful of their government's initial attempts to cover up the HPAI outbreak there was also a high level of compliance with and receptivity to attempts to contain the disease.<sup>21</sup> Bird owners, frightened by the devastating impact of the virus on their poultry and its presumed implications for their own lives, agreed en masse to surrender their birds in exchange for the proffered compensation, which was among the highest rates paid anywhere in the region.<sup>22</sup> Approximately 62 million birds – mostly chickens being raised by small- to medium-sized backyard producers – were killed during this campaign, which employed not only animal disease experts but also public health volunteers and members of the Thai military and cost the government an estimated \$132.5 million<sup>23</sup> (DLD, 2005).

In addition to their culling efforts, officials at the DLD developed educational materials and launched a public information campaign designed to encourage compliance with disease control efforts and to promote safe animal handling practices both in the context of the culls and subsequently in animal husbandry facilities. This strategy of pairing direct physical interventions with public information efforts was paralleled by officials in the MOPH, whose emphasis was on preventing animal-to-human or human-to-human transmission of the disease.

The public health campaign, which like the animal health effort, corresponded closely to the directives of international organizations (including recommendations from the U.S. Centers for Disease Control and the World Health Organization), had two primary components. The first consisted in the ramping up of preparedness at primary health care facilities, including the stock-piling of anti-viral agents (Tamiflu) and preparation of containment facilities for patients presenting with symptoms suggestive of severe pneumonia. The second arm of the MOPH's campaign was a media blitz in which they encouraged workers engaged in poultry producers and as abattoirs to employ personal protective equipment and to avoid contact with sick birds; educational efforts aimed at both retailers and consumers, which explained safe food-handling practices and discouraged the sale and consumption of un- or under-cooked poultry; and, finally, advisories concerning the appropriate course of action (reporting immediately to a government-

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<sup>20</sup> Within a week of the Royal Thai Government's acknowledgement of the HPAI outbreak, the European Union, Japan, Singapore and the United States (Thailand's major buyers) had all closed their markets to poultry imports from Thailand, a move which ultimately resulted in a 91% decline in the export of uncooked poultry as compared to the year before (Pierce 2005). Poultry exports, in general, which had reached an all-time high of 545,000 tons in the year before, plunged to just 300,000 tons in 2004 (Thai Broiler Exporters Association, 2004).

<sup>21</sup> An important exception to this rule of generalized compliance was that owners of songbirds and fighting cocks, individuals who had a far greater economic and emotional vestedness in their birds appeared significantly more reluctant to surrender their pets. The case of the fighting cocks will be discussed in greater detail later in this paper.

<sup>22</sup> Compensation rates ranged from \$.50 to \$3.75 per chicken (depending on age and use), \$2.00 to \$3.50 for ducks, \$3.50 for geese, \$7.25 for turkeys and \$65 for ostriches (all figures in USD, taken from Tiensin, et al. 2005). Except in the case of fighting cocks, these compensation figures correspond to between 80 and 100% of the birds' market value (Nicely and Preechajarn 2004a).

<sup>23</sup> Note, this figure represents only the outlays related directly to compensation, expenditures on materials and personnel employed in the culling effort might easily have been double this, although exact figures are unavailable.



run clinics or hospitals) should someone display severe flu-like symptoms (MOPH, 27 January 2007).

Public education was not the only goal of the information barrage to which the Thai public was being subject during this period. There was also a secondary campaign underway to win – or win back – the confidence of domestic and overseas consumers of Thai poultry.<sup>24</sup> High ranking politicians, including the deputy minister of agriculture flew to Japan and Europe to assure foreign buyers that the government was taking every possible step to contain the disease. And in a particularly high profile move, Prime Minister Taksin Shinawatra himself appeared on prime time television consuming chicken and compensation to any person taken ill as a result of eating (well-cooked) Thai poultry (*The Nation*, January 31, 2004).

### **(Re-)Evaluating the First Wave Response**

By May 2004 the outbreaks had tapered off<sup>25</sup> and disease control officials turned their attention to planning for the next onslaught of infections, which despite assurances to the public to the contrary seemed all but inevitable (*The Bangkok Post*, 15 May 2004). Discussions ensued within both the public health and animal health communities as to how to refine preparedness and control efforts so as to prevent a catastrophic re-emergence of the virus at some future date.

For those whose primary concern was human health, the emphasis of their efforts during this period was in boosting the ability of the public health infrastructure to detect and respond to a large-scale emergency. Presumptive diagnostic criteria were developed in order to allow medical personnel to recognize and respond in a timely manner to early signs of H5N1 infection (Tawee, et al. 2005). In addition, public health personnel attended refresher courses in infection control with the aim of preventing a recurrence of the SARS experience, in which a significant proportion of the cases (outside of Thailand) resulted from hospital-acquired infections. Finally, the Thai government began stockpiling essential supplies, including oseltamivir, an antiviral agent which had been shown to have limited effectiveness in curtailing the severity of HPAI cases. Access to oseltamivir was to become an increasingly central concern of Thai health authorities as time went by.

On the animal health front the two main issues under discussion were quarantine and vaccination. The quarantine discussions were relatively straight-forward and emerged from a realization that the containment measures transplanted from Europe were untenable in a Thai context. Although the DLD had employed almost every imaginable available resource (including supplementary support from the MOPH, police and military) in its culling campaign its field staff routinely found themselves unable to complete the culling of poultry within the 5-kilometer exclusion zones within the time frame (48 to 72 hour) needed to prevent the further propagation of the virus. In fact, implementation efforts were described by one staff member as a “rolling kill” with the destruction of the birds taking place on a more-or-less continuous basis as disease control teams made their way from one hot spot to the next.

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<sup>24</sup> These confidence boosting measures were only partially successful. Poultry consumption in Thailand dropped by 20 to 30% in the first half of 2004 (Nicely and Preechajarn, 2004).

<sup>25</sup> According to official government reports there were no new cases of HPAI during April and May 2004 (DLD, 2004). However, international disease control agencies remained skeptical of these claims and it was noted that when the disease “reappeared” later that year the viral strain responsible was nearly identical to that which had caused the earlier outbreak (Avian Influenza Control Operating Centre 2004), suggesting that the two occurrences were not, in fact, distinct.

Conceptually, too, the imported zoning system was observed to be impractical given the near continuous patchwork of homesteads, often lacking in discernable boundaries which characterize rural Thailand. In attempting to implement the culling protocols as dictated by the FAO and OIE, field officers were forced to make somewhat arbitrary decisions as to which farms were selected for culling and which passed over. This, in turn, sparked resentment among those farmers whose animals were included in the kill.

As a result, during the lull in new cases DLD authorities began to shift their internal guidelines to favor a more targeted disease eradication strategy better adapted to local conditions. The radius of the kill zones was reduced from 5 kilometers to one. They also established regional centers responsible for disease surveillance and for educating local farmers on the proper housing and maintenance of poultry.

Finally, in a move designed to prevent further cases of fraud and abuse should culling resume, farmers were required to register their birds with the local authorities (a move which began some months before with fighting cocks), and the importation of birds from countries or regions where disease had been detected was forbidden (*The Nation*, July 9, 2004).

Of greater visibility – and acrimony – than the discussions related to the culling policies were the debates surrounding the use of vaccination against infection in poultry. From the earliest days of the HPAI outbreak, the owners of exotic birds and fighting cocks, in particular, had suggested that vaccination might offer an effective alternative to culling which, they claimed, resulted in the senseless destruction of large numbers of uninfected birds.<sup>26</sup> They were soon joined in their petition by the owners of small-scale poultry operations who lacked the capital needed to upgrade their facilities in order to comply with the more rigorous bio-security guidelines promulgated by the government in June 2004.

Mindful of small producers' sensitivities on this issue but also of the needs of the export-oriented industrial producers to maintain (or restore) their access to overseas markets, which were generally hostile to vaccine use, the government decided in July 2004 to establish a national committee under the auspices of the National Veterinary Council, which was charged with evaluating vaccine use as an approach to HPAI control. The committee met over a period of two months, listening to testimony from a variety of national and international experts and reviewing research on the efficacy and feasibility of introducing a vaccine-based regimen as a supplement to the culling protocols (which would remain the main feature of the control plan in the event of another widespread outbreak).

The committee's recommendation, released in September 2004, was that the total ban on vaccine use be upheld.<sup>27</sup> In announcing this finding, committee members cited four main factors, namely:

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<sup>26</sup> In fact, tests on carcasses recovered from the culls revealed that upwards of 98% of the birds killed were disease-free [source].

<sup>27</sup> In fact, the findings of the National Veterinary Council committee were not the final word on vaccine use. The issue came up again in February 2005 and again in October of that year and as recently as 2007 the government was floating the idea of employing vaccination in ducks and/or fighting cocks and exotic birds as a supplement to culling.

- 1) Vaccine use might facilitate the mutation of the H5N1 virus to a yet more lethal strain capable of causing widespread human infection.
- 2) Available vaccines were of insufficient quality to effectively contain the disease, especially when applied under the less-than-ideal conditions of actual field use.
- 3) The diversified conditions found within the Thai poultry sector posed insurmountable challenges in terms of the effective distribution and surveillance of vaccine use.
- 4) The economic costs of vaccination were untenable given the unwillingness of Thailand's major trade partners (in particular Japan and the E.U.) to accept birds which may have been exposed to the vaccine (Nicely and Preechajarn, 2004b, p. 3-4).

These findings, although put forth as the scientific conclusions of an unbiased scientific panel, were nevertheless seen by many small producers in Thailand – and much of the Thai public – as a major concession by the government to industrial interests. As such the policy created a resistance to and skepticism concerning subsequent control efforts that persisted long after the committee had been disbanded and complicated relations between the administration and the public into the second wave of the epidemic.

### **The X-Rays Campaign and Thailand's Response to the Second Wave of the HPAI Epidemic**

The re-emergence of HPAI in Thailand is officially dated to July 3, 2004, when officials confirmed an outbreak of H5N1 virus in a layer farm in the Central region.<sup>28</sup> This second wave of infections, which continued more or less uninterrupted through July 2005, ultimately resulted in 1,492 outbreaks spread across 1,243 villages in 264 districts, spanning much of the country (Tiensin, et al. 2005, Meyer and Preechajarn 2006).<sup>29</sup> The epidemic appears to have peaked in mid-October, when new cases appeared at a rate of 61 incidents a week; however, this upturn may be an artifact of increased surveillance activity during this period.<sup>30</sup>

Indeed, the most distinctive feature of the second wave of the epidemic was the so-called "X-ray campaign", a simultaneous cross-sectional disease surveillance campaign, which provided disease control personnel with almost real-time information on the prevalence and precise location of HPAI outbreaks nationwide. What made the X-ray effort so significant was not just its

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<sup>28</sup> As was the case during the initial HPAI outbreak, there was actually a lag between the time that poultry die-offs were first reported in the press and the government's acknowledgement of the disease. In this instance, reports of the disease's re-emergence began to surface in June 2004, but official confirmation came only some weeks' later (*The Bangkok Post*, 7 July 2004).

<sup>29</sup> By comparison, during the first wave infections there was a total of 193 cases in 188 villages in 89 districts (concentrated in the Center and lower North) (Tiensin, et al. 2005).

<sup>30</sup> There were those who argued that the sudden spike in cases was not an artifact but rather the result of an actual increase in the number of new infections, which resulted from the X-ray campaign itself. Volunteers traveling from one poultry farm to the next may have unwittingly served as vectors for the virus. While current bio-security guidelines would, in fact, militate against the movement of persons or equipment from one farm to another, there is not yet a convincing body of evidence to conclude that the campaign contributed to increased disease incidence, which instead seems to coincide with a predictable seasonal rise in infections and, in any case, dates to late September (Tiensin, et al., 2005), prior to the first round of X-ray surveillance.

scope and intensity – endeavoring to survey every household in the country for evidence of human or animal disease and in the process collecting more than 150,000 samples over a two to three week period – but also its structure which, for the first time since the outbreak of the HPAI epidemic (and one of the first occasions in the country’s history), involved a closely coordinated partnership between the two ministries – the Ministry of Agriculture and Cooperatives and the Ministry of Public Health – which had vied for “ownership” of and bitterly opposed one another’s initiatives during the first phase of the epidemic.

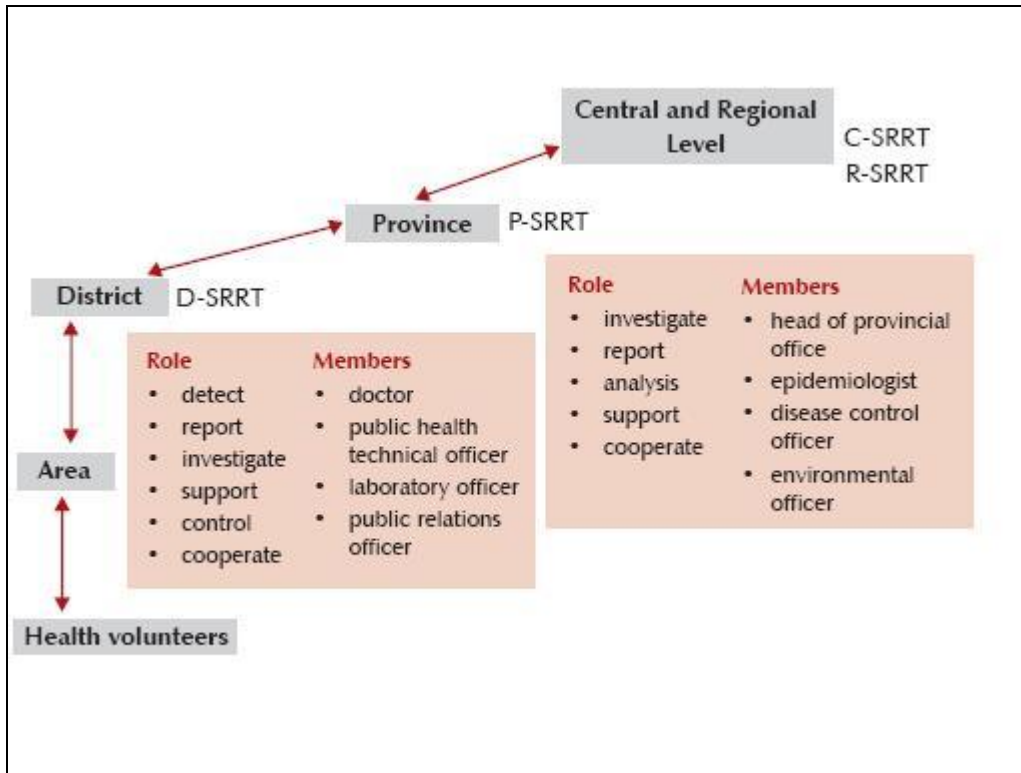
For reasons which remain murky but perhaps involve some re-assignment of personnel at the upper levels of administration, the Ministry of Agriculture and Cooperatives (working primarily through the DLD) and the MOPH resolved in the latter months of 2004 to put their differences aside and instead adopt a coordinated approach to the management of the HPAI response.<sup>31</sup> They joined hands in establishing a system of more than 1,000 Surveillance and Rapid Response Teams (SRRTs), which worked in tandem with the Ministries’ trained personnel in conducting the X-ray survey in October and then remained in place, carrying out passive surveillance and health education efforts at the grassroots level thereafter.<sup>32</sup> The composition of the SRRT teams and their organizational structure is illustrated in Figure 2.

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<sup>31</sup> It should not go without mention that at this point the entire disease containment effort was being overseen and, at least nominally, coordinated by the Avian Influenza Operations Centre , a cabinet-level coordinating body established by Prime Minister Thaksin in February 2004. Nevertheless, it was only with the launch of the X-rays campaign and the establishment of the Surveillance and Rapid Response Teams that underpinned it that the two ministries (the Ministry of Agriculture and the MOPH) were able to achieve sustained and effective coordination on disease surveillance and control.

<sup>32</sup> In fact, the success of the first round of the X-rays campaign led the AIOC to adopt it as a recurrent strategy for surveillance and disease containment. As such, SRRT members were subsequently called upon to participate in X-rays campaigns on a semi-annual basis from October 2004 through December 2006.

**Figure 2. Structure of Thailand’s HPAI Surveillance and Rapid Response Team (SRRT) System (after WHO, 2007)**



The genius of the SRRT approach was that it built upon the existing strengths of and complementarity between the two lead ministries. In particular, it integrated the technical expertise of the Division of Livestock Development<sup>33</sup> with the vast manpower resources and grassroots-level volunteer network commanded by the MOPH. The SRRTs at their most localized (or from a Bangkok perspective, distal) level consist of groups of specially trained village health volunteers (VHVs) who were charged with investigating and reporting any unusual incidents of poultry or human infection within the communities in which they resided.<sup>34</sup> Their findings were then reported to district level teams consisting of both veterinary and public health officials who confirmed reports of suspicious cases and activated a response, where

<sup>33</sup> It should be noted that the SSRTs’ efforts were also supported but the laboratory expertise of the MOPH’s Department of Disease Control (DDC) and Bureau of Epidemiology, which provided rapid assessment of clinical samples obtained from human patients reporting to local hospitals or health facilities with respiratory symptoms consistent with influenza.

<sup>34</sup> Thailand’s village health volunteer network, which constitutes a key component of the country’s primary health care delivery system, was established in 1973 and has been in continuous operation ever since. It comprises a network of approximately 1 million lay health advocates and extends to almost every village in the country. The VHVs, who are lay people selected on the basis of their reliability, interest and standing in their community, are routinely called upon to participate in trainings, surveillance exercises and health advocacy activities within their home communities under the direction of the local primary health care professionals. In exchange for their time commitment and services they and their immediate family members are offered free or reduced cost care in MOPH-operated clinics and public hospitals.

appropriate, and also compiled the local data for transmission to the provincial level teams (which more or less repeated this process at a yet more centralized level).

While the primary function of the X-ray campaign was, as the reporting protocol suggests, disease surveillance and (related to this) containment, the campaign also served a secondary function which was public education and public relations. By creating a sympathetic awareness of the perils of HPAI and the complexity of infection control amongst the health volunteer network, the campaign also promoted a more positive and cooperative attitude toward disease containment efforts among the rural public as a whole.

Compliance was also no doubt abetted by a sudden surge in the number of mammalian – including human – cases of H5N1 infection.<sup>35</sup> Most worrying among these was the first scientifically plausible instance of direct human-to-human transmission (Ungchusak, et al. 2005), which occurred in September 2004. This “family cluster” outbreak was reported by the Thai press in late September and early October, meaning that it roughly coincided with the launch of the X-ray campaign (*The Nation*, 28 Sept, 2 Oct 2004).

One of the consequences of this coincidence in timing and of the involvement of the public health volunteers in the X-ray campaign initiative was that it recast the effort in the eyes of the Thai public, shifting the emphasis from an initiative aimed at cutting losses in the livestock sector (and, in particular, losses experienced by export-oriented poultry producers) to a campaign aimed at eliminating a serious threat to human health. While this had been a motif throughout the prevention efforts, it seems to have emerged more forcefully at this time, particularly in light of the rising human casualties.

Related to this shift in emphasis (rather real or perceived) was a series of high profile events which emphasized Thailand’s role as a regional or even international leader in the investigation and control of avian influenza, particularly in humans.<sup>36</sup> Between July and January 2005, Thailand was named the site for a regional coordinating centre serving as the hub of surveillance and disease control activities for the Asia/Pacific Region (*The Nation*, 27 October). It played host to a WHO-sponsored joint ministerial meeting involving representatives from across Asia (14 Nov 2004), began collaborating with the United States Centers for Disease Control on development of a human HPAI vaccine (CDC, 2004), and through an infusion of funds allocated by the Thai parliament itself, established a regional diagnostic lab and sent health experts to Vietnam to assist that country in its disease containment efforts (*The Nation*, 26 Jan 2005).

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<sup>35</sup> Within a one month period in October 2004, H5N1 infections were diagnosed in a range of non-avian hosts, including dogs, cats, swine, and tigers (*Matichon*, 4, 12 and 20 Oct. 2004). This worrying trend suggested that the virus may have adapted itself to better survive in mammalian hosts.

<sup>36</sup> Although the epidemic at all times affected avian populations in far greater numbers and with more significant economic consequences than it did humans, international spending tended to favor research and control efforts targeting human populations.

## The Third Wave of Infection

While each of the first two waves of HPAI infection in Thailand indeed conformed to traditional notions of epidemic disease with well described “curves” in which infection rates built steadily and then declined, the third “wave”, which ran from July 2005 until approximately January 2006 (Meyer and Preechajarn 2006) consisted of a series of fairly contained localized outbreaks punctuated by extended periods when no new disease episodes were reported. As such, during this period the “epidemic” arguably shifted to a more endemic pattern of infection (Silan, et al. 2006, Meyer and Preechajarn 2006).

The onset of the third wave is dated to July 10, 2005, just two days before Thailand was to have been declared “disease-free” in accordance with international (OIE) guidelines<sup>37</sup> (*Bangkok Post*, 12 July). The first outbreak, which affected nine sites in the Central Thai province of Suphanburi, was quickly contained and authorities were, at first, hopeful that the outbreak would be but a momentary setback in their bid to eliminate the virus entirely (RTG report to OIE, July 15, 2005). However, the disease soon resurfaced elsewhere in the Central region, affecting four provinces (29 sites) there, before leap-frogging to Kalasin province (*The Nation*, 31 Oct 2005) in the Northeast. Additional point-source outbreaks, typically involving just a handful of birds, continued to arise sporadically throughout the Northeastern region until sometime in late 2005/early 2006, when the disease again went into abeyance.<sup>38</sup>

From a containment perspective, this new disease dynamic posed different challenges than had the original presentation. No longer was the emphasis on mustering large numbers of personnel to respond to mass outbreaks (although at times this was needed). Rather, officials now needed to identify those factors which were allowing the virus to persist – or be reintroduced – recurrently.<sup>39</sup> Their efforts on this front were abetted by the extensive dataset generated by the semi-annual X-ray surveys, which since their introduction in October 2004 had become a fixture in the disease control landscape. Reflecting on these data and on animal husbandry practices in the areas where HPAI seemed to have become entrenched, officials decided to focus their research and containment efforts on three types of poultry operations: free-grazing ducks, fighting cocks and “unorganized small poultry farms” (Meyer and Preechajarn, 2006).

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<sup>37</sup> The OIE's Terrestrial Animal Health Code (Article 2.7.12.2.) specifies that a country which does not vaccinate against HPAI can be considered “disease-free” 6 months after the slaughter of the last HPAI-affected animal. However, countries which *do* employ vaccination can only be deemed “disease-free” after having gone for 3 years without any cases, since vaccinated animals may harbor the virus without displaying clinical symptoms of infection.

<sup>38</sup> Reports vary slightly as to when the cases in this cluster tapered off, with the WHO reporting that the outbreak ended in November 2005 and Meyer and Preechajarn (2006) extending the epidemic right tail through January 2006. In any case, there was again an extended (apparent) disease-free period before the disease resurfaced in July 2006.

<sup>39</sup> Virological evidence suggests that the H5N1 virus was both being conserved and (re)introduced. Tissue samples obtained from two sites experiencing near simultaneous HPAI outbreaks in July 2006 displayed very different viral signatures. The first sample, taken from an outbreak site in Pichit (Central Thailand), had a signature similar to that from samples collected in Thailand in 2004 and 2005, suggesting that the virus had persisted while appearing to have been eradicated. By contrast, the signatures found in samples taken in Nakhon Phanom (Northeastern Thailand) belonged to a viral strain previously seen in southern China and Laos but never, until that time, in Thailand (Chutinimitkul, et al. 2007).

The identification of these three subsectors as (potentially) important vectors of viral transmission was a defensible choice epidemiologically,<sup>40</sup> but it stoked resentments among small producers (including small farmers, fighting cock producers and duck farmers) who felt that the government's policies and, in particular, their resistance to adopting vaccination as a containment strategy showed a clear bias in favor of large producers. Other government policies, including movement restrictions, also disproportionately disadvantaged small producers, since for them the administrative burden imposed by movement licensing requirements was crippling. A more detailed comparison of the challenges faced by large versus small or medium-sized producers is presented later in this report.

Small farmers and duck farmers also came under pressure to conform to heightened bio-security requirements including at least partial enclosure of the animals' housing and feeding/grazing areas, disinfection of persons, feed and equipment moving into and out of animal enclosures, documentation of acquisitions and movement patterns and the upgrading of processing (i.e., slaughter) facilities. The government attempted to lighten the financial, logistical and technical burden which these new requirements imposed by, for example, making available low interest loans to farmers who wished to upgrade their operations, and many took advantage of these offers. However, many more decided to close down their operations entirely, making the period from 2005 to 2006 a period of significant consolidation and restructuring within the Thai poultry sector.<sup>41</sup>

The third wave was also a period of consolidation and institutionalization on the policy front. During the first two waves of the epidemic, the responsible authorities within both the Ministry of Public Health and Ministry of Agriculture and Cooperatives (particularly the DLD) had been making policies and adapting them in a rather ad hoc fashion, as befit an acute crisis. By the third wave, however, it was clear to most of those involved with the disease control effort that the problem of HPAI was not short-lived and that the policies established to deal with it needed to have a similarly long-term character. As such these two ministries, working under the auspices of the Avian Influenza Control Operating Centre (itself under the direction of the Deputy Prime Minister), compiled two strategy documents, National Strategic Plan for Avian Influenza Control in Thailand and the National Strategic Plan for Pandemic Preparedness in Thailand.

These documents, which are briefly summarized below, collectively lay guidelines for both the prevention and/or containment of future outbreaks of HPAI as well as the steps to be taken to ensure the country's readiness should the virus mutate into a form that allowed for widespread human-to-human transmission.

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<sup>40</sup>In the cluster of outbreaks occurring between July 2005 and July 2006, HPAI was detected at 61 sites of which two (3%) were medium-sized broiler farms, three (5%) were layer (chicken egg) farms, three (5%) were quail egg farms, and the remainder were either backyard operators (including those raising fighting cocks) or informal small chicken producers. It should be noted, however, that because of the relative size of the different operations, broiler, layer and quail farms accounted for the majority of the birds infected and destroyed (based on data reported to the OIE by the Royal Thai Government).

<sup>41</sup> A year-on follow-up survey conducted by researchers from the Thai Development Research Institute among farmers who had been raising poultry on a small or medium scale during the first wave of the HPAI epidemic showed that 38% had abandoned poultry production altogether in the wake of the subsequent outbreaks. Another 26% had invested in the improvement of their facilities in order to bring them into compliance with the new animal husbandry guidelines, while 21% were still considering making such an investment ([citation]).



## **The National Strategic Plan for Avian Influenza Control in Thailand**

The National Strategic Plan for Avian Influenza Control in Thailand is a three year plan (2005-2007) which sets targets for the control of the spread of HPAI in both animals (poultry) and humans. It has as its goal the elimination of new outbreaks of HPAI within “economic poultry” a two year time horizon and aims within three years to reduce the incidence of the disease in other domestic and wild poultry to such an extent that outbreaks no longer pose a threat to either human health or the poultry industry.

In addition, the Plan articulates a goal of zero transmission of infection from animals to humans within a two year timeframe. It sets as a related goal the implementation of pandemic preparedness measures (discussed below) within a year’s time.

The National Strategic Plan has six components, which are as follows:

1. Development of a disease free poultry management system through the improvement of poultry housing and husbandry, enactment of a system of zoning and compartmentalization system, development of effective disease surveillance (in domestic poultry and wild birds) and (re-)assess the feasibility of vaccine use.
2. Disease surveillance and response during outbreaks – a slight expansion and institutionalization of the X-ray surveillance system to allow for near real-time monitoring of disease outbreaks at a very local level with recurrent aggregation and analysis of data at a national level.
3. Knowledge generation and management – The plan outlines an ambitious program of both basic and applied research, including expenditures on studies of the virus’ basic biology and transmission as well as attempts to develop appropriate vaccines and diagnostic kits and medicines for treatment of influenza infection.
4. Capacity-building of organizations and manpower – The medium to long-term objective of the plan is to increase Thailand’s ongoing ability to deal with an outbreak of epidemic disease (or a related health crisis). To this end, the plan specifies investment in infrastructure, disease surveillance networks (particularly veterinary surveillance) and the training of specialized personnel.
5. Creating understanding and participation in civil society and the private sector – The Strategic Plan recognizes a role for non-governmental bodies in the control of HPAI and containment of the downstream impact of the epidemic. To this end, it calls for responsible government bodies to reach out to their counterparts in civil society and the private sector and to enlist their aid in developing locally appropriate programmes.
6. Develop sustainable integrated management systems and mechanisms – In keeping with the understanding that HPAI (and epidemics of zoonotic origin, more generally) will be an endemic or recurrent problem in Thailand, the Plan calls for the establishment of more enduring coordinating bodies to both manage information and organize the response at both a local and national level.

## **National Strategic Plan for Pandemic Preparedness in Thailand**

The National Strategic Plan for Pandemic Preparedness in Thailand outlines the country's approach to the management and control of any infectious disease threat which might impact the country's health care system on a massive scale. Developed in response to a call from the WHO and, in theory, distinct from the Influenza Control Plan (IC), it unsurprisingly echoes (and expands upon) many of the same themes, particularly within the realm of human health.

The key components of the Pandemic Preparedness Plan are as follows:

1. Strengthening the influenza surveillance system – Like the IC plan, the Pandemic Preparedness Plan essentially reiterates and gives support to the measures adopted in conjunction with the X-ray surveillance campaign but also stresses the need to develop improved information handling capacity as well as the ability to more tightly integrate data on animal and human health.
2. Preparing essential medical supplies and equipment – This section of the plan speaks to the need to stockpile essential diagnostic and therapeutic materials as well as personal protective equipment. The most surprising component of this section, however, is its call for Thailand to develop its internal capacity to produce and distribute needed supplies (including oseltamivir).
3. Developing infrastructural capacity and standardized operating procedures – This section speaks primarily to the health care system's needs to extend and improve upon the training offered to health care personnel with respect to the management of mass casualties and the control of infections in an institutional setting. It anticipates a situation in which the capacity of the traditional infrastructure is overwhelmed and outlines plans for developing surplus capacity.
4. Conducting public relations and public education campaigns – The plan calls for the establishment of integrated public communications systems for the communication of risk information and to educate the public on disease containment and prevention.
5. Developing a sustainable integrated management system to oversee the pandemic response – This point essentially restates the IC Plan's call for a most enduring and integrated approach to disease surveillance and control measures through the institutionalization of coordinating networks.

## **The Fourth “Wave” of the HPAI Epidemic: Thinking Beyond Endemicity**

The stabilization of policies that accompanied the recognition of the endemicity of HPAI and the overall restructuring of the poultry sector in ways that both reduced susceptibility to infection and diversity of stakeholders meant that in the years following the 2005 outbreak, Thailand's control policies – and their domestic impact – have changed very little in the years since. This is true despite the fact that there have been seasonal outbreaks of infection on an annual basis in every year since.

The apparent complacency which has set in within the poultry sector and among those who observe it from outside is reflected in this summary of the HPAI situation filed with the US Foreign Agricultural Service by Meyer and Preechajarn in 2007:

High Pathogenic Avian Influenza (HPAI), H5N1 type, has hit Thailand periodically since January 2004. There are no reports of HPAI-related deaths or culls in broiler farms since the reoccurrence of the disease in July 2006 (p. 4).

In the absence of meaningful change – or hope of change – in terms of the disease’s actual incidence, movement on the HPAI front in the period since October 2005 has been mainly in the area of foreign policy and export promotions. Thai trade representatives have, since 2005, assumed an increasingly aggressive position in the dealings with overseas buyers, trying to encourage (even coerce) foreign governments to open their markets to Thai poultry products and to endorse the compartmentalization.<sup>42</sup>

#### **IV. COMPETING VOICES, COMPETING INTERESTS: DISSECTING THE INTERESTS AND NARRATIVES WHICH SHAPED THAILAND’S RESPONSE**

Over each of the four waves of HPAI infection which manifest in Thailand and throughout the interstices between them different stakeholder groups contributed to shaping both the public’s views and the government’s response to the epidemic. These groups, whose input reflected their social position, their economic interests, their epidemiological relationship to the events unfolding and their connections to policy makers and the political landscape more broadly, jointly defined the environment within which decision-makers forged national policy.

In the section which follows, I will attempt to tease apart the influence of some of the most important contributors to this process, namely: the industrial poultry sector, cock-fighting enthusiasts, duck farmers, and the persons acting in the realm of public (human) health. These interest groups were selected primarily on the basis of their centrality to the public debates at different points in time but also because they are drawn from distinct positions within Thai society and as such give insights into the way in which both the epidemic and the measures taken to control it have been viewed by and impacted different groups.

##### **The Industrial Poultry Sector**

Undoubtedly the single most significant factor influencing the Thai government’s perception of and response to the spread of HPAI has been the industrial poultry sector, comprising predominantly the export-oriented broiler producers and to a lesser extent, the layer industry.<sup>43</sup>

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<sup>42</sup> The concept of compartmentalization will be discussed further in the section on the industrial poultry producers and their interests, but in brief it refers to a mechanism which allows the products of one well regulated segment of the livestock industry to be considered in isolation of products of the same national origin made by producers with lower production controls.

<sup>43</sup> There is also industrial-style duck production in Thailand, but this is still on such a limited scale and played so marginal a role in HPAI policy-making, that it will be excluded from this portion of the analysis.

The weight carried by this sector is not only a product of its considerable economic clout,<sup>44</sup> but also of the degree of political organization and access which the major stakeholders enjoy.<sup>45</sup>

The major export-oriented producers are represented in their interactions with government officials and the media by a handful of highly organized and sophisticated lobbying groups, most influential among them the Thai Broiler Processing Exporters Association, which describes itself as serving as “a regulating and service agency for the large number of Thai chicken meat producers and exporters.” Indeed, the group has been highly successful in both coordinating the activities of its membership<sup>46</sup> and making a concerted statement on the industry’s behalf before lawmakers.

At numerous points during the epidemic, decisions taken by Thai officialdom have clearly reflected direct input from and/or collaboration with the industrial lobby.<sup>47</sup> Among the issues on which the industrial poultry producers’ interests have figured prominently are: management of information related to potential HPAI outbreaks; the receptivity (or rather, lack of receptivity) of Thai authorities to animal vaccination; rates and timing of compensation for animals culled in conjunction with disease control efforts; regulations on the movement of animals internally; negotiation of treaties and agreements related to the sale of poultry and poultry products international and in the labeling of poultry for domestic consumption (particularly with respect to food safety).

#### Growth and Restructuring in the Poultry Sector

The H5N1 virus arrived in Thailand in a period in which the poultry industry was already in transition, and some of the structural and technical changes associated with the epidemic were underway long before the epidemic erupted. Adaptations such as consolidation of ownership, increasing integration of production, adoption of increasingly high-tech, low-labor methods of animal husbandry and re-orientation towards the production of specialized cooked chicken products for export (as opposed to raw meat for domestic consumption) were changes which were accelerated rather than initiated by the outbreak of disease and the changing economic and regulatory environments which the epidemic sparked.

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<sup>44</sup> In 2005 the poultry sector is thought to have contributed between 3 and 4% of the total agricultural GDP and generated approximately 28 billion baht in export earnings.

<sup>45</sup> The outstanding example of this is Charoen Pokphand Group’s chairman and chief executive, Dhanin Chearavanont, identified by *Forbes* magazine as Thailand’s fourth wealthiest man with a net worth estimated at \$2 billion (USD). The company’s headquarters, CP Tower, is situated in one of the prime addresses in downtown Bangkok.

<sup>46</sup> In April and May 2003 the association organized a 20% across-the-board reduction in broiler meat production in response to a slump in prices and later that year worked with the government and with contracting farms to eliminate the use of nitrofans (an illegal growth supplement) which were threatening Thailand’s access to European markets (McSherry and Preechajarn, 2003).

<sup>47</sup> Some examples of decisions which clearly reflect direct industry input were delays in acknowledging HPAI outbreaks in November 2003 and June 2004 (*The Nation*, 31 January and 16 July 2004), reversals of decisions on vaccine use in fighting cocks (13 Sept 2004, 23 Feb 2005), and controversial zoning plans which would aid exporters’ in compartmentalizing their production (*Bangkok Post* 9 June 2004; *The Nation*, 23 Oct 2005). The industrial producers also openly contributed (financially) to a scheme to boost compensation to small producers who surrendered their birds’ during the initial wave of culling (from the legally mandated 75 to 100% of the birds’ presumed value).

The initial engine for change in the Thai poultry sector was the Charoen Pokphand Company (C.P., now the Charoen Pokphand Group) under the headship of Dhanin Chearavanont. In the 1970's, the C.P. chairman set his eyes on the poultry sector which, at the time, was composed almost entirely of small- to medium-sized producers employing low-tech methods to produce birds of local stock for the domestic market. C.P., then a mid-sized animal feed company, began importing foreign breeding stock and engaging in a concerted effort to improve the quality and efficiency of Thai broiler production with an eye towards eventual exports.

Their breeding program was successful, and over time the company began distributing hybrid chicks to farmers throughout the country, who contracted to raise them under conditions specified by the parent company, delivering the mature birds to C.P. at an agreed-upon price.<sup>48</sup> Over time, the scope of the relationship was broadened such that the contracting farmers received all of their consumables (feed, medicine, other supplies and supplements) as well as technical advice<sup>49</sup> from the parent company, which continuously evaluated operators' productivity, eliminating those with unacceptably low levels of weight gain (substandard egg production in layers) or high levels of loss.

The gains realized from improved stock and management practices as well as from the economies-of-scale realized through scientific management – and even more so, centralized purchasing or production of feed – transformed the sector. An industry which had produced birds almost exclusively for domestic consumption was, as production costs fell,<sup>50</sup> increasingly able to market their products overseas, and export production quickly became a central orientation of the poultry sector, as represented in Figure 3. Poultry exports from Thailand rose from negligible levels in the 1970s to hundreds of millions of dollars (USD) in the 1990s (see Figure 4).

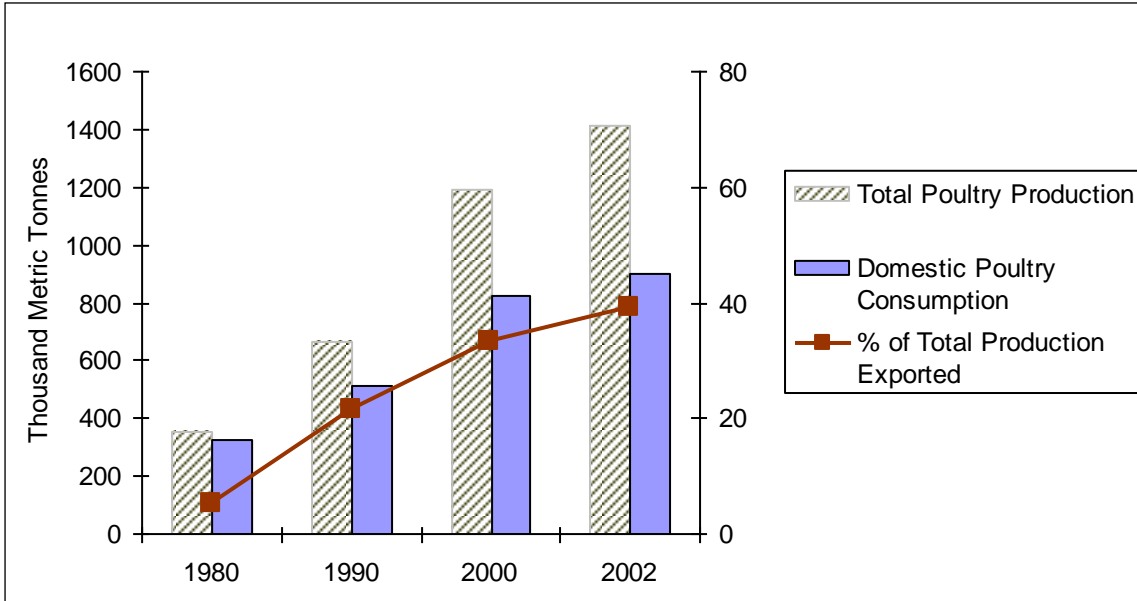
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<sup>48</sup> In the case of layers, the farmers would continue to raise and manage the birds throughout their productive lives, delivering the eggs to the parent company.

<sup>49</sup> As time went on contract farming also introduced technological innovations such as new high tech technologies including evaporative cooling systems which sped production and improved bird survival. The cost of these new technologies was typically shared between the parent company and the contracting producers for whom adoption of this technology this was a precondition for retaining their contract.

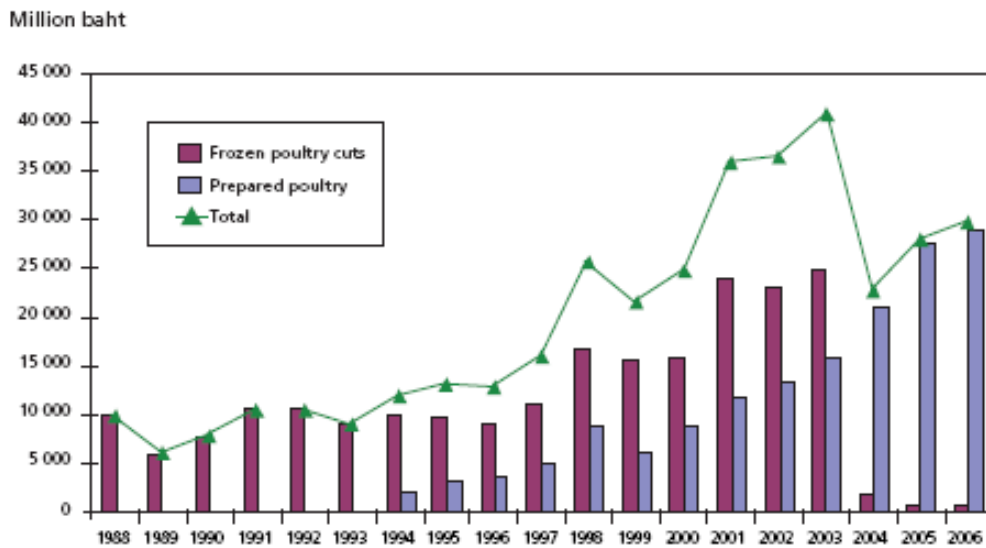
<sup>50</sup> For a detailed discussion of the changing cost structure of poultry production in Thailand see Poapongsakorn, et al., 2006 (FAO).

**Figure 3. Thailand Annual Poultry Production, Consumption and Exports (1980-2002)**



based on statistics from FAOSTATS 2005.

**Figure 4. Thailand poultry exports (1988-2006) from NaRanong (2007) based on data from Thai Ministry of Commerce.**



The changing cost structures and market opportunities did not only affect export-oriented production, which even in 2003 accounted for only about 40% of Thailand's total broiler sales. Contract farming was also replacing autonomously owned and operated enterprises in most segments of Thailand's domestic poultry production market<sup>51</sup> and average farms size was rapidly increasing (see Table One). By the late 1990s it was estimated that backyard and small, independent growers, who at one time accounted for the vast majority of chicken production in Thailand, produced no more than a quarter of the chickens in Thailand (Otte, et al., 2006),<sup>52</sup> and over time even the larger contract farms came under threat through the advent of vertically integrated (VI) production systems, which were owned and operated by the agro-processors themselves (Tisdell, Murphy and Kehren 1997).

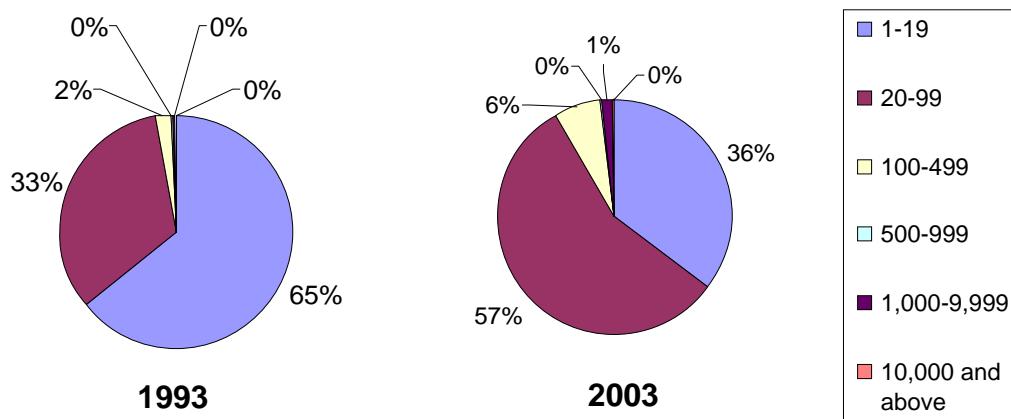
**Table 1. Poultry Exports from Thailand 2003-2006 (adapted from Burgos, et al., 2008)**

Year	Broiler Meat (uncooked)		Chicken Meat Products		Duck meat (uncooked)		Pre-cooked Duck	
	Quantity (kg)	Value (M baht)	Quantity (kg)	Value (M baht)	Quantity (kg)	Value (M baht)	Quantity (kg)	Value (M baht)
2003	331,044,896	22,685.9	192,089,974	22,108.9	5,246,441	474.9	13,741,059	1,721.0
2004	-	-	-	-	-	-	-	-
2005	64,530	2.1	263,418,946	31,550.8	161,680	4.1	6,526,312	1,536.7
2006	2,285,453	95.6	270,345,449	32,074.6	483,410	8.8	6,753,975	1,633.2

<sup>51</sup> The exception to this is in the niche market for "native chicken" varieties which have a following among Thai (and other Asian) consumers, who are willing to pay a premium for these birds. While the industrial producers have attempted to make inroads into this market, they have generally been unsuccessful, in part because the native birds adapt poorly to be raised in confinement.

<sup>52</sup> The dominance of very large producers has been less pronounced in the layer industry, in which the distribution of farm sizes follows a bimodal patten with peaks in the 100 to 300 bird and 1000+ bird ranges (Costales 2004). Large laying farms, many now owned by the same feed production companies which control the broiler industry, have benefited from the same kinds of reforms as the broiler industry. However, the returns to scale in egg production have been smaller, and the industry's growth has been capped to some degree by the absence of any significant export market (NaRanong 2007). Nevertheless, total volume of production has grown significantly in the past two decades, enjoying an extremely robust 5.5% annual growth rate from 1980 to 1990 and 1.1% thereafter (FAOSTATS, 2005).

**Figure 5. Composition of Thai Poultry Sector by Farm Size 1993 and 2003 (based on NaRanong, 2007)**



The growing ascendance of VI farms,<sup>53</sup> a trend still very much underway, represents a further consolidation of ownership and control in the Thai poultry sector. Like the rise of contract farming, it has been motivated in large part by the desire of the large export producers (many of whom are now also the major suppliers to the Thai domestic market) to realize even greater gains from standardized production and centralized purchasing and marketing. But there has been another force driving the conversion from contract farming to integrated production, namely the need for exporters to tighten quality controls in order to meet the demands of overseas markets, particularly those in Europe (Delgado, et al., 2003). Scandals related to the use of unauthorized feedstuffs and additives (including antibiotics and hormonal agents including nitrofurans, a growth enhancer) by contract farmers, as well as concerns over animal welfare had caused the European Union, which in 1995 accounted for 12% of all broiler exports, to threaten to close its doors to Thai poultry (Burgos, et al., 2008). These concerns, particularly as they related to animal health and provenance, gained much greater prominence in the wake of the HPAI epidemic.<sup>54</sup>

<sup>53</sup> Vertically integrated (VI) farms, described in brief earlier in this report, are typically very large scale (10,000+ bird) production facilities, which are owned and operated by the parent company directly. Because they handle all aspects of production and processing internally, VI operations give the parent company complete control over the cost and quality of their products.

<sup>54</sup> Vertically integrated farms address food safety concerns because they operate as biologically isolated environments in which contact between the birds/meat and potential contaminants is (in theory) all but eliminated. Mechanization is employed to minimize the need for human involvement in such routine procedures as feeding and cleaning of the houses, and those persons who do come in contact with the birds are first subject to disinfection before being outfitted with sterile garb. Outside inputs including transport vehicles, feed or equipment are similarly disinfected before entering the facility and before moving from one point to another internally, and even the air to which the birds are exposed is filtered to remove potential pathogens.



Before moving on to a discussion of the intersection between the ongoing changes in the poultry sector and the interests which emerged during the HPAI epidemic, it is important to note one additional change in the poultry export sector which began to take effect prior to the outbreak of the virus but gathered significant momentum since, namely the rise of value-added or pre-cooked products. Thailand's original advantage in poultry export markets was the product of relatively low production costs coupled with easy access to cheap feed. However, as other large, low cost producers – in particular, China and Brazil – entered the world poultry market, Thai exporters saw their comparative advantage in these areas decline. As a means of evading the inevitable squeeze on markets and profits, the major Thai export processors in the late 1990s/early 2000s began investigating options for increasing the unit value of their products.

They seized upon the production of pre-cooked poultry products which are typically tailored to specific markets. It proved a niche in which Thailand's low labor costs and ability to deliver consistent quality products conferred considerable advantage. In 1994 value-added poultry products contributed just a minute fraction to total exports, but by 2003 more than one-third of the value (not volume) generated by poultry exports from Thailand stemmed from pre-cooked poultry, and once the HPAI scare closed overseas markets to uncooked meat pre-cooked poultry became the singular focus of export production.<sup>55</sup> Volumes and values for poultry exports from Thailand, both raw and cooked, are provided in Table 1 in the Appendix.

#### Protecting the Interests of Export-Oriented Poultry in an Era of HPAI

From the outset of the HPAI epidemic – indeed, before the appearance of the virus was officially acknowledged – it was clear that the spread of a highly infectious zoonotic disease with the potential to infect humans would pose a major threat to Thailand's poultry exports. The fear of major economic losses in this sector impelled animal health authorities to cover up the earliest evidence of H5N1's arrival in November 2003 (*The Nation*, 31 January 2004), a move which arguably contributed to a more protracted and widespread outbreak than would have happened had aggressive action been taken immediately and which proved costly on both domestic and international political fronts.<sup>56</sup>

Nevertheless, when the virus re-appeared in June 2004, disease control officials again attempted to suppress news of the outbreak, which occurred on a large layer farm (Somkid Farms) in Ayutthaya province in Central Thailand, where much of the industrial scale poultry production is concentrated (*Mattichon*, 6 July 2004). Their actions, like many of the subsequent decisions taken by Thai policy makers as well as those implementing policy on the ground, show a high level of sensitivity to the concerns of the export-oriented producers and their need to maintain – or regain – access to lucrative markets in Japan and Europe.

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<sup>55</sup> In 2006, the last year for which such data is available, Thailand recorded minimal raw poultry exports to Vietnam – the only country then apparently accepting uncooked poultry exports from Thailand. For all intents and purposes, though, since early 2004 all of Thailand's poultry exports have been precooked (Meyer and Preechajarn, 2006).

<sup>56</sup> Domestically the revelation of the deception (which had long been suspected) led farmers and activists to hold rallies protesting the government's favoritism of large producers and to call for the replacement of the officials responsible for the cover-up (*The Nation*, 1 February 2004). Internationally, the implications were even more dire. The announcement of H5N1's appearance in Thailand (which soon became an admission that H5N1 had been circulating in Thailand for several weeks) came immediately on the heels of a visit by an agricultural delegation from the E.U. which had resulted in that body declaring Thailand "bird flu free". When it became clear that Thai officials had lied to their European counterparts a major diplomatic row ensued.

Overseas market access has been the singular focus of the large poultry producers (i.e., broiler producers) since the start of the epidemic, and while smaller producers, who were already being squeezed by the restructuring of the poultry sector, have often tended to read into the large producers actions a malevolence towards the smaller players – who have unquestionably been adversely affected by measures which the large producers pushed through – an analysis of the large producers’ actions and motives would tend to cast these results as essentially “collateral damage”. Indeed, at various points the larger producers, keen to maintain their public image and prevent political backlash, have offered olive branches to the smaller producers. For example, at the outset of the epidemic, large producers voluntarily contributed towards the creation of a supplementary fund which was used to boost compensation to small producers who had their animals culled from the legally mandated 75% to 100% of the animals’ assessed market value.<sup>57</sup>

Indeed, in each of the three areas in which the large poultry producers have taken a strong stand which is in some way contrary to the interests of small producers – vaccination, movement controls and compartmentalization or zoning – the actions of the larger players have been self-promotional but not inherently directed towards the destruction of the smaller players (who in any event pose little competition to the larger firms except in very specialized niche markets). The only area in which the industrial producers’ actions might be read (justifiably) as deliberately hostile to small producers is in the field of public (including scientific) opinion in which the large firms have aggressively promoted the message that the HPAI epidemic in Thailand has been fueled by the actions of small, unsophisticated growers using bio-insecure production techniques – a conclusion which, ironically, is now being challenged on scientific grounds.<sup>58</sup>

It is nevertheless useful to examine the industrial lobby’s position and (putative) involvement in the other issues raised above, each of which has proven a lightning rod in Thailand’s internal debates on HPAI control. Before embarking on this discussion I should make clear that none of my informants was willing to go on record with an open accusation or denunciation of the export industry’s involvement in shaping policies on these issues, although both the media and industry analysts have at times been pointed in making these connections.

### Vaccination

Around no issue has the export poultry industry’s concerns been more strongly articulated and their influence more clearly felt than around the issue of vaccination, and around no issue are their needs or preferences more clearly in conflict with those of other stakeholder groups. The issue of vaccination (of poultry) has been a perennial lightning rod in the policy debates surrounding HPAI control in Thailand, with small producers (in particular, those raising fighting cocks and exotic birds) repeatedly advocating for the limited use of vaccination (i.e., the use of

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<sup>57</sup> This action was, of course, motivated by the large producers’ desire to encourage compliance with the culling orders and to hasten the containment of the epidemic. But it nevertheless speaks to a desire to arrive at these endpoints through conciliatory rather than coercive means.

<sup>58</sup> For an evidence-based critique of the claim that small producers have been fueling or even contributing disproportionately to the burden of HPAI cases in Thailand, see Otte, et al. 2006.

vaccination in birds not intended for consumption) and the large poultry lobby consistently opposing any vaccine use.<sup>59</sup>

The reasons behind the exporters' resistance to vaccine use are self-evident. Foreign buyers – including Thailand's two major overseas markets, Japan and the European Union – have stated categorically that they would not accept poultry products from birds which might have been vaccinated unless or until it had been scientifically demonstrated that these products posed no threat to either human or animal health (*The Nation*, September 13 & 14, 2004). Attempts by Thai negotiators to get policy-makers in these countries to back down from their positions have reportedly been unsuccessful.<sup>60</sup>

Apart from this clear economic rationale, the exporters have publically trumpeted the findings of the scientific committee which first proposed the ban on vaccine use,<sup>61</sup> citing the possibility that vaccine use if employed incompletely or based on an ineffective formulation might result in a subsequent recurrence of the H5N1 virus in yet more virulent form. While this is clearly a defensible position scientifically, and one put forward at various times by experts in the field (Capua and Marangon, 2006), it appears somewhat disingenuous coming from an industry (export broiler production) whose most prominent members are also heavily invested in the production of laying hens,<sup>62</sup> an industry in which use of protective vaccination is now reputed to be routine.<sup>63</sup>

The influence which the export producers have been able to exert in defense of their position is impressive, particularly given the comparatively small numbers of firms which they represent. The most visible and memorable example of their influence on policy-making came during an incident in October 2004 when Yukol Limlaemthong, Director-General of the Department of Livestock Development, expressed his unit's intentions to establish a laboratory dedicated to the development of a poultry vaccine against HPAI. The move was generally interpreted as a tacit expression of support for the use of vaccines once an acceptable candidate became available.

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<sup>59</sup> There is potentially an interesting footnote here, as it has been suggested by one of my informants and is perhaps hinted in an early news report on the topic that when the HPAI epidemic first erupted (and before it was publically acknowledged) the industrial producers in the area of the outbreak supported the use of vaccination among small scale producers in the area in order to keep the virus from "escaping" into the larger poultry population. Once it was clear, however, that containment on a local level was not an option, the industry turned against vaccine use and has remained opposed to it (publically) ever since.

<sup>60</sup> The fact that numerous sources have claimed that the issue was raised with importers on multiple occasions suggests, however, that both the exporters and Thai government officials would like to be "allowed" to lift the ban, at least selectively.

<sup>61</sup> Nicely and Preechajarn (2004b) are among the most direct in questioning the independence of this body, suggesting that the very establishment of the committee was a step taken by the government to "placate the ... export-oriented broiler processors who strongly opposed [the use of vaccines]." Elsewhere (2004a) they note that there was considerable support for the use of vaccination among certain factions within the Ministry of Agriculture and Cooperatives (although the Ministry of Public Health opposed it).

<sup>62</sup> Several of the large agro-processing companies which dominate broiler production are also heavily invested in layer production, among them Charoen Pokphand (CP), Laemtong and Betagro (Rainat, 2003).

<sup>63</sup> Reports of widespread use of vaccination in the layer industry have surfaced in the press and been reported by the USDA's FAS and other industry observers (see McSherry and Preechajarn, 2005). The use of vaccination by laying farms is arguably an economically sound and epidemiologically sound decision given the birds' comparatively long productive life (which impacts the capital investment they represent), the controlled conditions under which they are raised, and absence of an export market.

A few days later an irate Prime Minister Thaksin Shinawatra was quoted in the Thai media, lambasting Yukol and denying any commitment on the government's part to the development of a vaccine. According to the report, which appeared in the widely circulated English-language newspaper, *The Nation* (October 13):

Thaksin sent back the budget request to Chaturon's [the Minister of Agriculture] committee to remove the bird flu vaccine request before resubmitting it for approval. "Why has the bird flu issue been so confusing?" [a] source quoted Thaksin as telling the weekly Cabinet meeting. "The government has not allowed the use of bird flu vaccine yet, but a budget has been requested for making it. There are plans to make vaccine, test vaccine and build laboratories and these confused the public and affected the psychology of the market and panicked the public. From now on, Chaturon [the deputy prime minister, who had been put in charge of the national coordinating committee on HPAI control] will be the only person to give interviews on bird flu issues and anyone else must inform Chaturon first before giving any interview."

This rare open castigation of high placed government official by his superior is testament to the pressure which the prime minister was apparently feeling in the wake of indications that his administration might be wavering in its position on vaccination. Perhaps equally telling was the fact that approximately one year later when the prime minister was himself at a political impasse he startled analysts by issuing a statement re-opening the vaccination debate and suggesting that there might be room to "build immunity [to HPAI] in the Kingdom's avian population" (*The Nation*, November 8, 2005).<sup>64</sup>

As an interesting coda to the vaccination saga, which has recurred at intervals throughout the epidemic, is that as industrial poultry production has shifted its orientation to cooked products for which sensitivity of markets towards vaccine exposure seems less and as the recurrence of outbreaks has become more sporadic and localized, the stern resistance of the export producers to vaccine use has also relaxed (although their official position remains unchanged). In January 2007, for example, the government put forward a proposal for very limited vaccine use (which appears to have gone unimplemented but was also not directly challenged) and aggressive measures to intercept illicit vaccine imports have also been abandoned (*The Nation*, January 18, 2007).

#### Movement Controls/Zoning Restrictions

Less vigorously debated but no less divisive in terms of their differential impact on small versus large producers were the introduction of zoning proposals and movement restrictions. Although distinct pieces of legislation and promulgated independently, both of these strategies served to physically segment the country, thus seeking to overcome a complex dimension of the HPAI control in Thailand, the diverse admixture of small and large producers (and the facilities which supported their operations) in close proximity.

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<sup>64</sup> It should be noted that at this juncture Thaksin was in an antagonistic relationship with much of the Bangkok elite and seeking to build a more populist basis of support.

Zoning restrictions, which were proposed on at least two occasions but never actually enacted, consisted of controls on the type of enterprises or poultry production practices which could go on within a given geographic area (typically defined in terms of district or provincial boundaries). The zoning plans, which were first floated by the Ministry of Agriculture and Cooperatives in February 2004 and revived in July 2005, were a transparent attempt to protect the (bio-secure and profit-generating) industrial producers from the (potential infectious, politically unconnected) small producers and their contaminants.

While blatantly discriminatory with respect to the small producers located within the areas zoned for industrial-style production, the zoning schemes were nevertheless fairly even-handed in their treatment of like producers within a given region and included provisions for the compensation of small producers driven from production or for the conversion of their facilities to more bio-secure production systems where feasible. The resistance that the plans faced and the reason for their ultimate failure was the scale of displacement entailed in enacting the measures. The geographic intermingling of the large and small operations was so complete that there was no district in which the plan could be enacted without significant disruption. In addition, it remained unclear that if such measures were taken the physical barriers thus created would ever be recognized by poultry importing countries as a meaningful division between “high-risk” and “risk-free” production systems.

Movement controls, by comparison, were temporary containment measures which were applied specifically to regions which had experienced (or were adjacent to areas which had experienced) recent outbreaks. According to legislation promulgated in June 2004 and renewed in October 2005, the movement controls affected farms located within a 10 kilometer radius of a confirmed (or for the first 30 days until diagnostic test results were available, suspected) H5N1 outbreak. For a 90 day period following such an outbreak no susceptible animals were to be transported from or through the affected area *except* with a permit granted by the local animal health authorities.

This last exemption was one of the sources of greatest friction between small and large producers. Put in place (presumably) at the behest of the large producers who needed to adhere to strict production schedules and to move their birds, which they claimed to be disease-free, from points of production to points of slaughter and/or processing, the controls came to place a disproportionate burden on smaller producers who, among other things, could exert less pressure on disease control authorities to grant them permits and were thus forced to endure longer waits and greater losses.<sup>65</sup> The differential became even more pronounced as the large firms shifted their production to vertically integrated systems in which it was sometimes not even necessary to transport the birds from the premises.

### Compartmentalization

In some ways analogous to the physical segmentation of production achieved by movement controls was the conceptual and legal segmentation achieved by compartmentalization. Compartmentalization is a concept introduced by the World Animal Health Organization (OIE) in the mid-1990s. It consists of a virtual segmentation of a country’s production of a given product (form of livestock) based on evidence of epidemiologically and physically distinct circumstances

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<sup>65</sup> The waiting time for the industrial producers was negligible since they were able to perform the required health checks on their birds internally and get permission for large numbers of birds to be moved at once.

in one production environment (defined in terms of a region and/or type of producer) as compared to another. Compartmentalization is intended as a mechanism which would allow producers who are certified to have adhered to bio-secure production and handling practices to participate in international markets separately from their compatriot producers who fail to meet these standards (Meyer and Preechajarn, 2006).

From the time that the nitrofurans controversy threatened to close European markets to Thai poultry, the largest producers – specifically those operating vertically integrated facilities – were engaged in negotiations to have the products of these operations recognized as distinct (from a health and regulatory perspective) from those of their compatriots. The effort originally generated significant controversy, not only between the very large producers and their smaller competitors (truly small operations were not concerned with export markets), but even among poultry exporting firms, since many exporters had not yet converted their production to integrated operations and feared being disadvantaged by the new arrangements.

The advent of HPAI changed the industry's thinking about the issue of compartmentalization, which since 2005 has been a major rallying point in negotiations between Thai trade representatives and their counterparts in overseas markets. Initially the Thai delegation's efforts met with no success in either European or Japanese markets (Meyer and Preechajarn, 2006, 2007b). However, late in 2007 a breakthrough in negotiations between the Thai broiler industry and Japanese importers created a possible opportunity for the program to be implemented and within short order inspectors from the DLD certified two vertically integrated export producers, Charoen Pokphand and GFPT, as meeting the minimal standards for independent consideration (Meyer and Preechajarn, 2007b). The scheme moved forward in 2008 when importers in the European Union also indicated a receptivity to the idea after OIE officials independently ascertained that the DLD-approved producers adhered to international standards. However, there are, as yet no instances of sales (specifically, sales of uncooked poultry products) which have been completed under the auspices of the arrangement.

What makes compartmentalization compelling and potentially decisive from the standpoint of domestic politics is that it allows, at least conceivably, for a near-complete disengagement of trade practices and interests from the promulgation of disease control policies internally. As such, progress in the implementation of the compartmentalization scheme may eventually free the hands of Thai bureaucrats to better address the diverse interests of different constituent groups, allowing, for example, for the routine use of vaccination as a HPAI control strategy in high value birds (like fighting cocks) and reducing the need for strict zoning or movement controls outside of export-production facilities.

### **Cock Fighting: The Great Wager in the Bird Flu Debate**

If industrial poultry producers were the darlings of disease control officers responsible for stemming the HPAI outbreak, cock fighting enthusiasts were their nemesis. Engaged in a contentious relationship with officialdom which long predated the HPAI outbreak, proponents of cock fighting, who are estimated to number in the hundreds of thousands, were among the most vocal and persistent critics of the government's approach to influenza control and, in particular, of the decision to forego vaccination as an alternative or supplement to culling.

Were the cock-fighting enthusiasts an isolated lobby unto themselves it is likely that their protests would have gone unheeded. However, in many respects they became the voice for the

multitude of backyard poultry producers who felt their interests to have been marginalized in the national debates about HPAI and its control. As such, both rural constituencies and the Thai media seem to have placed disproportionate weight on the views of fighting cock enthusiasts who, as recently as June 2007 were still staging protests in Bangkok calling for the relaxation or repeal of legislation controlling the movement of birds and imposing other restrictions on the practice of cock-fighting. The fact that vaccination is still appearing on the national agenda and still an issue in policy debates about HPAI control almost three years after the problem of widespread outbreaks had essentially been contained and long after industrial poultry producers had abandoned their interest in this issue is also reflective of the centrality of the cock-fighting lobby to this issue.

#### Cock-fighting: The National (Male) Pastime

Cock fighting is a sport with a long and distinguished history in Thailand. Enthusiasts claim that one of the prime Thai fighting cock lines was bred by King Naresuan, the Thai monarch who led his country to victory over the Burmese in the 17<sup>th</sup> century (*Forbes*, 2001). Whether or not this is the case, cock-fighting was undoubtedly a sport that was widely practiced and publically accepted in Thailand as recently as the early part of the twentieth century. However, as the country modernized and Western middle class sensibilities filtered in, the sport fell into disfavor among the educated elite who pushed forward legislation circumscribing the site, timing and circumstances of cock-fighting as well as the wagering which surrounded it. Cock-fighting thus joined the ranks of issues such as polygamy (or its surrogate, prostitution) and spirit-worship among the issues which defined class rivalries and internal cultural divides within Thailand.

If non-elite Thai have in many ways lost the policy debates, seeing their sport relegated (at least officially) to a limited number of approved venues on specified dates and times and with adapted rules, they have nevertheless triumphed in the court of public opinion. Cock-fighting has a large following in Thailand, extending far beyond the ranks of those who directly raise, train and fight the birds to include those who wager on them, those who run supplemental industries supporting cock-fighting (these include trade publications, manufacturers of special feeds and medicaments, producers of equipment used in rearing and training fighting cocks, operators of licensed and unlicensed arenas and concessionaires selling food and other products at these venues), residents of rural and low-income urban districts who tolerate if not actively support the enterprise and even some intellectual and cultural elites who take cock-fighting as a symbol of a besieged indigenous culture.

In terms of its actual scale, estimates vary widely. Media accounts of the number of birds being raised as fighting cocks vary from a low of about one million to a high of fifteen million birds or higher.<sup>66</sup> There are no more reliable official or academic estimates of the size of the cock-fighting industry, although tallies of native chicken production, of which fighting cock production is sometimes considered a subset, estimate that as many as 80% of rural households keep some birds either for recreation or home-consumption. An informal village survey carried out in the context of this research would suggest that no more than one in ten of these households are actually raising birds for sport, although the trainers interviewed typically

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<sup>66</sup> It seems likely that the actual number of fighting cocks lies somewhere towards the midpoint of this range, if not somewhat higher given that a national campaign to register the birds -- a proposal which met with significant resistance among bird handlers and thus was unlikely to have achieved anything approaching comprehensive rates of subscription -- enrolled close to a million birds within a few months' time.

claimed to be holding between ten and fifty birds each (these included young birds which were not yet being fought as well as breeding stock).

Another proxy for the size of the industry is the proliferation of affiliated activities. There are at least four (and more likely six to ten) semi-glossy magazines dedicated to cock-fighting, bearing titles such as “Cock Fighting Man” or “Friend of the Fighting Cock”. Although statistics on their distribution are not systematically maintained, they appear in most cases to be printed on a monthly or semi-monthly basis and to be distributed through newsstands throughout the country. Their publication is financed not only by sales of magazines themselves, but also through advertisements taken out by commercial interests including breeders and trainers promoting specific birds, manufacturers of feed, supplements, balms and medicaments used as part of standard bird-rearing practice and also to treat ailments and injuries resulting from competition, firms manufacturing cages or selling materials used for the housing of birds or the construction of fighting arenas, and well known trainers selling instructional videos and/or training equipment.

In addition there are numerous trade associations and lobbying groups including the Association of Fighting Cock Career Promotion, the Siamese Fighting Cock Association, the Siamese Fighting Cock Breeding Association and the Thai Indigenous Chicken Conservation and Development Association. These organizations both serve as informational network for enthusiasts and also as spokesmen on behalf of sport before the legislature, government ministries (particularly the Ministry of Agriculture and Cooperatives, which regulates production and feedstuffs, and the Ministry of the Interior, which licenses arenas and governs other aspects of bird fights) and in the media.

#### The Contentious Relationship between Cock-fighters and Thai Officialdom

Even prior to the outbreak of avian influenza cockfighters and cockfighting enthusiasts had a strained relationship with Thai officialdom. The laws regulating the time, place and circumstances of fights were so restrictive that they rendered the vast majority of matches (not to mention the betting and other activities surrounding them) illegal. Local officials, among them village headmen, subdistrict officers, police and animal control officials, professing to act in the interest of enforcement, then extorted significant sums from the match organizers and participants in order to allow the contests to go forward, creating a de facto “tax” on the proceedings.<sup>67</sup>

Although the enthusiasts spoken to in the context of this research were aware that the collection of these sums constituted blatant acts of corruption, they nevertheless identified the root of the problem as lying in the legislation itself which they said created the opportunity for graft. It was thus the government itself, rather than its petty officers, to whom they blamed for the sometimes substantial “overhead” placed on their sport.

It is unsurprising, then, that following the advent of HPAI and the associated disease-control legislation cock-fighting enthusiasts reacted hostilely and with a great deal of skepticism to government claims that mandated culls, inspections and movement controls were necessary to

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<sup>67</sup> Almost every informant interviewed made explicit reference to the bribes which had to be paid to local officials in order to allow cock-fights to take place. In a yet more ironic twist more than one informant directly implicated a local administrator as an organizer of local cockfights while others mentioned the presence of village and sub-district officers at matches.



ensure the welfare of both the birds and their handlers. Indeed, some of the earliest reported acts of defiance of the legislation occurred among fighting cock owners who smuggled their birds out of quarantined regions to prevent them from being culled (*The Nation*, February 9, 2004).

Out of fairness to the bird owners, though, it should be noted that the sacrifice being demanded of them was not on par with that made by other “backyard chicken producers”. Fighting cock owners tend to maintain a close and personal relationship with the birds they rear, devoting hours a day to the care, feeding and training of their birds.<sup>68</sup> Their spouses similarly joked that the men – for it is an almost entirely male sport – lavished more attention on their birds than they did on their children.

There was also an economic dimension to the cock owners’ resistance. For while the owners of birds being reared as layers or for home consumption were being offered between 75 and 100% compensation for the value of birds culled in conjunction with HPAI control efforts, the cock-fighters were being offered mere pennies on the dollar for birds whose value often exceeded 1,000 baht per bird. As such cock-fighters’ aversion to the culls should not simply be interpreted as an act of defiance aimed at the government.

However, antagonism to officialdom played into the equation also, particularly as the epidemic dragged on and the cock-fighters witnessed a series of decisions taken which they viewed as prejudicial to large producers and/or antagonistic to their own interests. The two issues around which this played out most clearly were vaccination and movement controls.

#### To Vaccinate or Not to Vaccinate: That is the Dilemma

The resistance of the export-oriented industrial poultry lobby to vaccination was transparent in its origins. The position of fighting cock enthusiasts, who ultimately came down overwhelmingly in favor of vaccination, was less cut-and-dry. Unlike industrial chicken producers whose contact with their birds was limited and who therefore faced little immediate threat from the spread of HPAI in birds, fighting cock handlers were commonly in intimate contact with their birds and, indeed, two of the earliest cases of human infection with H5N1 in Thailand occurred among individuals who had had close personal contact with fighting cocks, a fact widely reported in the press (*The Nation*, Jan 24 and Feb 28, 2004).<sup>69</sup>

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<sup>68</sup> These time estimates are consistent with the care and training protocols described in cock-fighting magazines and online sources.

<sup>69</sup> As a paradoxical side note to the comment that cock-fighters were highly sensitized to the public health dimensions of the epidemic. There existed in parallel or at least in close succession to these fears a persistent belief among many bird handlers that fighting cocks were, in fact, more resistant to HPAI than other birds, and on these grounds some owners justified sequestering their birds and protecting them from the culls. The handler’s views may have been based on (misleading) empirical evidence, since fighting cocks are often kept somewhat segregated from other birds except when mating or sparring (meaning that they may have been less exposed than other birds). Also, because fighting cocks are not raised in large flocks, their deaths would not have manifest in the large-scale die-offs which occurred in broiler and layer populations. That said, the epidemiological data seems clearly to indicate that fighting cocks were at least as susceptible as other poultry populations and may, in fact, have been implicated in a disproportionately large share of the later outbreaks (perhaps because of breeders’ efforts to subvert controls).

Fighting cock handlers were thus well aware that the unchecked spread of HPAI could pose an imminent threat to their own health and that of their birds and were as eager as any member of the general Thai public to see the epidemic brought to a quick end. That said, bird owners were not eager to submit to disease control efforts, especially preventive culls. Because of their personal relationships to their birds and the birds' value, some of which was captured in their gene pool and thus could not be redeemed through cash outlays, fighting cock owners were particularly eager to see their specific birds – not just birds of equivalent type and age or value – salvaged. They thus became the earliest and most vocal advocates of a disease control effort based around vaccine use (at least in the fighting cock population).

The cock-fighters lobbying efforts on behalf of vaccination have been relentless and vociferous. Among the tactics they have employed are mass rallies,<sup>70</sup> celebrity endorsements,<sup>71</sup> and advertisements and statements in the Thai language press.

Through these measures the cock fighters have succeeded on at least four occasions – in October 2004, February 2005, November 2005 and March 2008 – extracted pledged from government policy-makers to seriously consider, if not overtly approve, the selective vaccination of birds which are not intended for consumption or export. And while the tendency may be to see their repeated failure to carry the issue as a sign of political weakness, this conclusion would be naïve given the stiff opposition they faced from the export poultry lobby.

Indeed, the cock-fighting lobby's ability to bring the matter to such a high level of visibility on so many occasions is at some level a triumph not only of the enthusiasts themselves, but also of rural interests more generally. Over time and across multiple iterations of the battle the cock-fighters have gained considerable sympathy among the rural electorate (as well as the urban poor), who have come to see the cock-fighters as proxies for the interests of small farmers vis-à-vis the industrial producers.

The cock-fighters have also had another influential card to play in the vaccine debate, namely the threat – indeed, the reality, of illicit vaccination. When the decision was taken *not* to endorse vaccine use and, indeed, to ban the importation of poultry vaccines, even for use in select populations, the fighting cock community set up their own (unofficial) channels to obtain and distribute the vaccine surreptitiously.<sup>72</sup> And despite the occasional interdiction of shipments, there is widespread agreement among poultry industry analysts that vaccine use is rampant in the cock-fighting community (McSherry and Preechajarn 2005, Meyer and Preechajarn 2006, Tiensin, et al. 2005).

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<sup>70</sup> Public rallies in support of the vaccination of fighting cocks were held or threatened on the following dates: [dates]. At the largest of these rallies it is claimed that more than 5,000 enthusiasts turned out in support of the measure.

<sup>71</sup> The most recognized spokesperson for the fighting cock lobby is the well known singer Ad Carabou who was made honorary president of the Association of Fighting Cock Career Promotion. Carabou himself raises fighting cocks and in September 2004 in a statement to the Thai media he claimed to have vaccinated his own birds using sera obtained illegally from overseas.

<sup>72</sup> It should be noted that even as these illegal supply chains have flourished and presumably proven profitable for some providers, cock-fighting enthusiasts continue to bemoan the fact that they cannot access information and support on vaccine use from government extension workers.

## Movement Controls and Travel Documentation

A second source of on-going tension between the cock-fighting enthusiasts and those seeking to prevent the further spread of HPAI was the policies put in place to prevent the movement of potentially diseased animals from or through areas of infection. A mainstay of disease control legislation, the movement controls attracted far less attention and public protest than did the government's anti-vaccination policy. However, in the minds of cock fighting enthusiasts and advocates they were no less onerous.

Indeed, the movement controls, which specified that birds that were to be transported over provincial boundaries obtain a certificate of health from a DLD veterinarian within 2 weeks of the move, were a significantly more cumbersome imposition than was the vaccination ban, perhaps because the movement controls loomed as an ever-present burden on bird handlers. Although the movement control restrictions were not unique to fighting cocks, they affected this population disproportionately given the frequency with which the birds had to be moved.<sup>73</sup>

Furthermore, because the cock-owners lacked either the numbers or economic clout to make their birds' inspection a priority in the eyes of the local veterinary authorities, they complained that requests for inspections were often subject to extensive delays causing them, in some instances, to miss a scheduled match and, more commonly, to move the birds without the appropriate permissions, paying bribes to the authorities responsible for enforcing quarantines. Fight organizers also paid additional compensation to authorities to "look the other way" when it came to inspecting participants' paperwork.

Unlike the vaccine issue, however, the question of movement controls was resolved to a certain extent amicably through the introduction of so-called "bird passports," an ingenious invention developed by animal health authorities working in cooperation with fighting cock enthusiasts. Bird passports were developed as an alternative to a suggestion floated by the National Bird Flu Control Task Force that fighting cocks be implanted with machine-readable microchips which would uniquely encode the bird's identity. This plan was opposed by those raising the birds on the grounds that the chips would cause the birds discomfort and potentially impede their ability to fight.

Instead, the handlers recommended that the authorities adopt a system of identification based on the unique characteristics that the birds already possessed, namely a distinctive pattern of coloration, scarring and facial profile which breeders claimed could be "read" by anyone familiar with the sport.<sup>74</sup> The authorities accepted this proposal and devised an official travel document based on a set of photographs of each birds head and legs and an imprint of their feet (see Figures 6 and 7). These documents, which were relatively inexpensive to produce and created

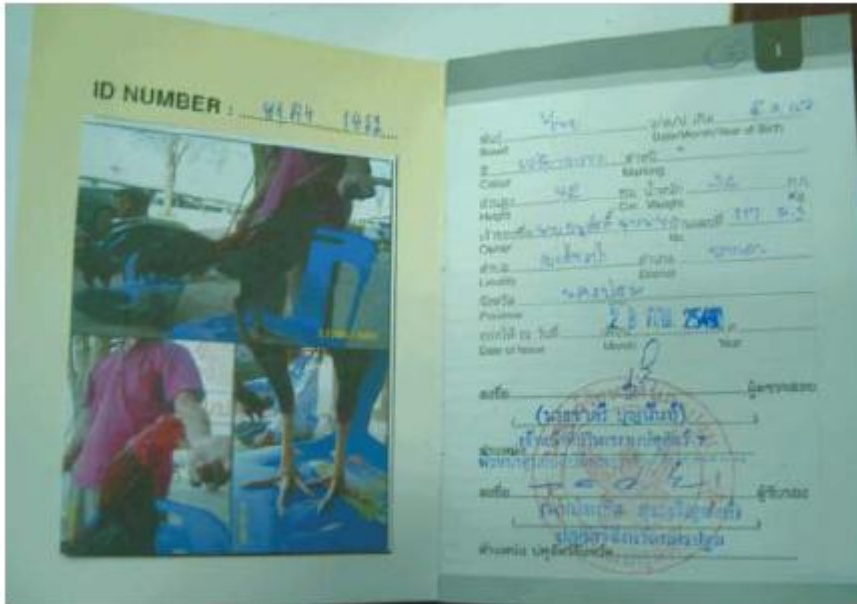
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<sup>73</sup>Whereas owners rearing birds for egg production or direct consumption might move their birds across provincial boundaries only once in the bird's life (for slaughter) – and even less frequently when integrated facilities were employed, cock fighters might have to do so every two to three months in order to give their birds access to matches in more prestigious (higher stakes) arenas which tended to be concentrated in regional centers or in Bangkok. Birds were also moved significant distances for breeding purposes (or after having been procured from a breeder of particular renown).

<sup>74</sup> Correct identification of a given bird is, indeed, essential to cock-fighting since matches are arranged and bets placed on specific birds on the basis of their pedigree and performance in previous fights. Were one bird to be substituted for another of significantly greater – or lesser – potential it could dramatically affect the outcome of the match and of the wagers staked on the contest. Thus both the handlers and the punters need to be assured that the birds competing are as claimed.

little inconvenience and no risk for bird handlers represent a rare example of successful negotiation in the government's otherwise stormy relationship with cock-fighters over HPAI-control.

**Figures 6 &7. Images of Fighting Cock Passport (Taken from WHO 2007)**



## Duck Farming and the Spread of HPAI in Thailand

Prior to the economic crisis of the late 1980s, and arguably prior to the advent of the HPAI epidemic a decade later, few commentators on the rural Thai economy would have given separate attention to the farming of ducks, which was historically a small sideline enterprise practiced by a subset of farmers as a form of income augmentation. Duck farming was – and remains to this day – a far more limited enterprise, both in economic import and in geographic and numerical scope, than the farming of chickens, and most accounts of animal husbandry in Thailand make only passing mention of the practice [sources].

What first propelled duck farming into a more visible and economically prominent position was the confluence of two factors. The first of these was the introduction of a new system of duck rearing, known as open-field duck production or free-grazing, which provided a low-cost, ecologically sound (or so it seemed prior to the advent of HPAI) approach to the production of duck meat and eggs based on “free” gleanings from rice fields. The second was the Asian economic crisis, which in 1997 dislodged thousands of workers of rural origins from their paid employment in the Greater Bangkok Metropolitan area, and sent them fleeing back to their communities of origin where their land-holdings and traditional economic opportunities were often insufficient to sustain them.<sup>75</sup> These workers, especially those resettling in Central and lower Northern Thailand where growing conditions were favorable to open-field duck production, enthusiastically embraced the new form of animal husbandry which allowed them to turn their surplus labor – with little additional land or capital inputs<sup>76</sup> – into a reasonably productive asset.

The open-field duck farming system comprises an integrated approach to animal husbandry in which ducks, which can convert scavenged food into marketable meat and eggs, are driven by their handlers over newly harvested rice fields. There the birds collect grain which was lost during the harvest and winnowing process, a particular problem in an era of mechanized harvest and processing,<sup>77</sup> and also feed on the insects, slugs and snails – including the cherry snails, an important rice pest – which accumulate in the fields during the cropping and harvest cycle.<sup>78</sup> As an added bonus to the rice growers, whose land is made available to the duck keepers for this purpose (typically with a small rental fee attached), the ducks in their grazing deposit manure on the fields, further enriching the soil and increasing subsequent rice yields.

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<sup>75</sup> Many of the rural migrants who moved to Bangkok in the 1980s and early 1990s in search of economic opportunities in the modern sector did so at least in part in response to a shortage of arable land in rural Thailand. Other migrants sold their land back home in order to gain access to capital, reasoning that with paid employment an option, they had little need for agricultural land-holdings (and little access to the labor needed to make the land productive). The widespread reverse migration of the late 1990s however, reversed a long-term trend and resulted in an over-population of workers in rural areas.

<sup>76</sup> The start-up capital for open-field duck production is typically supplied by a Chinese financier, known colloquially as a *tao kae*, who supplies the money needed for the purchase of day-old ducklings and the feed needed to bring them to the age (approximately 20 days) at which field grazing is possible. From this point, relatively little additional capital inputs are needed until the ducks are ready for market, at which point the *tao kae* return to serve as marketing agents and to collect on their investments.

<sup>77</sup> It has been estimated that when mechanized harvesting and processing is employed, as is now the norm in rural Thailand, more than 16% of the rice produced is lost during the transition from standing rice-stock to threshed grain (*Matichon*, 25 December 2004).

<sup>78</sup> The problem of pest build-up has become particularly severe with the introduction of improved rice varieties which allow paddies to be under almost continuous cultivation (three crops/year) as compared to traditional systems involving one to two rice crops a year with significant periods of fallow.

Open-field duck farming is thus a win-win arrangement between the duck keepers, who are often managing flocks ranging in size from 500 to 2,000 birds and transporting them across multiple non-contiguous fields with the use of trucks, and the rice farmers (Costales, 2004). It has also been a significant boost to the rural economy, particularly in areas where near-continuous rice cultivation is practiced, making it feasible to engage in open-field duck production on an ongoing basis, as well. Little surprise, then, that rural residents reacted negatively to the DLD's surprise announcement in late 2004 that it was seeking to put an end to the practice of open-field duck cultivation, forcing duck rearers to return to the practice of closed-system production in which birds are raised in an enclosed area.

Livestock officials were no doubt also chagrined to be making the recommendation that open-field rice production be closed-down, after all it was their own extension agents who had first promoted the practice which had been one of their more successful interventions. Indeed, from the introduction of open-field duck farming in the late 1980s or early 1990s to the outbreak of HPAI in the mid-2000s duck farming had grown from being a small scale, entirely domestic concern to a rapidly growing, increasingly export-oriented enterprise. Indeed, in 2003 Thailand was the world's third largest producer and fourth largest exporter of duck meat<sup>79</sup> with expanding markets in Asia and Europe (*World Poultry*, 2005).

#### The Smoking Gun: Open-Field Duck Cultivation and the Transmission and Propagation of HPAI

What spurred officials to intervene in duck production was the accumulation of virological and epidemiological data pointing to ducks, and in particular open-field duck production, as an important contributor to the propagation and perpetuation of the HPAI epidemic. The first indication that ducks might not only be susceptible to the H5N1 virus – a blow to common wisdom which dictated that ducks were largely immune to influenza infection – but might furthermore serve as important reservoirs of the virus came from virological research carried out in southern China. Li and colleagues (2004) tested blood and fomites samples taken from domestic duck populations in an area which had experienced widespread die-offs of other poultry, including chickens, and found that the ducks were infected with nearly identical strains of the H5N1 virus.

When this research was extended to viral strains isolated from infected birds from Southeast Asia it was found that domestic ducks could indeed be infected with the local H5N1 strains but typically displayed few if any clinical signs of the disease and seldom succumbed to their infection. Yet more disturbingly, these apparently healthy birds were shown to shed significant quantities of the virus in their fomites (feathers, down and manure) and the viral particles were unusually stable, remaining active and capable of causing new infections in birds – or possibly, people – who came in contact with them up to seventeen days after they had been deposited (Hulse-Post, et al. 2005).

Added to this speculative evidence of ducks' role in the propagation of H5N1 was epidemiological data gleaned from the first round of X-ray surveillance which demonstrated a strong geographic correlation between outbreaks of H5N1 in chickens (which incidentally

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<sup>79</sup> Duck meat production in Thailand in 2003 was estimated at 112,000 metric tons (up from 108,00 MT the year before), of which 98,000 metric tons were consumed domestically and 13,300 metric tons were exported (up from 11,100 the year before and representing a 54% increase in export value compared to 2002) (*World Poultry* 2003, 2005).

coincided more or less with outbreaks in humans) and density of open-field duck production. Indeed, a series of studies by Gilbert and colleagues (2006, 2007) demonstrated that this relationship held true at both a very localized and more macroscopic level and that the correlation between duck farming and HPAI outbreaks was stronger even than correlation of the disease with other suspected causal agents such as backyard chicken production and proximity to wildfowl breeding areas.

With this evidence in hand animal health officials believed they had their “smoking gun” which plausibly explained the persistence of HPAI virus over periods and in regions in which all visibly diseased animals – or members of the flocks to which they belonged – had been destroyed.<sup>80</sup> Asymptomatic ducks which invisibly harbored the virus might be serving as a reservoir in which the virus could persist for extended periods of time, circumventing efforts to eradicate the disease through the elimination of possible carriers. Furthermore, the movement of the ducks, abetted by mechanized transport, also explained the ability of the virus to “jump” from one area to another non-contiguous site in a short period of time.

#### Attempts to legislate duck production and sources of resistance

Animal health authorities responded to this information with a stringent set of regulations designed to close down the loophole in their protective measures by eliminating open-field duck cultivation. In October 2004 they issued an advisory informing producers that they had three months to transform their duck farming operations from open-field to closed-system styles of management (*The Nation*, October 19), meaning that birds were to be kept in enclosed facilities where their contact with other poultry or open waterways would be restricted.

The DLD began a campaign to promote the new production systems among duck farmers, offering both technical and economic support to those who signed onto the new approach. In February 2005, just as these measures were to have taken effect, the Avian Influenza Control Team headed by then-Deputy Prime Minister Chaturon Chaisang put forth a plan to use government funds to buy out all remaining duck stocks and to then convert the operations to closed farming system – a plan which was vetoed the very next day by the only official more senior, Prime Minister Thaksin Shinawatt (*The Nation*, February 15)

Thaksin’s resistance to the control plan seems to have been based largely on the resistance which he was hearing from the small- to medium scale duck producers, including the financiers whose money backed the open-field duck farming system. These stakeholders realized that given the realities of land-holding patterns in the Central and lower North regions where duck farming was most concentrated and the relative profitability of open- versus closed-system duck production,<sup>81</sup> conversion would only prove a viable option for the large commercial producers whose access to capital and geographic mobility would allow them to set up new production

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<sup>80</sup> It is important here to stress that across multiple waves of HPAI outbreaks the strain of the virus identified from diseased carcasses was, in general, remarkably similar, suggesting that the virus persisted in some invisible or quiescent state, rather than having been reintroduced (Viseshakul, et al., 2004).

<sup>81</sup> A farmer quoted in the Thai press estimated that closed-system farming, which required that the ducks be maintained on purchased feed year-round, would cost producers approximately ten times what they were paying to produce birds using the open-field system (*The Nation*, December 10, 2004).

facilities in the less densely populated Eastern seaboard region where other integrated poultry operations were also being relocated.<sup>82</sup>

In the face of the stiff opposition and the Prime Minister's own resistance to the conversion scheme, the DLD rescinded its ban on open-field duck production and instead announced plans to introduced limited vaccination of poultry (other than chickens, but including ducks) intended for domestic consumption (*The Nation*, February 22, 2005). It should be noted that this policy, which appears as yet not to have actually been enacted, flew in the face of prior announcements which consistently rejected vaccination as a component of the national disease control strategy.

As a final step, the DLD also imposed strict movement controls on poultry within zones immediately affected by HPAI (*The Nation*, July 13, 2005). These controls, which while opposed by duck producers were nevertheless widely adhered to, have since been renewed in conjunction with each subsequent outbreak of disease. The DLD has also continued to offer support and incentives to farmers who have expressed a willingness to convert their operations to the more biosecure closed-farm systems and have over time succeeded in convincing an estimated 60% of producers to make the transition (*The Nation*, August 15, 2006).<sup>83</sup>

### Ducks and Vaccines

As a final rather ironic footnote to the battle between the DLD and duck producers over the use of culling and biosecure production facilities as compared to vaccination as the mainline defense against HPAI outbreaks, disease control authorities in January 2007 again floated the idea of allowing limited vaccine use as a bulwark against the spread of H5N1 in birds intended for domestic markets (exported birds cannot be vaccinated because of controls imposed by the importing countries) (*The Nation*, January 18).

The great irony of this proposal is that it comes at a time when the preponderance of evidence suggests that vaccination, particularly among ducks, is a technically ill-advised solution. Vaccine trials carried out since 2004 have indicated that unlike chickens, ducks require multiple doses of the vaccine to build up sufficient titre to confer effective immunity and that even when subjected to a 3-shot regimen, a significant proportion of the birds develop only enough immune protection to prevent symptomatic infection but nevertheless can harbor asymptomatic, subclinical infections which, from a disease control perspective are at least as problematic as symptomatic infections (which can trigger culls).

At the time of this writing there had been no firm consensus reached on the status of the vaccination question, and in the absence of an acute outbreak it seemed unlikely that more decisive action would be taken although active research and consultation on the issue continues within the Division of Livestock Development.

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<sup>82</sup> Indeed, so fierce was opposition to bird flu control legislation among duck farmers and so well-organized was the lobby that they earlier threatened to march on Bangkok and release their birds on the grounds of Government House where Parliament sits (*The Nation*, July 17, 2004).

<sup>83</sup> Note, it is unclear to what extent this purported "conversion" rate actually represents a consolidation of the duck industry in parallel to the transfer in ownership and geographical transition which occurred among broiler producers some years earlier.



## Human Health and Vaccine Development

The last of population of interest in explaining the Thai government's understanding of and response to the HPAI epidemic was the human population itself. The inclusion of this item as the last of the points addressed in this analysis is reflective of the fact that human health concerns and the interests which represented them were, in many ways, a somewhat marginal inclusion in the debates which swirled around HPAI disease control legislation.

This is not to say that the Thai authorities were unconcerned about the implications of the disease for human health. On the contrary, as one well placed animal health official commented, the protection of humans from disease was the absolute "bottom line" in the government's evaluation of its disease control policies. But the issues which the disease raised in public health circles often had little overlap with those discussed in animal health-related fora, and where there was overlap – as was the case in the debates surrounding vaccination (of animals) – representatives of the animal and public health communities generally sparred, often acrimoniously, especially in the months preceding the X-ray surveillance campaign which was first launched in October 2004.<sup>84</sup>

Indeed, October 2004 can be seen as a watershed, dividing two epochs in the public health response to HPAI in Thailand. Prior to this date, health officials were fully occupied by the acute care needs of actual or suspected cases. Seventeen of Thailand's twenty-five confirmed cases of H5N1 infection in humans (17 of which ultimately resulted in death) occurred during the period from January to October 2004 and during the second half of that calendar year alone 2,235 people reported with possible or probable flu symptoms (Department of Disease Control, 2004).<sup>85</sup>

It was only after the initial deluge of infections had passed that public health officials could take stock of the situation and begin to articulate their longer term priorities. As they did so, two themes emerged. The first of these was the need to equip the public health system to deal with a nationwide emergency of a massive scale. Secondary but not unrelated to this fairly immediate aim was the goal of national capacity-building, and specifically enhancing the country's diagnostic, surveillance and research capabilities.

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<sup>84</sup> Tensions between the Ministry of Agriculture and Cooperatives and the Ministry of Public Health reached such a level that in September 2004 Prime Minister Thaksin Shinawatra called the two men to task and demanded that their ministries work together towards combating the epidemic. (*The Nation*, 9/30/04)

<sup>85</sup> The concentration of cases (or suspected cases) was even more pronounced than these statistics indicate, all the confirmed H5N1 cases, and most of the suspected disease events took place either in January 2004 (the period of greatest concentration) or in the period from August to October of that year (DDC, 2004; Tiensin, et al. 2005).

## Case Detection and Treatment: Responding to the Early Waves of HPAI Infection

Thailand has been praised for its prompt and effective response to the initial outbreak of HPAI, which is believed to have significantly reduced the overall number and severity of human infections (WHO, 2006; Barnett, et al., 2005). Many of the policies which were employed to contain the human disease burden – to the extent that these were distinct from the more generalized campaign to reduce the transmission of infection among animals (and hence from animals to humans) were actually borrowed from the campaign launched in response to the SARS outbreak a year earlier (Chunsuttiwat 2008).<sup>86</sup>

One of the cornerstones of this approach was an aggressive public information campaign aimed at alerting the public to the presence of the disease and educating them on the basic preventive measures that could be taken to reduce the likelihood of infection. Interestingly, the public education efforts launched by the MOPH in the early months of 2004 appear to have been effective in raising awareness of and fears concerning the spread of HPAI. However, they did not translate into greater self-protective activity on the part of the general public, and as such did not serve to reinforce the messages being circulated (independently) by the Ministry of Agriculture concerning safe animal husbandry and food handling practices.

Another key component of the initial public health response was the effective screening of possible cases and implementation of effective infection control measures to reduce the likelihood of the disease being transmitted within a hospital context. Among the protocols implemented for the containment of infections was the treatment of presumptive cases (i.e., persons who presented with symptoms consistent with influenza even in the absence of a confirmed laboratory diagnosis) with oseltamivir, an anti-viral agent which appeared to have at least modest effectiveness in treating H5N1 pneumonias, provided that it was administered promptly (Auwerakul 2008). The aggressive use of oseltamivir based therapy may have reduced the number of HPAI-related fatalities in Thailand, it certainly increased the country's perceived need for access to the drug, which, in turn, fed into a campaign to produce it locally (which will be described below).

Finally, with the launch of the X-ray surveillance effort the Thai public health system moved from an approach based on passive to one based on active surveillance. It did so in concert with officials from the Ministry of Agriculture and their efforts were, at this point, mutually reinforcing, combining the (volunteer) personnel of one agency with the disease-specific expertise of the other. In point of fact the collaboration between the MOPH and the DLD on HPAI came to be seen as a model for long-term coordination in response to any zoonotic disease outbreak, and as such the principles employed in the short-term response to this epidemic evolved into the foundations of a larger, longer-term effort.

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<sup>86</sup> SARS, which stands for severe acute respiratory syndrome, was a highly contagious respiratory ailment which first emerged in 2003 and affected countries throughout East and Southeast Asia as well as Canada.

## Pandemic Preparedness and Longer Term Planning

An intermediate point between short- and long-term planning in the minds of Thai public health officials was the promulgation of a national pandemic preparedness plan, developed at the behest of the World Health Organization, but also seen by those within the Ministry as an important planning and coordinating mechanism. The plan laid out a 3-year program by which the Thai government, and the Ministry of Public Health,<sup>87</sup> in particular, could systematize the gains made and lessons learned during the initial phase of the response and also develop the logistical capacity to backstop a large-scale response.

In terms of discerning the goals and logic of the public health community's response to HPAI, what is most telling about the Pandemic Preparedness Plan, is not its specific contents (or omissions) but rather the way in which each of the constituent elements is developed, always with an eye to advancing the system's overall capacity. As such the HPAI response was to be used as a catalyst which could help propel the public health system and health research infrastructure to the next level of sophistication, much as foreign and domestic investments in health made during the AIDS crisis of the 1990s had established the foundations of the current infrastructure.

This longer-term thinking is evident in the way in which the Plan draws parallels and bridges immediate needs with objectives of longer term capacity building. For example, it identifies as a single goal the (short-term) objective of stockpiling sufficient oseltamivir (an antiviral agent) to treat up to 325,000 patients and the development of the capacity to manufacture a generic form of the drug (in exportable quantities) within a five-year time horizon. Similarly, it links the immediate goal of obtaining an appropriate influenza virus (for use in humans) to the longer-term (5 year) objective of building the country's capacity to manufacture such a vaccine.

While goals such as the manufacture antiviral agents in exportable quantities or production of a sophisticated vaccine may have at first glance appeared unrealistically ambitious goals for a middle income country with an established but still quite basic pharmaceutical infrastructure, they appear in the eyes of international health experts to have been appropriate and well chosen goals and in both instances Thailand's bid to garner external support for these efforts was successful.

In February 2006 the Swiss drug manufacturer, Roche, under pressure from the international public health community to increase the availability of its product, agreed to license the Thai Government Pharmaceutical Office (GPO) to produce oseltamivir (to which Roche held patent rights under the brand name, Tamiflu) for local sale. Around the same time the GPO was again recognized, this time by the World Health Organization, which identified it as one of only five national labs selected for development as an international vaccine production centre.<sup>88</sup>

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<sup>87</sup> In fact, the National Pandemic Preparedness plan is intended as a coordinating document which specifies roles for at least 13 government bodies. However, most of the roles laid out in the plan are assigned to agencies which are attached to the MOPH.

<sup>88</sup> In addition to recognition, the endorsement brought Thailand a pledge of monetary and technical support from the world body on the condition that their investment be met by a similar commitment on the part of the Thai government. Accordingly, the Thai parliament authorized the expenditure of more than 700 million baht for long-term preparedness measures including the development of oseltamivir and vaccine production capacity (*The Nation*, January

While it would be an overstatement to claim that the outbreak of HPAI has been a windfall for the Thai public health community and, in particular, its research arm. It is unquestionably the case that the interest generated by the country's geographic centrality relative to the global pandemic, its openness to the conduct of research and its capacity to support increasingly sophisticated technical endeavors has allowed the research community to capitalize on the opportunities which the H5N1 virus has created. If history (in particular the history of the HIV/AIDS epidemic) is any indicator, both those directly affected by the virus and the Thai public more generally will also be long-term beneficiaries of the investments made in Thailand in this context.

## V. CONCLUSIONS

Analysts chronicling Thailand's response to the HPAI epidemic have drawn attention to the nation's achievements, among these: her apparent success in curtailing the spread of HPAI in both humans (amongst whom there have been no further cases since 2006) and animals (with no widespread outbreaks among poultry in the same period); the containment of losses within the broiler industry, which is now arguably even more competitively positioned relative to global markets than it was at the epidemic's outset; the promotion of the nascent Thai pharmaceutical industry and of the biomedical sciences in Thailand more generally; and the establishment of a comprehensive grassroots disease surveillance network which can be employed not only for the active monitoring of the influenza situation but in response to any zoonotic or infectious disease threat. These are, indeed, credible and laudable accomplishments for which the Thai government – and the Thai private sector, especially the industrial poultry sector – deserves recognition.

However, this depiction of the HPAI control effort and its impact is incomplete. Importantly, it ignores the ways in which the effort has given short shrift to certain stakeholder groups and allowed political calculus to triumph over prudence in ways that might have ended in disaster – not only for Thailand, but for the larger global community, as well – had the virus' mutations followed a different course. It is worth recapitulating these less hagiographic dimensions of the epidemic, as well, in order to clarify the tradeoffs that were made.

One of the starkest tradeoffs in Thai policy-making related to HPAI was the country's balancing of the interests of the large producers against those of the small- to medium- sized entities. While it is self-evident that any country with such a large and economically vibrant industrial poultry sector would go to great lengths to preserve and protect that sector's interests, it is not clear that Thailand's effort need have been implemented in a manner that was so costly to the smaller producers who, while economically less influential, were (and are) nevertheless quite numerous. Yet on issues ranging from vaccine use (or the prohibition thereof), to the control of animal movement, and restrictions on husbandry practices (including mandating the use of more capital-intensive production facilities), the Thai government consistently and almost unilaterally sided with the large producers, making only token concessions (such as the vaccine use review panel) to small commercial and non-commercial interests.

Clearly feeding into the government's pattern of decision-making was a broader concern with regenerating the country's foreign reserves, which had been badly depleted during the economic crisis of the late-1990s. Of all the subclasses of poultry producers, only the industrial

producers contributed substantially to this larger national goal. There was, furthermore, a natural affinity between the Thaksin administration, staffed to a vastly disproportionate degree by former(?) businessmen and others with a commercial orientation, and the agribusiness interests which controlled the export-oriented poultry concerns. Their overlapping social, political and economic interests would have provided the industrial producers with a degree of access to policy-makers which was unmatched by any other group, and in a very hierarchical political climate such as that which prevailed under Thaksin, it would have taken relatively few such contacts to exert considerable impact on the way in which policies were drafted and enforced.

Another crucial issue is the way in which information was managed, especially in the early stages of the HPAI crisis. It is, on the one hand, a testament to the diplomatic savvy of the Thai government that the country managed to evade being tarred with the same stigmatizing brush that cost the Chinese government so dearly in the wake of the SARS cover-up. That said, there seems clear evidence that Thai authorities actively and deliberately concealed information concerning H5N1 outbreaks in poultry on at least two occasions (in November 2003 and June 2004), and that they subsequently failed to disclose (or, at least, expose) evidence of vaccine use (among layer farms) even as they were assuring their overseas markets that such practices were forbidden within Thailand's borders (which they were, legally).

Were the implications of Thailand's active manipulation of its image overseas (and for that matter, domestically, among Thai consumers) solely a matter of impression management, then it might be dismissed as a matter of political posturing. But the practical implications of these decisions, in terms of the speed and enthusiasm with which the early outbreaks of disease were suppressed, extend far beyond politics. During the period that the Thai government was responding to the first manifestations of the H5N1 epidemic as localized outbreaks, the virus spread to operations throughout the country, exposing many times more birds – and humans – to infection than need have been the case. It is, furthermore, unclear the extent to which subsequent outbreaks within large-scale industrial facilities may have been dealt with internally rather than disclosed to the public.

In any case, the government's failure to deal forthrightly with the presence of the virus both hurt its credibility with the Thai public and ironically (given the government's goals in suppressing the information) damaged ties with importers (especially the E.U.). One wonders, if the Thai government had, from the outset, been concerned with equally protecting the interests of all its citizens – including small-producers and humans potentially brought in contact with the disease – if it might not have responded to the earliest signs of infection with greater alacrity and resolve and in doing so achieved yet better results from the standpoint of disease containment.

Finally, the Thai government has used the HPAI epidemic as an opportunity both to showcase the accomplishments of its public health sector (including the country's nascent pharmaceutical industry) and to enhance the sector's capacity, particularly from the standpoint of research. One wonders, however, how many tangible gains the average Thai has realized from these investments, including the commitment of millions of baht in matching funds to the establishment of vaccine development efforts and antiviral manufacturing capability in place of investment in general medical infrastructure and staffing. While it is conceivable that the Thai public will, in the long-term, be well served by the advances made in these areas, they have, in the short-term been left without a more comprehensive health safety net which might have served their immediate needs.

Furthermore, the arms-length stance which the Thai medical and public health communities – and, to a lesser extent – the veterinary health communities have taken vis-à-vis international agencies, whose representatives they welcomed as conference delegates but whose actual input was marginalized, has also cost the government and the society in terms of potentially valuable exchanges of experience and perspectives. Thailand’s “go-it-alone” approach has, thankfully, proven adequate to her needs, but also prevented a potentially fruitful cross-fertilization of ideas on issues such as vaccine use, in which domestic political interests dictated that she shut down dialogue and take ownership of the matter internally.

An effective policy response is, first and foremost, one which addresses the issues at hand, which in the case of the HPAI epidemic in Thailand meant preventing or at least containing the spread of the H5N1 virus. This Thailand has done with a fair degree of success, although she was unable to prevent the virus from becoming endemic in poultry (a goal which may well have eluded her, no matter what actions she took).

Effective policy-making also, however, takes into account and carefully balances the needs of various stakeholder groups, and here Thailand’s success was largely cosmetic. Thai authorities did manage – sometimes through creative problem-solving, such as the issuance of “bird passports” and sometimes by creating uncharacteristic openings for the expression of dissatisfaction (like the cock-fighter rallies) – to provide safety valves for the release of political tensions without meaningfully addressing the needs of groups being squeezed by the industry-friendly policies being promulgated.

Policy-making is, inevitably, a tradeoff between competing goals and interests and this analysis has attempted to reveal the dynamic interplay amongst the different groups most centrally affected by the spread of HPAI in Thailand and the ways in which this may have affected the national response. Having such an explicit characterization of the policy-making environment in Thailand and a description of the ways in which HPAI-control policies, once promulgated, were implemented, should make it possible to compare the decisions taken by Thai authorities to those of their counterparts in other Southeast Asian countries and elsewhere in the world. Such a cross-national analysis, it is hoped, will ultimately enable not only those who make policy directly but also those who advise them to better carry out their responsibilities.

## APPENDIX A: METHODOLOGY

The present study combines data collected through semi-structured interviews and ethnographic observation with information gleaned in a systematic fashion from the Thai press. A brief description of each of these methodologies and overview of the informants contacted in the course of the field research is provided below.

### Content Review of Thai Media Sources

In order to compile an over-arching chronology of relevant events and to glean contemporary perspectives on these developments, a survey was taken of articles appearing in the Thai press during the period during which the epidemic was being covered by the print media. While most representative perspective on the media's coverage might have been obtained by doing a panel sample of coverage across different publications at different points in time, this proved unfeasible since few of the Thai language dailies (or weeklies) are routinely archived (even in Thai university libraries).

Hence the author settled on a strategy of more comprehensively canvassing a smaller range of publications. In particular, with the assistance of a research assistant fluent in both Thai and English, she reviewed the coverage of HPAI and HPAI-related policymaking in the two major English-language Thai dailies, *The Bangkok Post* and *The Nation*, both of which were available in electronic form for the entire period in question, and the coverage of HPAI and select related topics (including: the poultry industry, the pharmaceutical industry, disease control and agricultural exports) in the Thai-language daily, *Matichon*, which serves a predominantly educated, middle and upper-class readership. Archival holdings of *Matichon* were complete only for the period from 2004 to 2005.

Both a count and a brief summary of the contents and tone of articles relevant to the research topic were recorded and articles with more detailed coverage were photocopied for subsequent analysis.

### Key Informant Interviews

The field research component of this study was carried out between June and August 2008 and relied primarily on interviews with key informants carried out in person, whenever feasible, or by phone. Informants were selected through a combination of snowball sampling (gathering the names of potential informants from those who had already been interviewed) based on multiple seeds (most obtained through personal contacts); direct solicitation of individuals identified in published sources, in meeting records or other interviews as having taken part in specific proceedings; and institutional referrals from the public relations or central administration of organizations which played a key role in the events in question.

A general description of the persons contacted in the course of these interviews is included in the table below. As a general point, though, it should be noted that among those contacted there was a high degree of reluctance to be interviewed on the topic on record, with some potential informants refusing even to speak to the researcher on an informal basis and many

more asking to do so “off the record” and with no recording of the proceedings. This was in sharp contrast to the author’s prior experience in interviewing Thai informants on issues related to health or economic development and suggests both the atmosphere of uncertainty which prevails within the bureaucracy at present (since most of those contacted were in government positions) as well as the highly political nature of the subject matter in question.

For informants who did agree to be interviewed “on the record” either with their names used or, at least, with the interview conducted in person in a more formal manner, the interviews were generally conducted at their place of work and consisted of 60 to 90 minute conversations which, whenever possible, were tape recorded. The interviews were conducted either in English or in Thai (at the informant’s discretion) and were semi-structured in nature with questions tailored to the informant’s area of expertise. In most cases the interview also included some brief chronology of the epidemic’s major events which was used to both position anecdotes shared by the informant in time, and to provide background to and confirmation of the chronology which emerged from media sources.

### Table of Informants

Informant’s title	Nature of Employing Organization	Topics covered
Researcher/administrator	International organization – animal health, livestock production	History of epidemic, policies promulgated and rationale, role of government bodies, role of international community
Research staff, supervisor	Gov. org responsible for animal health and livestock promotion	Policy development and promulgation, relations with other government bodies, relations with international organizations
Research staff	Gov. org responsible for animal health and livestock promotion	Background on duck raising and policies related to same, internal structure of gov. ministry and process of policy promulgation and enforcement
Field staff (by phone)	Gov. org responsible for animal health and livestock promotion	Background on animal husbandry practices in rural areas, review of government policies, description of enforcement practices and reception among locals
Staff researcher	Agricultural arm of foreign service delegation to Thailand	Chronology of epidemic, overview of Thai gov. response, perspectives on commercial sector, media
Staff researcher	Agricultural arm of foreign service delegation to Thailand	International perspectives on HPAI control, trade implications of epidemic,



		technical dimensions of epidemic
Lobbyist/spokesperson	Trade organization involved in government relations and promotion of poultry exports	Restructuring of Thai poultry sector, impact of HPAI on poultry exporters, internal organization of trade org., relations with government and media
President/spokesperson	Lobbying group promoting cock-fighting in Thailand	Structure of cock-fighting industry, support for cock-fighting in rural areas, impact of gov. policies on cock-fighters, role of lobbying group, mech. For expressing political dissent
Former industry executive (by phone)	Commercial poultry producer	Impact of epidemic on Thai poultry exporters, responses to epidemic among large producers, relations with government and small producers
Researcher, liaison to national bodies	International body responsible for disease control and health promotion	Role of MOPH in control of HPAI, role of int'l comm. in advising/supporting Thai policies, Thailand's role in regional disease control, role of spec Thai gov. units
Researcher, liaison	Representative of foreign entity seconded to Thai gov. unit focusing on health	Structure of bio-medical research in Thailand, role of int'l comm. in supporting & developing research capacity, influenza control
Administrator, liaison to int'l health organizations	Thai government entity responsible for disease control and prevention	Background to development and promulgation of state health policies relating to HPAI, relations with int'l health community, role in regional health initiatives
Field staff	Government entity responsible for health promotion and treatment	Activities undertaken at local level in support of HPAI education and control, local perceptions of HPAI, communication and training for MOPH staff
University lecturer/researcher	Public university (affiliated with research unit)	Health promotion education related to HPAI and its control, coordination among gov ministries on HPAI control

Journalist (by phone)	English-language Thai daily	Major influences on gov policy-making, public perceptions of HPAI and gov policy, investigative reporting & censorship in Thailand, relations between media and gov/lobbyists
Former duck farmer	Self-employed	Duck husbandry and health practices in rural Thailand, impact of HPAI and other diseases, relations with gov. animal health officers

### **Ethnographic Field Research**

In two areas of information-gathering it became clear that research based solely on interviews would not supply an adequate understanding of events on the ground. Both the complex sub-culture of cock-fighting and duck-farming practices were insufficiently rendered by the oral accounts of informants, many of whom were themselves removed from the practices described. So, an attempt was made to supplement this information with direct field observation.

In the case of cock-fighting a second complexity arose, namely the highly gendered nature of the sport which made many male respondents reluctant to speak in any detail with a female researcher. After a series of abortive attempts to gather information directly, the author decided to enlist the support of an experienced Thai social scientist (male) who ventured into the field to conduct the interviews and observations on her behalf. Over the course of three field visits to sites scattered throughout the rural North the researcher was able to speak to approximately fifteen informants, several of whom had spent many years involved with the training and breeding of fighting cocks and two of whom had even been employed by “professional” breeding farms. There were also informants whose involvement with cock-fighting was more peripheral: attending fights and placing bets or in one instance, preparing food and selling it at fights.

Plans were also laid to pay a visit to a government animal health field office and a duck-rearing operation, both located in an area which had been the site of a major outbreak two years before the schedule visit. However, the visit was called off just a few days before it was to take place and it proved impossible to reschedule. Consequently, an interview was carried out with the animal extension officer by phone and contact was made with a substitute informant who had been involved in rearing ducks but had left the business prior to the outbreak of HPAI.

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