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The Political Economy of Avian Influenza in Indonesia

Paul Forster

Indonesia

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The Political Economy of Avian Influenza in Indonesia

Why is the response to H5N1 highly pathogenic avian influenza (HPAI) so challenged in Indonesia? Why did the virus spread so fast, and why has the disease persisted? Are there features of the country and its culture that encourage or inhibit the disease? Is the internationally led response appropriately sensitive to local contexts? This paper suggests that distinctive social, cultural, economic and political factors work against a technocratic response such as has been employed in Indonesia. The paper explores the interactions between global bio-medicine, a mesh of power relations linking health, industry, institutionalism and governance, and Indonesia's diverse and complex political and social contexts. How is an infectious zoonotic disease controlled in a dynamic environment where modernist models of authority and rationality are unproven?

Since H5N1 was first detected in central Java in mid-2003, it has spread to 31 of Indonesia's 33 provinces, caused the death or destruction of at least 150 million poultry birds, and killed over 110 humans. The international response, which began in mid-2005, has focused on animal surveillance, control and vaccination, human health system capacity building, and information and behaviour change communications. The response is challenged by the size, geography and infrastructure of the country, an exuberant democracy and extensive decentralization. Other diseases, sectarian tensions and regular natural disasters overshadow the threat of HPAI to human health and food security. Nevertheless, issues of trust between science, government, business and civil society, and nationalism, are shown to be key, as are the varying constructions of risk, public goods and governance associated with the international organizations driving the response, and the people affected by the disease.

About the Author

Paul Forster is an ESRC STEPS Centre doctoral student at the Institute of Development Studies at Sussex University and a member of the STEPS Centre epidemics project. He is based in Jakarta, Indonesia.

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Paul Forster

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For further information please contact: STEPS Centre, University of Sussex, Brighton BN1 9RE
Tel: +44 (0) 1273 915 673
Email: steps-centre@ids.ac.uk
Web: www.steps-centre.org

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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)

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Tek kotek kotek
Anak ayam turun sepuluh
Mati satu, turun sembilan...

Cheep-cheep, cheep-cheep, cheep-cheep
Ten baby chickens run around
Then one dies, and nine survive...

Popular nursery rhyme heard in Majalengka, West Java, 17 August 2008
to be repeated, counting down...

Indonesia is more affected by H5N1 highly pathogenic avian influenza (HPAI) than any country in the world. Since 2003, when it was first detected in central Java, HPAI has spread to 31 out of 33 provinces, caused $470 million in economic losses[1], disrupted the livelihoods of over 10 million people who are dependent on the poultry industry[2], and killed 113 people out of 139 confirmed human cases, mainly children and young adults[3]. Indonesia has also received the largest financial commitment to fight avian influenza from the international community, totalling over $128 million[4]. This has resulted in huge programmes of surveillance, culling, vaccination, and information and behaviour change communications, led largely by United Nations agencies, and some improvements to the health system. Despite these efforts, HPAI remains endemic in Java, Sumatra, Bali and Sulawesi, and sporadic outbreaks continue to be reported in other areas[5].

Historically, and today, Indonesia experiences economic uncertainty, inadequate infrastructure, and regular natural and unnatural disasters, as well as separatist agitation and intermittent sectarian violence. The size and geography of the country also conspire against an easy response to avian influenza, and complex social, cultural, and political factors are at work. Over half of all households keep poultry at home, and chickens, together with other birds, play an important role in culture and provide the poorest with something to eat and trade. Indonesia is also a numinous culture. Fatalism and humility prevail in the face of threats from the natural world in particular. Despite being an ideal

[1] KOMNAS Presentation, 10th National Veterinary Conference of the Indonesian Medical Association, Bogor, 20 August 2008.
[2] http://www.nzaid.govt.nz/programmes/c-indonesia.html accessed 7 November 2008
[3] WHO: Avian influenza – situation in Indonesia – update 45 9 December 2008 available at http://www.who.int/csr/don/2008_12_09/en/index.html accessed 22 December 2008
[4] UNISIC & World Bank (2008)
[5] FAO (2008)

place for a human influenza pandemic to start, there is little popular conception of such an event, and poor comprehension of its consequences. Understanding policy processes must take such contexts into account. How risks are understood, and how responses are framed, are very much located in particular ecological, social and political contexts, and Indonesia presents its own distinct set.

Politically, Indonesia is a dynamic young democracy emerging from 40 years of autocratic rule. Created out of political repression, economic hardship and the triumph of people power, today's political environment might be characterised as a democracy in formation where protest is usually met by political compromise. This makes any robust response to AI politically challenging. At the national level, and at that of 456 autonomous districts and municipalities, there is little trust in government. This is sometimes justified. Despite good intentions, all post-1997 administrations have suffered a degree of continuity with those of the past, which were characterised by institutionalised corruption, opaque processes and collusion with business interests.

Then, as now, the government faced numerous distractions, and it has not interacted significantly with either the industrial poultry sector, which is used to being autonomous and self-sufficient, or the millions of small farmers, who are also used to being autonomous and self-sufficient. Trust again is central. Does the government have any great competence? Does it have any right, or rights, to demand action? This complex relationship between the state and its bureaucracy – a vast, decentralised network of local governments and administrations – and the people, be they peasants or industrialists, is central to understanding the policy processes surrounding the emergence of avian influenza in Indonesia, and the responses to it. As this paper shows, the relationship is neither straightforward nor fixed, and has led to a situation that is challenging the ideal plans of the government, its donor supporters, and the implementing agencies.

All Indonesian poultry production is consumed by the domestic market and imports are negligible. Chicken is Indonesia's favourite meat, and around ten conglomerate companies control all industrial production, with three responsible for 70% of the market. Most integrators operate at least partially under sub-contracting schemes that see poultry, material associated with poultry production, and waste products, widely transported about the countryside. Small scale 'backyard' and village farmers also make a significant contribution to production, and hobbyists abound. Although both groups are keen to blame the other, the nub of the problem does not lie in industrial farming, or in backyard farming, but in the interactions between them, and the widespread movements of poultry products associated with both. Only now are the results of detailed studies becoming available, with markets and market-related movements becoming more clearly implicated in the spread of the virus.

The HPAI response has been led by international agencies, operating in emergency mode. The Food and Agriculture Organization of the United Nations (FAO), working with the Indonesian Ministry of Agriculture, has been in the front line, creating and implementing disease control plans designed, and led, by veterinarians and public health experts. The scale of the problem is awesome, however, and technical, science-led, approaches such as vaccination are proving challenging to implement in village and backyard settings. The need to understand and get involved with critical issues such as compensation for culling, for example, which involves disbursement of small sums of money to large numbers of people, adds huge complexity, some of it political.

Communications, led by the United Nations Children's Fund (UNICEF), and organizations such as Development Alternatives, Inc., have been more fragmented but no less extensive. Very successful in raising awareness, they have affected long lasting attitude or behaviour change less convincingly. The United Nations World Health Organization (WHO) has been faced with the most extreme political difficulties, despite pressing needs for fundamental scientific research and improvements to a low-level healthcare system. It has however added important specific capacity.

This international architecture, whilst faced with its own internal challenges of priorities, cultures, co-ordination and trust, is also charged with co-ordinating and building relations with national, provincial and regional government and non-government agencies, and individuals, as well as civil society, in an atmosphere of charged nationalism and complex politics. Just as the people are suspicious of the government, the government is suspicious of the global community. This leads to a larger question: how will Indonesia – at the epicentre of the global avian influenza epidemic – choose to relate to the rest of the world, which is fearful of the consequences of a human pandemic? Here tough geopolitical debates about equity, public goods and global responsibilities arise, illustrated most starkly in the controversy surrounding virus sharing (see Viruses and sovereignty below).

This paper is the result of three weeks fieldwork in Indonesia in August 2008 that involved interviews with 38 individuals[6]. The majority were professionally involved in the avian influenza response, although a number had broader interests in politics, economics and society. This followed interviews with 59 people involved with avian influenza based in Europe and the US (cf. Scoones and Forster 2008) and a literature review covering avian influenza, agriculture, health, politics, society and economics in Indonesia. This included academic studies, and published and unpublished policy, strategy and evaluation documents produced by national and international bodies. Three transect walks were accomplished in Jakarta, and two in Majalengka, West Java. A press review covering the period 2004 to 2008 provided a wider picture, which was triangulated with data from interviews and the literature. For reasons outlined in the paper, the perspectives of the integrated poultry industry are not well represented, directly, nor those of the Indonesian Ministry of Health. For reasons of time, the concerns and activities of the Association of South East Asian Nations have not been addressed.

The paper first outlines the geographical, economic, ecological, cultural, and historical context of Indonesia. A description of political events since 1997 leads to an analysis of the current political situation, in particular the challenges posed by decentralization and the legal system. The late reporting of the initial HPAI outbreak to the World Organization for Animal Health (OIE) is investigated, and a time line contrasts major events related to avian influenza with other, competing, events. The role of poultry in everyday life and commerce is described, and the responses to avian influenza are elucidated through outlines of the roles and activities of the national co-ordinating agency, and related national and international bodies. This is divided in sections covering agriculture, public health and communications. One objective is to identify both dominant, and neglected, actors, networks and narratives (persistent storylines) involved, and their interactions, or the lack of them. Finally Indonesia's recent refusal to share human H5N1 virus samples is investigated, and some conclusions are offered.

DEMOGRAPHICS, DANGER AND DIVERSITY

The Republic of Indonesia's 235 million citizens[7] inhabit some 6,000 islands in a 17,508 island archipelago that stretches over 5,000 km between mainland South East Asia and Australia. Ranked 107 out of 177 countries in the UNDP's 2007/2008 Human Development Index, GDP per capita was $3,471 in 2006 (PPP, current international dollars) with 40% of the population living on less than $2 a day (Asian Development Bank 2008). Despite a slowing global economy, national economic growth reached a ten-year high of 6.3% in 2007 with unemployment falling to 9.1%, exports growing, and the balance of payments account showing a surplus (McLeod 2008:185-186, CEIC Asia database[8]). Further data for Indonesia is presented in tabular form in Appendix B.

[6] See Appendix A

[7] Nearly every statistic relating to Indonesia needs to be treated with caution. A recent study found a shortfall of 36 million people in the national electoral roll, for example (Jakarta Post 21/8/08).

[8] Available at www.ceicdata.com accessed 11 December 2008

Rich in natural resources (including petroleum, natural gas, coal, tin, timber, bauxite, copper and fertile soils), Indonesia's location on the edges of three tectonic plates makes it the site of 130 active volcanoes and frequent earthquakes and tsunamis. Home to 12% of the world's mammals, 16% of the reptiles and amphibians, 17% of the birds and more than 25% of all marine and freshwater fish, agriculture currently engages 44% of the working population and services 38%. In 1980, 22% of the population lived in urban areas and in 2002, 42% (Fabiosa 2005:2). Adult male literacy is reported at 92% and female at 83%[9]. Culturally and economically, the country is dominated by the island of Java (the Javanese and the Sundanese from western Java make up over half the Indonesian population), which has a remarkably high population density of nearly one thousand people per square kilometre. Islam is the dominant religion and Indonesia has the world's largest Muslim population. Islam however is often mixed with other cultural and religious influences including animist, Hindu, Buddhist and Christian. Across the country, over 300 ethnic groups speak over 700 languages and dialects.

Under Dutch rule for over 300 years, and one of the Netherlands' richest colonies in the 1800s, Indonesian independence was declared in 1945, recognised in 1949, and until 1965 the country was under the authoritarian regime of President Sukarno. This period was characterised by endemic corruption and a nationalist, quasi-socialist economic policy that resulted in hyperinflation and economic stagnation. An attempted coup in September 1965 was countered by the army and subsequently between 500,000 and one million people were killed as alleged communists and supporters (Cribb 1990). From 1968, when he was formally appointed, President Suharto reversed many of Sukarno's policies and initiated a 'New Order', which saw foreign debt rescheduled, an inflow of aid and investment, and significant economic growth: the proportion living below the poverty line reduced from around 60% in 1970 to around 11% in 1997. More corrupt and authoritarian than Sukarno, Suharto and his close family also prospered, amassing a fortune estimated to be several billion dollars (McLeod and MacIntyre 2007).

The 1997 Asian economic crisis devastated the economy and provoked dramatic political change. Popular discontent and resentment at the government's corruption manifested in urban riots and Suharto was forced to resign in May 1998. His vice-president, B.J. Habibie was subsequently sworn in as president, and in a state of the nation address on 15 August 1998[10], he suggested that the proportion in poverty had soared to 40%[11]. In what became known as the *Reformasi* era, the regime liberalised, political prisoners were released, controls were lifted on the press, independent political parties and unions were sanctioned, and political and economic stabilization became the main tasks of government. In June 1999, the country held its first free legislative elections and the People's Consultative Assembly (MPR) subsequently selected Abdurrahman Wahid as president, who offered the vice-president position to Megawati Sukarnoputri (Sukarno's second child and first daughter). In July 2001, however, Wahid was implicated in two corruption scandals, impeached, and Megawati was sworn in as the fifth president. In July 2004, the first direct presidential elections were held and Susilo Bambang Yudhoyono (known by his initials SBY) won a clear victory in a second round run off against Megawati.

SBY's administration has set a new tone of competence and political accountability, and has acted significantly in the struggle against pervasive corruption, but the economic and political situation is widely perceived to be, if not in a state of flux, at least mutable. Dramatic and far-reaching events have arisen rapidly and with little warning in the past, and with parliamentary elections scheduled for April 2009, and presidential elections for July, the future is looking less predictable than usual, even with SBY consistently leading the opinion polls. Economically, the country is more resilient than it has ever been, if not growing so dynamically, but exchange rates still wander alarmingly, and rapid changes in the prices of raw materials and basic commodities make forward planning difficult for

[9] http://www.ilo.org/public/english/region/asro/bangkok/skills-ap/skills/indonesia_literacy.htm accessed 12 December 2008

[10] Jakarta Post 16/8/98 and in Bourchier and Hadiz (2003)

[11] Fabiosa et al (2004) report real per capita income dropping from $1000 in 1996 to $205 in 1998.

business and government alike. Politically, the picture is brighter now than ever, but significant patches of poverty and extreme contrasts of wealth suggest that it is brighter for some than others, and that a dangerous fragility may not be far beneath the surface. Perhaps living on a chain of volcanic islands fixes minds on the here and now, rather than tomorrow, or the day after, but this is not a mind set well suited to the years or even decades of determined and consistent activity required to combat a highly infectious disease entrenched in millions of small animals. The questions emerge: How can HPAI be managed in such a setting? Are the existing political processes fit for such a purpose? How might they help or hinder the response?

POLITICS AND POLICY MAKING

Indonesia's system of government is both presidential and parliamentary in style, and has seen significant change since the beginning of the *Reformasi* era. According to the amended 1945 constitution, the Indonesian president is head of state, commander-in-chief of the armed forces, and chief executive, responsible for domestic governance, policy-making and foreign affairs. He or she appoints a council of ministers to serve as the executive, who need not be elected members of the legislature. Two chambers form the legislative branch. The 695-member *Majelis Permusyawaratan Rakyat* (MPR), or People's Consultative Assembly, has the authority to amend the constitution and to inaugurate, and discharge, the president and vice-president. It is made up of all 550 members of the *Dewan Perwakilan Rakya* (DPR), or House of Representatives, who are elected for a five-year term by proportional representation in multi-member constituencies, plus the members of the *Dewan Perwakilan Daerah* (DPD), or Regional Representatives Council, also selected at general elections. Other organs of state include the Supreme Court (*Mahkamah Agung*), the Constitutional Court (*Mahkamah Konstitusi*) and the State Audit Board (*Badan Pemeriksa Keuangan*).

Since 1999, constitutional and institutional reform has led to some important changes including direct presidential and parliamentary elections, a far-reaching decentralization programme, two-term limits for the president and vice-president, and the creation of the DPD, in which each province is represented by four members. These moves have seen the DPR gain considerable power, and it is increasingly assertive in its oversight of the executive. Critics, however, express disappointment at the slowness of reform, suggesting that the DPR has yet to demonstrate any great capacity to distinguish between privately and socially beneficial demands, and remains unresponsive to concerns about the business environment (McLeod and MacIntyre 2007). Others suggest that the democratic transition has been marked by dramatic breakthroughs followed by disillusionment, and that a high degree of continuity exists between the new democratic politics and those of the authoritarian past. Aspinall's (2005) analysis sees Suharto's government replaced by a reconstituted version of itself, with Suharto's hand-picked vice-president, B.J. Habibie, moving into the presidential palace. His successors, presidents Wahid and Megawati also failed to inspire. McGibbon (2006:321) characterises the period of 1998 to 2004 as 'six years of weak government, economic hardship and far-reaching political change'.

On Suharto's demise, one interviewee said:

> An entirely family-orientated country lost its father. He was not always the kindest father, but everyone looked to him to steer the ship. A vague nation became even vaguer; the ship lost its rudder, and forwards movement. Politically things have got better – we have a free press for example – but there has been no replacement for that authority. We are fixing a new rudder now, and going forwards again, but the rudder is not so big, and not so well connected to the helmsman. If Suharto had got the bit of bird flu between his teeth, we would have seen a completely different reaction[12].

[12] Interview, Jakarta 25 August 2008

Susilo Bambang Yudhoyono's 2004 success in the first ever direct presidential elections saw a new optimism, which has been described as 'a triumph of personality, image and popular choice over party machine politics and the power of party bosses' (Aspinall 2005a cited in McGibbon 2006). SBY, a reserved, secular and relatively progressive ex-army general from Java, has been credited with forming a successful partnership with the more exuberant vice-president Jusuf Kalla, from South Sulawesi. He has fostered democracy, manoeuvred the army out of politics, and given the economy a much-needed boost through sound microeconomic policies and structural reforms. Other successes have included maintaining a peace agreement with secessionist Aceh province, on the country's northern tip, and addressing the issue of deep-rooted corruption. More nuanced comment, however, suggests that the defining feature of SBY's presidency has been a strong tendency to engage in political compromise, and to prefer stability over unsettling political and economic change (McGibbon 2006). One example given is the government's reluctance to confront growing religious intolerance (McLeod 2008:183). This paper suggests that another, in the face of a significant number of competing priorities, has been an unwillingness to engage with both the business interests associated with the integrated poultry industry, and the 30 million or so households which keep poultry at home.

One reason for this inability to defend and push through difficult decisions is that, compared with the two previous presidents, SBY does not have a natural constituency. If Wahid's ideology was founded in traditional Islam, and Megawati's in secular nationalism, SBY's touchstone might best be described as pragmatic populism, with vacillation or back-tracking common in the face of any opposition. Another factor fomenting against change is the fragmented multi-party political system. Under Suharto, only three officially sanctioned and tightly controlled 'national' parties were allowed. The liberalisations of 1998 saw over 100 new parties emerge in months (Reilly 2007), and only a complex set of incentives and restraints limited numbers to 48 in the 1999 national elections, and 24 in the 2004 elections. Haggard (1997 cited in Reilly 2007) points to the difficulties of such systems in which parties may only need a small plurality of votes to win office, and so can focus on providing benefits to their own supporters. This compares with systems involving smaller numbers of parties, where support must be cultivated and maintained across a broader range of social groups. This may cause particular problems in diverse societies like Indonesia where parties often form around distinct social groups based on ethnic, religious or regional identities. A further, and related, factor supporting the status quo is the practical complexity of political life in 'rainbow' cabinets, where posts and state resources may need to be distributed to neutralise party opposition.

Indonesia is accustomed to strong and decisive leadership. In Max Weber's terms, Sukarno's presidency (1945 – 1967) was arguably based on 'charismatic' authority, and Suharto's (1967 – 1998) on 'patrimonial' authority. Only in the last ten years has the country made moves towards a European (Ancient Greek) idea of democracy, with SBY, the current president, facing the challenges of coaxing politics towards the base of a 'legal' authority, founded on modern concepts of the law, the state and bureaucracy. Traditional Javanese political processes such as *musyawarah* (discussion, deliberation, consultation) are still very much in play, and powerful mythological ideas such as that of the *satria* (knight) – the smooth and unruffled man of power who exerts himself as little as possible in any action – are far from irrelevant. Finer grain analyses of Javanese concepts of power (cf. Anderson 2006) see manifestations of disorder in the natural world, such as floods, eruptions and plagues, as symptoms (but not causes) of a lessening of a ruler's power. The implications for the response to HPAI are manifold. First, a base political instinct must suggest ignoring HPAI, or at least not acknowledging it as a substantial problem. Secondly, the protocols of power (as well as the associated, essential good manners) prohibit any sort of display of agitation, or real determination for the future to have a particular shape. Thirdly, as the next section outlines, the control room of political order is still under construction.

A BIG BANG

The World Bank (2003:1) calls Indonesia's 1999 decentralization legislation (Law No. 22/1999 on Governance – revised by Law No. 32/2004 – and Law No. 25/1999 on Financial Balance between the Central and Local Governments), implementation of which began on 1 January 2001, a 'Big Bang'. One of the most centralized countries in the world was being transformed into one of the most decentralized. This was a key element in the reform strategy of the IMF, proposed in 1998, and widely considered essential to resolve the regional and ethnic tensions that resulted from Java's historical hegemony and the policies of Suharto's 'New Order'. During that period, strict control was exercised to the benefit of the centre through the security apparatus, corporatist controls, and co-optation of the legislature. Public services for the entire country were implemented through a long, hierarchical apparatus that was designed not to meet the needs of the people, but to accord with the strategic interests of central actors and their cronies (Erawan 2007).

Change came in three areas: a direct electoral system, introduced in 2004, made the governors, district heads and mayors representatives of their constituents rather than appointees of central government; local governments were guaranteed authority and discretion in policy innovation, with funding mechanisms put in place to enable regions to fulfil their autonomous functions; and the bureaucracy was restructured to emphasise local delivery. Most significantly, power was not devolved to the provinces, which might only have exacerbated centripetal forces, but to the districts and the municipalities. Consequently, in January 2007, Indonesia comprised 33 provinces and 456 autonomous local governments of which 363 were districts (regencies) and 93 municipalities (cities) (McLeod 2008:201-202).

The responsibility for controlling HPAI falls largely on the autonomous district-level governments, and national guidelines are only implemented when local officials think it is necessary and have the funds and local support to do so. Many interviewees suggested that this was the most significant challenge to controlling the disease in the country. One respondent was explicit: "Decentralization is why avian influenza became established here, why it spread so rapidly, and why there is still no effective response"[13]. Another said:

> In terms of dealing with an animal disease decentralization is a disaster. To pass responsibility to 440-plus autonomous administrations is absolutely ridiculous. The Ministry of Agriculture can do and say what it wants, but the districts don't have to take any notice, and nearly always don't. I guess their attitude is that there is no point to *otonomi* unless you are autonomous[14].

An informant from an international organization responsible for implementation said:

> What *otonomi* means is that we have to negotiate with every district. Before we can start operating we have to get buy in from the local leaders and decision makers. We have to persuade them. Then we have to convince the local animal health people it's a good thing. And only then can we start doing the real work. It is a long and challenging set of steps[15].

The story in the health sector is the same. Padmawati and Nichter (2008:44) quote a WHO epidemiologist in Jakarta, interviewed by Associated Press:

> The amount of decentralization here is breathtaking. Health Ministry officials often meet with outside experts to formulate plans to fight bird flu, but they are rarely implemented. Their

[13] Interview, Jakarta 15 August 2008
[14] Interview, Jakarta 12 August 2008
[15] Interview, Jakarta 13 August 2008

> power extends to the walls of their office. The advice must reach nearly 450 districts, where local officials then decide whether to take action.

Otonomi was however not just a political ideology and a reaction to inefficient and corrupt central bureaucrats, but also a means to reduce central government expenditure, with local governments raising taxes from their own natural resources and business activities. In particular, veterinary services became an 'easy target' for cost cutting (Normile 2007:31). As one source[16] put it:

> At the provincial level we can find the Livestock Service, but in the district level we cannot always find the Livestock Service since sometimes the Livestock Service is under another Service supervision, such as Agriculture and Marine Service. The Livestock service is positioned as sub-service [and beyond this, Animal Health is a further sub-service of the Livestock service]. This causes trouble in receiving and applying commands from the centre to eradicate AI, and is also sensitively related to the budget issues.

Furthermore, the central state has no mandate to audit local governments, and district authorities are not obliged to report accounts. Examining the health sector in four districts (Central Java, Lombok, Kalimantan and Flores), Kristiansen and Santoso (2006:254) found no figures available for the real district government expenditure and concluded that 'there is a total lack of financial transparency and accountability in all districts'.

As might be expected – or even hoped – the results of decentralization are far from uniform. One significant factor is that income per capita is more than 50 times higher in the richest districts compared with the poorest, mainly due to earnings from oil and gas resources. Erawan (2007) reports significant variations in the style of politics across the country, with local state capture and rampant corruption in some jurisdictions, and deepening democracy and the emergence of effective government in others. Hadiz and Robison (2005:234-235) suggest that there are powerful interests intent on maintaining the status quo, reporting on the rise of gangsters (*preman*) in North Sumatra, Yogyakarta and East Java in 'a replication ad infinitum of the predatory pattern of state-business relations, which under New Order rule was concentrated in Jakarta, but is now growing more or less autonomously at the local level'. Other analyses are more positive. Concerning elections to the JPPR, covering 224 regions, McGibbon (2006:331-2) found that over 40% of incumbents lost office, that elections introduced an element of downward accountability, and that elected executives were being forced to take account of citizens' demands as never before.

Similarly there are variations in the HPAI response and some "pockets of excellence"[17]. Lampung in Sumatra is often given as an example, and regions in Kalimantan, which have only had sporadic outbreaks, are also deemed to have had some successes[18]. Similarly, Bali has been well co-ordinated since mid-2006, and South Sulawesi is often cited as a bright spot: "The governor is engaged, there are some proper movement controls, and they are doing sensible things like paying compensation [for culling] and worrying about reclaiming the funds afterwards"[19]. One interviewee suggested taking advantage of this: "If we could bypass the complex politics at the top, and reward regions that were responding well, the others might get the message and we could see a different picture emerging"[20].

The bottom line, however, is that decentralization, especially in its highly variegated and in many senses admirable Indonesian form, conspires against almost every principle of stamping out an infectious animal disease. This requires comprehensive, consistent and co-ordinated action across

[16] Ketutsutawijaya: available at http://ketutsutawijaya.wordpress.com/2007/03/16/11/ accessed 3 November 2008
[17] Interview, Jakarta 13 August 2008
[18] Interviews, Jakarta 11 & 12 August 2008
[19] Interview, Jakarta 13 August 2008
[20] Interview, Jakarta 12 August 2008

the whole infected area. But with priorities, competencies, funding and even administrative cultures and languages varying across 450-plus autonomous regions, some of which are prepared to collaborate with their neighbours – and the centre – and others less so, the consequences for the HPAI response are stark. Devising and implementing a national response consistent with the modernist command and control principles of the international guidelines is an uphill task. In theory, legislation solves the problem, but as the following section explains, this corner of the control room is in particular disarray.

LEGISLATION AND THE RULE OF LAW

Indonesia's legislation relating to animal health dates from 1967 (Law No. 6 on Animal Husbandry and Veterinary Hygiene) and does not cover an outbreak situation. According to one informant, the government does not actually have the legal capability to cull infected poultry[21]. A revision (provisionally entitled the 2008 Law on Animal Husbandry and Animal Health) has been in draft for over a year, but still has serious flaws. Critics find over 20 shortcomings including: lack of clarity in to whom or to what the Law applies, lack of specificity in defining which diseases are notifiable and what the responsibilities of the veterinary authority are, and an inadequate definition of epidemic diseases of livestock[22]. Decentralization, of course, complicates matters further. As an interviewee put it: "Neither the national government nor the regions have the capacity to address the gaps in the animal health laws. They don't have the skills, they don't have the focus, they don't see it as a priority"[23].

The situation is further complicated by politics. An informant offered one explanation: "The agriculture minister does not have the necessary influence at the high table. This should have the highest priority. What can you do if there is no law?"[24] Another suggested:

> [Minister] Apriyantono's appointment was seen as sop to the Islamicists. He's not particularly respected. He spends his time building networks with places like Sudan, which doesn't do much for Indonesia. But to be fair to him he has a complex constituency – smallholders, middle holders, the big food producers – and I don't think anybody would envy his job in the bird flu response: trying to change the national way of life. Bakrie, the co-ordinating minister, is respected, and could get a lot done. People try to pull him in, but he tends to body swerve, and it's hard to blame him. What do you do except make yourself unpopular? And he has plenty else to do. If you look at all the other issues, avian influenza is just a little rattle deep in the Indonesian machine. It's not really part of the national debate. No one takes it seriously[25].

Within the agriculture department itself, matters are no less complex with the Directorate of Animal Health subordinate to the Directorate General of Livestock Services, and numerically and politically outnumbered by it. A respondent said:

> There is actually no permanent CVO [Chief Veterinary Officer] at the moment. Who knows what's really going on, but to my best knowledge the previous CVO, Musni [Suatmodjo], was caught up in a scandal, and the director before that didn't last long. Running Indonesia's animal health service is beginning to look like a poisoned chalice[26].

[21] Interview, Jakarta 11 August 2008
[22] Interview, Jakarta, 13 August 2008
[23] Interview, Jakarta 11 August 2008
[24] Interview, Jakarta 11 August 2008
[25] Interview, Jakarta 28 August 2008
[26] Interview, Jakarta 11 August 2008

Even if appropriate regulations existed, enforcement would still be problematic[27]. Despite a determined anti-corruption drive, and indeed the SBY's reputation as 'Mr Clean', Indonesia was ranked 143 out of 180 countries in Transparency International's Corruption Perceptions Index for 2007. Under Suharto, the judiciary was effectively an instrument of the regime and some suggest that, consistent with the politics of compromise, the recent high-profile investigations and prosecutions have failed to reach the entrenched interests at the centre of power (McGibbon 2006:325). Others go further claiming that *reformasi* era corruption is actually more damaging because it is fragmented, incoherent and not under the control of a central force (McLeod and MacIntyre 2007:3). Hadiz and Robison (2005:237-8) conclude:

> This regulatory state, like all modes of organising power, requires a social and political base which as yet does not exist in Indonesia... In the present conjuncture, save for isolated pockets of liberals in a few government ministries and agencies, and some academics and intellectuals, the building blocks for such a vehicle are virtually nowhere to be found.

Consequently, the rationalist, science-led approach of the tried and tested international response to infectious animal disease, which assumes a Weberian bureaucracy operating in the context of a liberal democracy, runs aground on Indonesia's complex democracy in formation. One question that arises is: is Indonesia likely to attain this state, and if so when? Another, given that there is no reason why the country should follow Europe's political evolution, and certainly no reason why it should be pressurised to do so, is whether the international response to HPAI needs to be modified to take account of the specific local context. Imposing standard rational-technocratic policy solutions on contexts they don't fit is frustrating, and may be counter productive. Accepting that such responses may usefully bear modification opens up fresh perspectives on understanding what is not possible, or worthwhile, and more importantly, what is. The following section looks at what happened when the H5N1 virus first appeared in the country.

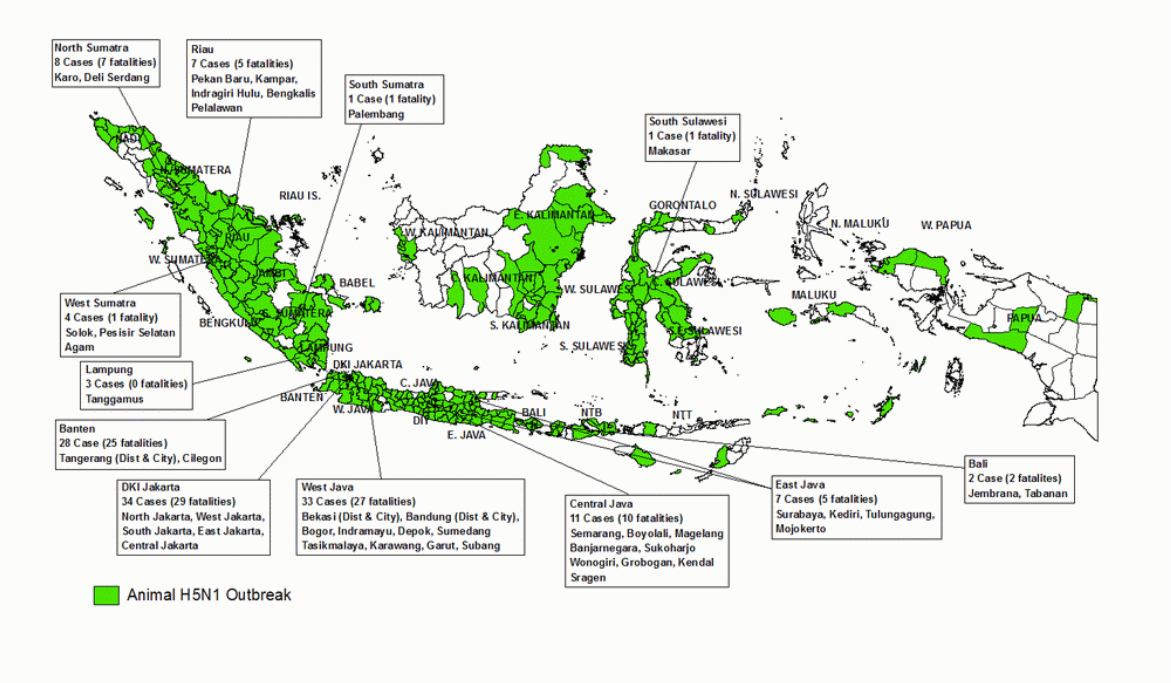
THE ARRIVAL OF HIGHLY PATHOGENIC AVIAN INFLUENZA

HPAI first appeared in Pekalongan in Central Java in August 2003 and by January 2004 it had spread across Java and into Bali, Kalimantan and southern Sumatra[28]. In 2005, it reached Sulawesi, North Sumatra, and Aceh, and in 2006, Papua. At the end of June 2006, 27 of 33 provinces were affected (Sedyaningsih et al 2007:522) and at mid-2008, all but two – North Maluku and Gorontalo – had reported outbreaks. In March 2008, the FAO described the avian influenza situation in Indonesia as 'critical', quoting FAO Chief Veterinary Officer Joseph Domenech: 'Despite major control efforts, the country has not succeeded in containing the spread of avian influenza in poultry'[29], and in September (FAO 2008:49) the official verdict was that 'the disease remains endemic in Java, Sumatra, Bali and South Sulawesi, with sporadic outbreaks reported from other areas'. Reports from the field in December 2008 paint a more positive picture:

> Control has been achieved in some areas, such as Kalimantan, and Ministry of Agriculture data appear to show that the disease is no longer spreading to new areas, that overall incidence and geographic spread is decreasing, and that selected areas, such as Bali, have seen large reductions in disease incidence. It is true though, that despite this progress in reducing the level and extent of virus circulation, the disease is not yet under control in

[27] Ulfah (2008) reports 41 protected species being traded in 17 markets in and around Bogor, for example.
[28] According to the Ministry of Agriculture, the provinces hit hardest by the disease in 2003 were: Central Java, with 17 afflicted regencies; East Java (13 regencies); West Java (3); Yogyakarta (6); Lampung (3); Bali (5); Banten (1); South Kalimantan (1); East Kalimantan (1); and Central Kalimantan (1). On the island of Java alone, over 10 million birds are estimated to have died of the disease since October 2003. Jakarta Post 26/1/04.
[29] 'Bird flu situation in Indonesia critical' FAO News 18 March 2008 available at http://www.fao.org/newsroom/en/news/2008/1000813/index.html accessed 3 December 2008

densely populated areas, such as western and Central Java, and there is a need for continued effort[30].



Location of Human H5N1 Avian Influenza Cases and Animal Outbreaks at 10 December 2008[31]

Initial outbreaks are thought to have been in the commercial poultry sector, resulting from imports of live birds as breeding stock from China (Sedyaningsih et al 2007:522, Vanzetti 2007:2-3). Thailand has also been suggested as the immediate source of infected birds[32]. Others close to the matter say it is essentially unknown in which sector the disease first appeared, and where it came from. One informant said: "The rumours say it was industry first, but that is all there is to go on. Rumour and hearsay"[33]. Phylogenetic analysis suggests that the Indonesian outbreak originated from a single introduction (Smith et al 2006). The rapid spread is most commonly explained as a result of the movement of infected commodities including commercial chickens (Thornton 2007). The Indonesian government declared HPAI infection to the OIE in January 2004 and on 3 February 2004, the Minister of Agriculture issued decree no: 96/Kpts/PD.620/2/2004, declaring avian influenza a dangerous disease.

Between August 2003 and January 2004, at least 600,000 chickens reportedly died of the disease in 17 of Central Java's 35 regencies[34]. Some 10.5 million birds were reportedly lost in 2004 due to disease and culling[35], and during peaks of infection in February/March 2005 and 2006, recorded monthly poultry deaths were 530,453 and 647,832 respectively[36] with losses due to disease or culling estimated to be between 15% and 20% of all poultry stock. In 2004, the combined effect of 50% to 60% lower prices and 40% lower sales volumes meant income reductions of 70% to 80% for traders, and employment opportunities dropped by 40% on larger poultry farms[37]. According to the

[30] Review comment, 22 December 2008
[31] Source: WHO http://www.who.or.id/avian/map/humans_and_poultry.gif accessed 26 December 2008
[32] Interview, Jakarta 27 November 2008
[33] Interview, Jakarta 13 August 2008
[34] Jakarta Post 4/10/04
[35] Avian Influenza Control Campaign 2006 - 2008, An Indicative Outline, Ministry of Agriculture, December 2005:6
[36] Presentation: 'HPAI Vaccination Program in Indonesia', Ministry of Agriculture presentation, Scientific Conference on Vaccination Verona Italy 20 - 22 March 2007
[37] Committee on World Food Security, Thirty-second Session, Rome, 30 October – 4 November 2006

chairman of the Indonesian Poultry Breeders Association, 2.5 million workers in an industry with an annual turnover of Rp50 trillion (US$5.95 billion) were affected[38].

Many groups, including the press[39], were quick to cry foul. The Chinese government had set a precedent for opacity in their early cover up of the 2002-2003 SARS outbreak, and the Indonesian government had doubtlessly been pushed to make an announcement. Confirmation of millions of HPAI deaths by the East Java chapter of the Indonesian Association of Veterinarians was significant, as was the Malaysian and Singaporean governments' ban on poultry imports from Indonesia[40]. At a press conference, however, the then Director General for the Development of Animal Husbandry, Sofjan Sudardjat, denied allegations that the announcement had been delayed due to pressure from the poultry industry, and suggested that the disease had been intentionally introduced into Indonesia by foreign parties. Industry was unsympathetic. 'The government is slow in handling the problem and is giving opportunities for the virus to spread to other areas in the archipelago. We have been asking for the vaccine since September,' was the response of the Indonesian Poultry Breeders Association [41].

A number of vivid conspiracy stories (see Box 1) surround the first months of infection, but those close to the matter have a more consistent and prosaic set of explanations. One respondent suggested:

> First there was the matter of not believing it was HPAI. Chickens die of disease regularly[42] and with no AI reported in the country, there was no reason to think of it as an AI outbreak. Secondly there was no idea what to do. There were no reagents stored for testing, and with no scientific proof, it was easy for the Newcastle[43] lobby to influence the decision makers[44].

Another said:

> It was a cock-up rather than a conspiracy; bureaucratic inertia and incompetence rather than anything deliberate. The civil service here is very formalised, very hierarchical. You have to be deferential. If there was some technician with a test that was showing positive, he or she probably didn't show it to their boss for fear of upsetting them. It's possible too that the technical people, or even the regional bosses, were not aware of the need to report, or how to do it. Doing nothing is always the best course[45].

Box 1 - Rumours and conspiracy stories

A cloud of rumour and some vivid conspiracy stories have emerged around the uncertain knowledge associated with the arrival of HPAI. Reflecting nationalist concerns, one of the most common is that the US introduced the virus to destroy the Indonesian poultry industry and promote its own poultry exports and vaccines. Similar stories make China the protagonist, again looking to boost exports, with the government complicit as they would collect higher import taxes. More strategic analyses suggest that it was introduced by the US as part of a global plot to

[38] Jakarta Post 27/01/04
[39] 'Govt confirms bird flu after long cover-up' Jakarta Post 26/01/04
[40] 'S'pore, KL freeze poultry plans' Jakarta Post 24/01/2004
[41] Jakarta Post 27/01/04
[42] The Jakarta Post (6/06/2002) reports an outbreak of Marek's disease killing 2.8 million chickens in West Java in early 2002. Senanayake and Baker (2007) offer an intriguing historical perspective, describing an illness that destroyed poultry and devastated the human population in the Maluku islands in the 16th century.
[43] Newcastle disease is a common, and deadly, viral disease of poultry that does not transmit to humans.
[44] Interview, Jakarta 13 August 2008
[45] Interview, Jakarta 14 August 2008

destabilise Islamic countries; or more specifically to weaken Indonesia, to make it more dependent on international aid and loans, and therefore behoven to the western powers in need of its natural resources[1]. Evidence given in support of this view is the fact that the disease arrived later in the predominantly Christian provinces[2]. Domestic plots suggest that avian influenza was introduced by big business in league with central government to drive small producers out of the market by depressing prices and making factory-raised chickens appear safer[3]. Others, including some poultry farmers, hold that the government is exaggerating the problem in order to attract donor funds. Many are of the opinion that avian flu is being sensationalised by the press to sell papers[4].

[1] Interviews, Jakarta 14 August 2008
[2] See: http://www.indonesiamatters.com/1042/bird-flu/#comment-13469 (accessed 1 November 2008)
[3] Padmawati and Nichter 2008:42
[4] ibid:38

Once the news reached Jakarta, other factors came into play. As one interviewee explained:

> Ministers travel all the time. They are expected to and whilst they are away nothing gets delegated, nothing gets decided. Whenever it was that some brave soul had summoned up the courage to go to the boss and say 'we have a problem' there was a 50/50 chance the boss was away and nobody wanted to know[46].

Another suggested:

> We don't know exactly what happened. The opinion is that it started in the integrated sector but the backyard farmers got blamed. They are a more visible target and have no way of putting their case in an organized way. It's easy to argue that poor and uneducated people are the source of the disease rather than big business. It might be the case that the industry simply does not want to 'fess up, but it is more likely that they see it as their business and their business alone. If they went to the government, would anybody say thank you to them? Would they get any help? No. They'd be told it's their problem, go sort it out, leave us alone, we have more important things to think about[47].

And the fact is that in 2004, as the virus was spreading rapidly across the most populated areas of the country, the people and the politicians did have other priorities. In June that year, the country had its first ever, and exuberant, free presidential election with a 70% turn out. In September a terrorist bomb in Jakarta killed nine people, and injured over 100. And on 26 December, the Indian Ocean tsunami hit. As one informant put it: "After the tsunami, everything else dropped off the radar. This was understandable"[48].

A time line follows setting the significant reported events of the HPAI outbreak, and the subsequent response, against other newsworthy events. One intention is to make clear the scale and frequency of the other deadly and life-threatening occurrences that occupy the media, interest the population, and demand the politicians' attention. The human death toll from avian influenza – 113 confirmed to date – for example, slips towards insignificance when compared with the death tolls from other diseases, and all manner of other natural and man-made disasters. Secondly, the escalating nature of the HPAI epidemic, and the increasing scale and scope of the response, become evident.

Timeline – Avian influenza & other events 2004 – 2008

[46] Interview, Jakarta 26 August 2008
[47] Interview, Jakarta 25 August 2008
[48] Interview, Jakarta 15 August 2008

Avian Influenza		Other Events and H5N1 Human Deaths
	2004	
24/1 Singapore and Malaysia postpone poultry import plans following thousands of chicken deaths in East Java and Bali. 26/1 Ministry of Agriculture admits the disease was first spotted in August 2003 in Pekalongan, Central Java, before spreading to other areas. 29/1 Jakarta chicken sales drop 50%. 30/1 Pressure from WHO. Selective cull of infected chickens announced. 2/2 Government allocates Rp50 billion ($5.9 million) for compensation and orders the vaccination of healthy chickens. Vaccines to be imported. 5/2 Government announces outbreaks in 51 regencies in 10 provinces across the country with 4.7 million chickens killed to date at a cost to industry of Rp7.7 trillion ($911 million). 6/2 First cull: Tabanan regency on Bali. 7/2 Worries over uncertified vaccines from China reported.	Q1	5/2 Earthquake in Papua kills 23. 19/2 Dengue fever outbreak has killed 91 people to date.
	Q2	5/4 Parliamentary and local elections. 11/4 58,301 dengue fever and DHF cases with 658 deaths reported in 2004.
19/6 Officials burn avian influenza vaccine smuggled from China. 3/7 Thailand bans poultry from Vietnam and Indonesia. 16/7 7.4 million chickens, ducks, geese, pigeons and other birds are estimated to have died from the disease.	Q3	5/7 First-ever direct presidential elections: former general Susilo Bambang Yudhoyono and incumbent Megawati Sukarnoputri clear front runners. 6/9 Car bomb outside the Australian embassy in Jakarta kills nine people and injures over 100. 20/9 Susilo Bambang Yudhoyono wins 61% of the vote in the runoff round of the presidential election.
4/10 HPAI in Grobogan regency, Central Java. Breeders receive 300,000 free doses of vaccine. 13/12 HPAI breaks out in several parts of West Nusa Tenggara. Local officials say that more than 20,000 birds, or 43% of the poultry population in the city have died.	Q4	20/10 Susilo Bambang Yudhoyono sworn in as president. 26/12 More than 200,000 Indonesians are dead or missing following the Indian Ocean tsunami.
	2005	
4/3 HPAI spreads to West Java with Cirebon municipality having the largest number of reported cases. In 2004, more than 10 areas in the province were affected: 1.6 million, or 25% of chickens died.	Q1	28/3 8.7M earthquake off Sumatra kills at least 1,000 people, many of them on Nias island.

24/3 HPAI continues to spread in South Sulawesi, affecting around 128,000 chickens in four regencies. Government sets aside Rp750 million ($83,333) to assist poultry breeders. 30/3 Over 23 million doses of bird flu vaccine prepared to prevent spread in Central Java.		
	Q2	June Launch of direct elections for local governments. 8/6 Eight new polio cases confirmed bringing total to 28.
25/7 Director General for Animal Husbandry announces that the Ministry had distributed 126 million doses of vaccine. 25/7 Cull in Tangerang sees only 31 pigs and 40 ducks destroyed due to lack of compensation money. 8/8 Demand for chicken and eggs increases driven largely by restaurants and supermarkets.	Q3	21/7 First laboratory confirmed H5N1 human death announced. 25/7 Government designates 44 specialist influenza hospitals across the country. 15/8 Government and Free Aceh Movement separatists sign a peace deal. 5/9 Passenger aircraft crash in Medan kills more than 150.
1/9 'Tanggap Flu Burung' public awareness campaign launched. Government declares "an extraordinary event". 21/9 Ragunan Zoo in South Jakarta is closed: 19 of its captive birds had avian influenza. 5/10 Indonesia currently has 25,000 boxes of Tamiflu available. 8/10 Ministry of Agriculture allegedly complicit with vaccine producers in lowering quality in order to gain more profit from the contract value. Also alleged corruption in the disbursement of compensation funds for poultry farmers. 12/10 Ragunan Zoo re-opens. 9/11 Latest data from the ministry shows that as many as 16.2 million birds have been killed due to the virus, which has spread to 22 of 33 provinces. 24/11 Infected birds have been found in seven of 20 subdistricts in Jakarta. 2/12 Avian influenza detected in Aceh.	Q4	16/9 Second laboratory confirmed H5N1 human death announced. 1/10 Three suicide bombings on Bali kill 20 people. (This followed an attack in October 2002 which killed 202.) 1/10 Fuel prices double.
	2006	
27/2 Door-to-door checks and vaccination in Jakarta after two residents die in January. 7/3 KOMNAS FBPI created. 17/3 Government appoints state pharmaceutical company Indofarma to supply 12 million Osletamivir tablets.	Q1	6/2 Four further human cases announced. 29/3 Annual death toll of 140,000 from chronic TB announced. Indonesia third behind China and India in TB prevalence. 10/3 28 confirmed human cases to date of which 21 were fatal.

24/3 Jakarta residents asked to keep their birds in cages.		
1/4 Participatory Disease Surveillance programme covers 12 districts in Java. 11/4 Vaccine shortage hampers government's nationwide poultry vaccination drive. 21-23/6 Government, WHO, FAO and UNICEF expert meeting.	Q2	18-23/5 Six family members die in Karo Regency, North Sumatra. Health authorities ask 30 people to quarantine themselves. 27/5 6.3M earthquake kills c. 6,000 people near Yogyakarta in central Java, $3.1b loss and damage estimated. 28/5 Mudflow in Sidoarjo, East Java, displaces more than 10,000 people.
15/9 Bogor begins mass vaccination. 20/9 North Sumatra Animal Husbandry Office says five regions in the province are still experiencing worrying levels of poultry deaths.	Q3	17/7 7.7M undersea earthquake off Java kills more than 500 people.
2/12 Rp1.1 trillion ($1.2 million) losses due to avian influenza announced.	Q4	20/11 President Yudhoyono meets with President Bush in Bogor. 29/12 Ferry sinks in Java Sea. At least 461 killed.
	2007	
17/1 Jakarta governor Sutiyoso bans backyard birds. 50% drop in chicken sales reported in Jakarta. 22/1 Thousands of birds culled in Jakarta. Poultry health certification scheme announced; breeding, storage, slaughtering facilities to be moved. 25/1 Mass culling blamed for rising prices in Yogyakarta. 2/2 Jakarta inspections called off due to torrential rain. 100,000+ 'infected' poultry culled to date. 8/2 Government appoints Swiss-based Baxter Healthcare SA to develop a human vaccine for the Indonesian strain of bird flu. 16/2 WHO officials meet health minister Siti Fadillah Supari. Indonesia insists on a material transfer agreement. 29/3 Health ministers from 18 Asia-Pacific countries issue the 'Jakarta Declaration', calling for "more open virus and information sharing and accessibility to avian influenza and other potential pandemic influenza vaccines for developing countries".	Q1	1/1 Passenger aircraft crash off Sulawesi kills all 102 onboard. 8/2 Floods in Jakarta kill more than 20 and leave hundreds of thousands homeless. 7/3 Passenger aircraft crash at Yogyakarta kills 22.
7/4 West Java decrees that all poultry must be kept at least 2.5 metres from all houses in areas that receive direct sunlight. 14/4 60th World Health Assembly, Geneva. 30/5 The Ministry of Agriculture	Q2	16/4 WHO confirms 15 additional cases, including 13 deaths. Total is now 96 confirmed cases with 76 deaths.

announces the purchase of 60 million doses of vaccine, and grants of 33 million doses, from China and 5 million from the World Bank. 15/6 New animal health law proposed to replace the existing 1967 law.		
27/8 Jembrana Regency, Bali lifts its ban on chicken meat and day-old chicks from entering the regency following protests from Bali poultry farmers. 11/9 International avian influenza conference on Bali.	Q3	11/7 European Union bans Indonesia's national air carrier, Garuda, and 66 other airlines from EU air space. 23/8 First death on Bali reported.
20/11 Follow-up to May 2007 World Health Assembly meeting.	Q4	
	2008	
4/2 An announcement of infections in chickens causes panic among residents in Banjarnegara regency Central Java. 22/2 Indonesia sent two virus samples to WHO after receiving assurances its rights to any vaccines produced from them would be recognized. 25/3 Jakarta administration and KOMNAS announce intensification of prevention and control programme.	Q1	27/1 Former President Suharto dies. 30/1 Three more deaths. Jakarta has been hardest hit by bird flu, with 29 reported cases and 25 deaths.
28/4 US NAMRU 2 laboratory in Jakarta accused of engaging in intelligence operations. 20/6 Health Minister decides to withhold information on human deaths.	Q2	26/4 Pandemic exercise on Bali. 23/5 Fuel prices increased by 29% on average with subsidies to 19.1 million poor families.
	Q4	9/12 Total 139 confirmed cases to date with 113 deaths.

Sources: BBC Online (www.bbc.co.uk), Jakarta Post (www.thejakartapost.com) Sejarah Indonesia (www.gimonca.com/sejarah/sejarah.shtml), Indonesian Embassy, Washington DC (http://www.embassyofindonesia.org/news/newsarchives.htm), Wikipedia (http://www.wikipedia.org), WHO (http://www.who.or.id/avian/current_situation.php)

The selection of items for inclusion in this time line is from an extensive catalogue and to a degree opportunistic. Some caution is therefore appropriate in any analysis. However, a number of salient points can be drawn from it. First is the apparently reactive nature of nearly all of the government's announcements and actions, and there is little evidence of any determination at the highest levels to drive policies through, once formed. Secondly, whilst there is doubtlessly a media bias towards the capital, Jakarta, it appears to be there that policy is most rigorously implemented. An interviewee supported this view: "The capital is what the president sees, where he lives, and where he drives about. If he doesn't see any chickens on the streets, and if there are no deaths in the city, his interest level is not going to be that high"[49]. Thirdly, HPAI doubtlessly has had a significant impact right through the food supply chain. Although the disease is not transmitted to humans through properly cooked meat or eggs, consumers are quick to abandon poultry products when an outbreak is announced, and almost as quick to return to them when the fuss dies down. Fourthly, there is a continuing and detailed discourse relating to poultry vaccine, both as a solution and a problem. This is probably related to the perception of vaccine as a panacea, to the significant business interests

[49] Interview, Jakarta 28 August 2008

associated with providing vaccine on such a large scale, and to nationalistic complexities associated with the provision of a supply domestically, compared with importing it from countries such as China. Finally, the minister of health's role in challenging the international status quo with respect to sharing human virus samples gains increasing attention.

Against the background of these relatively high profile reported events, a more complex set of actors, networks and narratives has emerged as involved with the HPAI epidemic, and the response. These are outlined in the following sections.

ACTORS, NETWORKS AND NARRATIVES

Some 30 million homes, 60% of all Indonesian households, are estimated to keep around 300 million chickens (*ayam kampung*) and/or ducks (*bebek*) and quail (*burung puyu*) in their backyards (Normile 2007:31). Wild fowl were probably first domesticated in South East Asia, and foraging chickens are a common way for poor people to earn additional income and secure food. Backyard poultry also act as a form of capital, which can be sold to pay for items such as school uniforms and medical bills (Padmawati and Nichter 2008). *Ayam kampung* eggs and meat are considered superior to that of commercial broiler chicken (*ayam potongan*, *ayam daging*) and the meat has about twice the market value: $3 per kilogram compared with $1.50 (ibid). Beyond money and food, many Indonesians – particularly the Javanese, the Sundanese and the Balinese – have a strong affection for poultry and other birds. Poultry hobbyists, pigeon-racers, and song-bird and fighting-cock owners abound, together with live bird markets. On Bali, chicken and ducks play important roles in religious ceremonies, which occur frequently. A cultural concept exists for the way that birds are kept that is not captured by either the 'pet' or 'livestock' concepts of the West. One respondent stressed that they were not pets: "They don't have names and usually end up in the pot"[50]. Others spoke of a sense of "completeness" they add to a household:

> Indonesians, especially those from Java, love to hear the rooster crowing in the morning. Negative images are simply not understood because chickens have been a part of life for as long as everyone can remember. As well as food and money, they are pride, prestige, even toys[51].

Whilst this picture holds true for much of Java, with just over half the population, the same cannot be confidently said of the rest of the country, which is ethnically and culturally diverse. The majority of the population are descended from Austronesian-speaking peoples (originally from Taiwan), but Melanesians dominate in the eastern parts, and Indian, Arabic, Chinese, Malay, and European genes and cultural influences have washed through many parts of the archipelago for centuries[52]. Other areas have been, and remain, totally isolated. In all, more than 300 ethnic groups speak over 700 languages and dialects, and in terms of religion, Moslems, Hindus, Buddhists, animists and a wide range of syncretic combinations co-exist[53]. This poses a further set of challenges to a uniform and consistent response to HPAI. Attitudes towards birds and poultry, as well as to disease, responsibility, authority, and practically every aspect of life and the world, are all culturally located and highly variable.

The commercial poultry (*ayam negeri*) sector is large and well organized, employing over one million people (Padmawati and Nichter 2008:32). Historically, production rose at an average rate of 15% per annum from 1989 to the start of the economic crisis in 1997, and post crisis the growth trend

[50] Interview, Jakarta 26 August 2008
[51] Interview, Jakarta 25 August 2008
[52] http://www.embassyofindonesia.org/about/people.htm accessed 5 December 2008
[53] US Library of Congress http://countrystudies.us/indonesia/42.htm accessed 5 December 2008

recommenced[54]. The industry is strongly concentrated in Java and the largest companies are very profitable[55]. In the government's first Five Year Plan (1969-74) high priority was given to increasing poultry production as a means to provide protein for an increasing population, and in the early 1980s, the government passed a decree that regulated the size of commercial laying farms to 5,000 birds. One objective was to spread business and employment opportunities; another was to limit the spread of disease in poorly managed large-scale poultry units (Kristiansen 2007). The policy was very successful. Indonesia now produces more poultry on less land to feed more people than any other place on earth[56]. As part of general deregulation of the economy, government support was largely abandoned in the late 1980s, and much of the growth since then has occurred through vertically integrated production units controlled by a limited number of large-scale feed manufacturers. Arguments for this approach have included easier access to veterinary and technical services (Ritter 1984). The industry has grown rapidly because of increasing domestic demand, a ban on imports of poultry parts and strict inspection and 'halal' certification requirements (Fabiosa et al 2004). Protection for the rice industry is also supported by all major political parties (Fane and Warr 2007).

Encouraging domestic production and promoting rural employment has resulted in the need to import feed and other inputs (Fabiosa et al 2004). From a low base in the 1980s, imports of soybeans and corn quadrupled with the expansion of the poultry industry between 1991 and 1996. Now Indonesia imports over one million tons a year of each of the major feed ingredients, and roughly 80% of imported corn is used for the production of poultry feed (ibid:1). In 2000, imports came mostly from the US (83.8% market share), Brazil and Thailand (8% each). Feed costs in Indonesia are consequently higher than elsewhere. Typically in Europe or the US, feed comprises 60-70% of the costs of layer egg production. In Indonesia this ratio is usually above 90% (Kristiansen 2007:60).

The 'big five' integrators are PT. Charoen Pokphand Indonesia, PT. Japfa Comfeed, PT. Wonokoyo Rojokoyo, PT. Sierad Produce[57], and PT. Leong Hup [Leong Hup Holdings Bhd.] (ibid). Sumiarto and Arifin (2008:10) suggest the first three of these companies have shares of total production equivalent to 27%, 23%, and 19% respectively. Fabioso (2005) adds PT. Manggis, PT. Cipendawa Agroindustri, and PT. Cibadak Indah Sari Farm as large producers. PT. Cheil Jedang, a Korean company located in Indonesia, and PT. Galur Palasari Cobbindo are also significant players. The leading companies are parts of complex business conglomerates. Kristiansen (2007:60) suggests that elements are owned by ethnic Chinese Indonesians with close connections to the family of the former president. Aside from poultry farming and feed production and distribution, other activities in these conglomerates include poultry shops (providing feed, equipment and drugs), egg distribution, butcher shops and fast-food restaurants. Most breeds for chicken egg production in Java and Bali come from one hatchery, PT. Multibreeder Adirama Indonesia Tbk, which is owned by PT. Japfa Comfeed, and most vaccine is supplied by one company, PT. Medion in Bandung[58].

Poultry production in 1998, the worst year of the economic crisis, was less than half the 605kt produced in 1996, a drop due to falling demand and the sector's links to the exchange rate through imported feedstuff ingredients. Production exceeded the pre-crisis level only in 2002 (Fabiosa et al 2004). Extrapolating from 1997 numbers (the last year for which aggregate figures are available), Simmons (2006:437) suggests total poultry numbers of just under two billion, divided into 68% broilers, 22% native chickens, 7% layers, and 2% ducks, with Java having 60% of the national flock. As well as being profitable, the poultry business is considered risky, especially for small producers. Even

[54] http://www.japfacomfeed.co.id/profile/poultry.html accessed 5 December 2008

[55] PT. Charoen Pokphand Indonesia, the largest feed and processed chicken meat producer, has estimated its 2008 sales at Rp12 trillion ($1.04 billion) and net profit at Rp450 billion. In the first nine months of the year, the company generated Rp9.98 trillion in sales, up by 61% on the same period in the previous year. In the same period, net profit jumped 129% from Rp175 billion to Rp401 billion. Jakarta Post 28/11/08

[56] Interview, Jakarta 27 November 2008

[57] PT Sierad Produce produces on average 80 million Day Old Chicks per month. Jakarta Post 13/2/04

[58] The two other vaccine producers are PT. Vaksindo, and PT. IPB Shigeta Animal Pharmaceuticals, a collaboration between Bogor Agricultural University (IPB) and SHIGETA Animal Pharmaceuticals Inc. Japan.

before the HPAI outbreak, on average 5-10% of birds were lost to illness, most notably Newcastle disease. Such birds are (or were) often eaten or sold to petty merchants who visit farms to buy such birds (Padmawati and Nichter 2008).

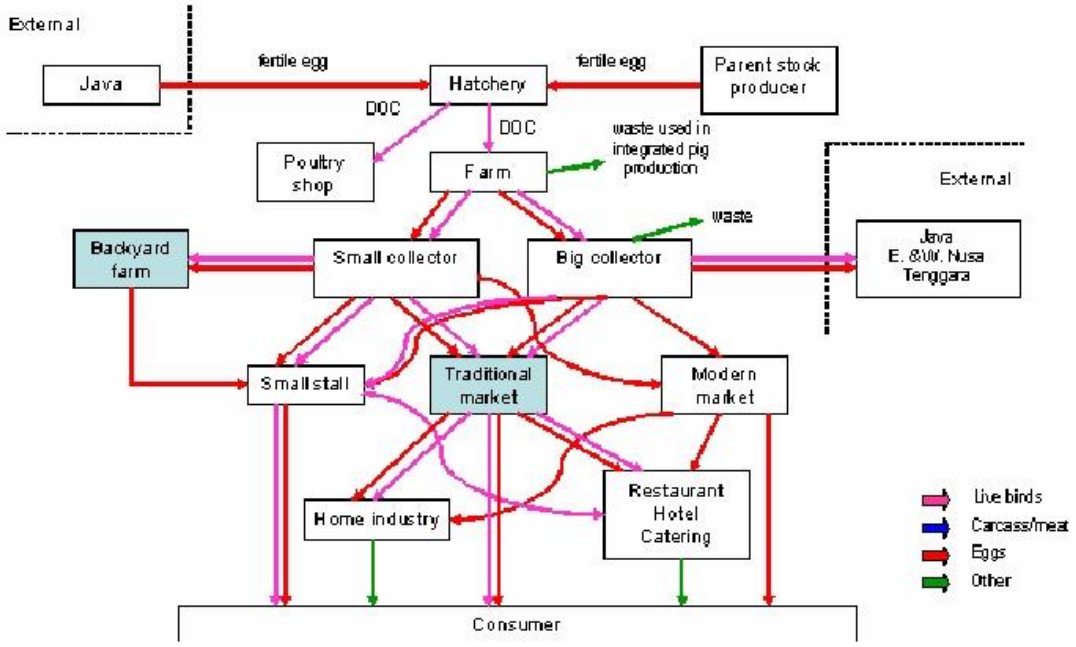
The Indonesian experience fits the common pattern of rising incomes and urbanization leading to increased consumption of animal protein, and reduced consumption of rice and other starches. Chicken is the most popular meat in Indonesia. In 2005 national consumption was around 1000 kt or 4.45 kg per head, compared with beef at 2.4 kg and pork at 2.6 kg. Imports in 2005 were minute at 2 kt, and exports zero (Vanzetti 2007:4). Indonesia does not have the sanitary standards required for export to the European Union and Japan, and exports were minimal even before the HPAI outbreak. In 1999, 50% of the total broiler production was sold as live birds. Integrated producers dispatch roughly 30% of their output through modern processing and slaughterhouses, which generally sell to restaurants, supermarkets and food processors, and 70% to traditional outlets (Fabiosa 2005:5). KOMNAS figures suggest that around 1.2 billion chickens are consumed each year nationally[59].

In addition to 70% of commercial production, all independent production goes to an estimated 13,000 live poultry markets, or is consumed at home. In Jakarta, for example, live markets account for 80% of the chickens consumed each day. Normile and Enserink (2007:448) calculate this to be 300,000 to 400,000 birds daily, but interviewees suggested that the figure is probably closer to one million[60]. Women, who usually provision the household, consider it safer to purchase a live bird and have it slaughtered than to buy a dressed bird (Padmawati and Nichter 2008). For many, 'halal' slaughter is important. Supermarkets are not trusted, especially as suppliers of frozen chickens, which many think have been injected with water. Most layer farms are privately owned and operated, ranging in size from 500 to 15,000 birds. Eggs are collected daily and sold unwashed to local traders who distribute them. If birds become ill or stop producing eggs, they are usually eaten by the farmer or sent to market. A remarkable concentration of layer egg production exists around Blitar in East Java, with farms varying in size between 3,000 and 100,000 birds. Farmers in the area complain that large cartels and their outreach of poultry shops and traders are strangling smaller producers. In other areas small-scale entrepreneurs claim to be excluded, citing limited information and knowledge, and uncertainties due to the concentration and market dominance of powerful business groups. Close ties are maintained between a number of large-scale feed producers and dominant groups of egg collectors and traders, who gain from the status quo (Kristiansen 2007).

The integrated broiler production system is a complex web of activity centred around poultry distributors who usually act as agents for large poultry companies, supplying day-old chicks, feed, medicine and sometimes vaccines to contract farmers. Typically between 500 and 5,000 chicks are supplied to a set of 20 - 200 farmers who then raise the chicks for 33 - 40 days before returning them to the distributor or selling them to traders. Usually, the distributor will sell on to established clients such as restaurants and hotels, and the traders will supply local and national markets. Open trucks are commonly used for long distance trading, but more locally, transport is by whatever means is at hand: trucks, motorcycles, even buses. Manure is harvested and dried for sale to farmers who use it as fertiliser. As one informant put it: "If you were going to design a system to spread an infectious poultry disease, it would look something like this. Combine it with the number of backyard birds in Indonesia, and you have the virus flowing everywhere"[61]. Figure 1 presents a schematic. Further schemes extracted from two detailed studies are in Appendices C and D.

[59] KOMNAS Presentation, 10th National Veterinary Conference of the Indonesian Medical Association, Bogor, 20 August 2008.
[60] Interview, Jakarta 27 November 2008
[61] Interview, Jakarta 26 August 2008

Figure 1. Market chain for layer birds on Bali (Thornton 2007:5)



The lack of regulation and the self-imposed self-sufficiency of the industrial sector have not helped the situation. One interviewee explained: "It's murky and secretive. There's commercial competition, rivalry and no understanding that there is a shared interest"[62]. Another said:

> The big integrators are willing, but they are used to looking after themselves. They know they have a problem but they don't expect any solutions to come from the government. They don't trust the government's intentions or competence. There is no tradition of dealing with animal diseases. There is no tradition of co-operation for the common good. They know what bio-security is, and are actively trying to find and deal with the virus, through vaccination mainly, but they say, 'leave us alone. We know what we are doing. Please go and sort out the backyard farms. That's the problem'. Some of them practically dip their workers in disinfectant at every step, but if they are going to be brought in to the dialogue, they have to be spoken to in their own language. Pointing fingers don't work[63].

Another respondent offered a slightly brighter analysis:

> In the last year and a half, attitudes have changed a bit. Some companies are talking more. They know which side their bread is buttered on. But there has not been as much focus as there should have been on industry and building relations with them. They are isolated, in many cases quite happily. The biggest companies are completely integrated from feedstuff to fried chicken shops and have influence at the highest levels. The only way you know that there is a die off is when you see the smoke from the fires, or trucks of disinfectant going in through the gates. Even if there was a law that was enforced, there's nothing to say that you have to report. Involving industry meaningfully is one of the most important practical things that can be done. Government and industry need to form a partnership with the same objective[64].

[62] Interview, Jakarta 15 August 2008
[63] Interview, Jakarta 28 August 2008
[64] Interview, Jakarta 15 August 2008

There are therefore a remarkable number of actors involved in the Indonesian HPAI epidemic. Aside from chicken meat and egg consumers, and the millions who consider backyard birds an important part of everyday life, over a million people are closely involved in industrial production: farmers, feed suppliers, processors, wholesalers, retailers, transport personnel and shareholders. The government is also involved, even though it would prefer not to be. These actors can be resolved into four main groups: consumers, backyard farmers, industrial producers, and the government; and the challenges of avian influenza in Indonesia become clear when the associated networks, or the lack of them, are considered. Short of not purchasing items and staging protests, consumers have few rights in Indonesia, and form only fragmented networks, susceptible to media excitement. Backyard farmers too generally have no common voice, or networks, beyond their immediate geographical locations. They range from the desperately poor to comfortably-off hobbyists, and the government tends to interact with them ad hoc, following specific protests for example, and inconsistently.

Similarly, the industrial producers are only just coming to the realisation that they have shared interests amongst themselves, and are still a very long way from seeing that they have any interests in common with the backyard sector. As yet, even the large and mid-sized producers consider themselves as having little in common. Large producers are more concerned about a consumer backlash and are keen to deny the existence of disease outbreaks publicly, for example, whilst medium-sized producers are more likely to acknowledge outbreaks in order to seek assistance and compensation from the government (Simmons 2006). The government network, despite significant attempts to co-ordinate a coherent position, and response, still finds itself fundamentally torn between industrial and small-scale agriculture (as well as other imperatives) and very largely lacks any means of interacting with industrial producers except for the relatively opaque informal communications that are a legacy of Suharto's corporatist era. Add decentralization and the picture becomes even more complex.

Underlying these disconnects is a lack, or an undeveloped sense, of a conception of public goods. A recent international consultation document[65] defines public goods as 'non-rival in consumption and having non-excludable benefits, which are consequently neither priced, nor supplied efficiently'. The context of the consultation is international public goods, but distinctions are also made, according to geography largely, between local public goods, regional public goods, domestic public goods and national public goods. In Indonesia, only the concept of local public goods has much traction, expressed by the phrase *gotong-royong*, meaning 'mutual help'. Whilst this extends (in some parts of the country) to the manning of local security/emergency posts, the maintenance of individuals' houses and communal irrigation ditches and terraced rice-paddies, for example, it does not extend to the provision of safe pedestrian sidewalks, for example; and notions of centrally managed facilities for refuse disposal are very recent. It certainly does not extend to the extermination, or management, of an invisible virus.

The highly stratified nature of Indonesian society is probably the most significant factor in this weak understanding of public goods. This concept is not familiar, or popular, in the international community (and not mentioned in the international consultation document quoted). The Javanese language has very formal forms associated with speaking to someone of a higher, a lower, or an equal rank, and it is still common to see, even in the most enlightened sectors of Jakarta society, the lower ranked physically stooping in the presence of the higher ranked. This doesn't mean that the well-to-do don't care for the less-well-off. Quite the opposite: there are well-defined protocols of responsibility associated with higher rank. But the different strata of society do not see themselves as having anything in common – of being in the same boat – in any way. Commenting on Jakarta's neglected public parks, an urban development observer suggests:

[65] Contributing to One World, One Health - A Strategic Framework for Reducing Risk of Infectious Diseases at the Animal-Human-Ecosystems Interface, October 2008, produced by FAO, OIE, WHO, UNSIC, UNICEF, and The World Bank, available at http://www.undg.org/docs/9464/OWOH_14Oct08.pdf accessed 29 November 2008

> We (Indonesians) are averse to mixing with all layers of society... This socio-cultural problem is one of the reasons why parks in Jakarta are yet to become melting pots, where people from all social layers gather together[66].

This sets a conceptual challenge for the government of Indonesia's young democracy in formation. In the bad old days, money simply followed power, and no question of legitimacy was associated with the accumulation of either (cf. Anderson 2006). Then, as is still the case often today, the needs of the poor were primarily addressed through mechanisms of paternalistic charity, and traditional concepts such as *gotong-royong* were promoted to encourage the poor to look after themselves. Now, there is a dawning realisation that sustaining such fractures, and structures, in society is not just morally ambiguous, but also dangerous for political stability, and economic growth and prosperity. Consequently, a host of questions are arising associated with taxation, the provision of public services, representation for minorities, smoking in public places, and more. In nearly all matters of state there are conflicting narratives, objectives and interests at play, and the government is uncertain as to its role and responsibility in negotiating and forming them into a broadly utilitarian response that might be called a public good. Also relevant in this numinous culture is that such a universalistic concept as a public good is most often seen as a matter best left to one or more deities.

The international response to HPAI is largely driven by a sophisticated concept of a global public good, as illustrated by slogans such as 'One World One Health'. No one would argue that even the local eradication of virus associated with a deadly animal disease is not worth attempting, and there are further concerns about the livelihoods of the poor, and food security, but the funds and the attention that have followed the spread of avian influenza have largely been generated by the possibility of H5N1 evolving into a form that causes a human pandemic that kills millions, and shakes stock markets and societies worldwide. The following section will explore this issue in the context of the response. What happens when the international community, proclaiming global public good objectives, arrives in a place like Indonesia, where notions of public goods are fragmented, contested and highly contingent, and where an international public good appears very distant?

THE RESPONSE: NATIONAL AND INTERNATIONAL NETWORKS AND NARRATIVES[67]

Actors associated with the HPAI response include national, international and regional organizations. The Departemen Pertanian (Deptan), or Ministry of Agriculture (MoA), is in the front line, supported by the United Nations Food and Agriculture Organization (FAO). The Departemen Kesehatan, or Ministry of Health (MoH), is also involved, supported by the United Nations World Health Organization (WHO). The national co-ordinating body is the Komiti Nasional Pengendalian Flu Burung dan Kesiapsiagaan Menghadapi Pendemi Influenza (KOMNAS FBPI), or the National Committee for Avian Influenza Control and Pandemic Influenza Preparedness. This is a ministerial-level committee, headed by the Coordinating Minister for People's Welfare Aburizal Bakrie[68], created by presidential decree on 7 March 2006. The committee has 14 members, including the Agriculture, Health, Forestry, National Planning (Bappenas) and Industry ministers, the Economics co-ordinating minister, the army commander, the police chief, and the chairman of the Indonesian Red Cross. The executive team includes six task forces that provide direction on research and development, animal health, human

[66] Jakarta Post, 24/11/08
[67] cf. Keeley and Scoones (2003)
[68] Forbes listed Bakrie as Indonesia's richest individual in 2007, with interests in infrastructure, mining, property and telecommunications, and a net worth of $5.4 billion http://www.forbes.com/lists/2007/80/07indonesia_Aburizal-Bakrie-family_0J8F.html accessed 28 October 2008

health, vaccine and anti-viral medicines, and mass communications and public information. A secretariat and a media centre aid coordination between the ministries, with communications supported by the United Nations Children's Fund (UNICEF), and a similar structure has been established in a number of provinces.

Further to the presidential decree of 7 March 2006, on 9 May 2006 the Ministry of Internal Affairs issued a letter asking the regions to work with KOMNAS. This stipulated that they should prepare plans, take the required operational steps, monitor, evaluate, and report every three months. The most important point however was the last: the costs were to be borne by the regional local governments[69]. Had central government been in a position to assure, and provide, funding at this stage, the situation could look very different today.

KOMNAS and the related agencies are guided by the January 2006 National Strategic Plan for Avian Influenza Control and Pandemic Preparedness[70]. This outlines ten strategies based on principles advocated by the FAO, the WHO and the World Organization for Animal Health (OIE):

1. Control in animals
2. Management of human cases
3. Protection of high-risk groups
4. Epidemiological surveillance for animals and humans
5. Restructuring the poultry industry
6. Risk communication, information and public awareness
7. Strengthening relevant laws
8. Capacity building
9. Action research
10. Monitoring and evaluation

In 2006, the government allocated $57.3 million for control, and in 2007, $52.9 million, with the chief executive of KOMNAS seeking $300 million annually[71]. At 30 April 2007, the international community had committed $128.15 million in grants (including $25.97 million from Australia, $16.16 million from Japan and $8.45 million from the US) and in kind (including $39.18 million from the US, and $12 million from the Netherlands), of which $89.94 million had been disbursed (UNSIC & World Bank 2008:87). This is the most committed to any country[72]. In comparison, Vietnam, with $117.6 million committed and $56.14 million disbursed, is the second largest beneficiary, and Nigeria with $58.33 million committed and $38.39 million disbursed, the third.

This adds up to a complex set of relatively well-funded networks. At the national level the response requires co-ordination between the MoA and MoH, and both organizations are required to co-ordinate with KOMNAS. This creates difficulties familiar to anyone who has worked in any civil service. "We have two plans in one binder and call it 'integrated'", says one closely involved respondent[73]. Another interviewee suggested: "The Ministry of Agriculture doesn't talk to the Ministry of Health, and vice versa. Politics and personalities get in the way"[74]. And another said:

> Agriculture and Health hate the KOMNAS role. They see AI as their problem and ask why another organization should be involved. At the Bali simulation in April 2008, the MoH would not let their people wear the official jackets as they had KOMNAS on them. Another plan was

[69] See Kalianda (2008) for details of the instruments involved.
[70] Available at http://www.komnasfbpi.go.id/files/Renstra_13_Januari_2006.pdf accessed 1 November 2008
[71] Jakarta Post 12/09/2007
[72] At April 2008, the USAID contribution alone to Indonesia was $42.85 million, and in September 2008 USAID obligated an additional $20 million.
[73] Interview, Jakarta 25 August 2008
[74] Interview, Jakarta 15 August 2008

> to embed KOMNAS in the MoA, but MoA said, 'no way, this is our business'. You would not believe the level of dysfunction that exists. There's now talk of disbanding KOMNAS in 2010, but that's not helping, just adding to the air of uncertainty[75].

Yet another informant explained:

> KOMNAS has the expert panels. All of the scientific findings go to it. KOMNAS then makes recommendations to MoH or MoA, which they don't like one bit. And implementation depends on the ministries. There you find a traditional culture. Initiative is not applauded. There is a culture of playing safe, just saying 'yes' to the boss. This is a very deep tradition. It needs a revolution to make any changes. It is even worse in the regions[76].

The international agencies, of course, have their own cultures, and are challenged in their own ways by organizational, disciplinary and professional divides. In Jakarta, a large FAO team is firmly embedded in the MoA, to the south of the city. A significantly smaller WHO team works out of more central MoH premises, and UNICEF and UNOCHA (Office for the Coordination of Humanitarian Affairs) both have independent offices. One respondent suggested: "The internal [UN] bureaucracy is not helpful, especially when combined with that of donor organizations like the EC, which are not exactly nimble. The priorities of the donors are not necessarily the same as those of the country, and it's hard work making them fit"[77].

Another interviewee, bemoaning the "deluge" of staff coming and going on short-term contracts, sees personality as key to co-ordination:

> There are monthly meetings between the agencies, which are fine as far they go. There is also informal contact – phone calls, meetings at social events – but these depend more on whether people get on. Everybody is very busy, very focused on their jobs, and it's easier to find space for someone else's problem if you get on with them[78].

The same issue of personality (or who has whose hand-phone number, or goes to the same parties) also clearly pertains to the relationships, and co-ordination, between the national and international agencies. In some cases it is obviously very good, in others, less so; but deeper issues are involved in the mix. One of the biggest challenges, described by an interviewee, is that: "The UN is not ultimately solution-driven. The government has to drive the solution, with UN, and other international agencies, facilitating. That is clearly not happening here"[79]. Another explained: "The focus of the response is very, very scientific and this does not fit the local context well. The science is important but it is not a solution on its own"[80].

Perhaps the greatest fracture between the national and the international is in the conception of a human pandemic. Accepting the uncertainty of when, where and magnitude, the international agencies and the individuals involved with them appreciate the science of viral evolution and the associated inevitability of a human influenza pandemic. But candidly, and almost without exception, every Indonesian interviewed admitted that they did not believe a pandemic would occur. One explained:

> We have no word for pandemic. We just use 'pandemi'. We have 'wabah' for outbreak, but this is not pandemic. We have no picture of pandemic. We have no history of events like the Black

[75] Interview, Jakarta 12 August 2008
[76] Interview, Bogor 21 August 2008
[77] Interview, Jakarta 15 August 2008
[78] Interview, Jakarta 28 August 2008
[79] Interview, Jakarta 28 August 2008
[80] Interview, Jakarta 15 August 2008

> Death. It is not part even of our imaginary world. Most people have more urgent and important things to deal with[81].

An (international) interviewee said: "There is no conception of the pandemic threat. Politicians need to buy in to this. Healthcare workers need to buy in to it. Everything is driven by the short term, the here and now"[82]. Another suggested: "There are people working on the problem who care. But the average citizen does not care. It's like talking to people who don't drive cars about the importance of wearing seat-belts"[83].

Thus the scale of the challenge for the international organizations leading the response to HPAI becomes clear. In Indonesia, the fourth most populous country in the world, and one of the geographically, ecologically and culturally most complex, they have set themselves the task of implementing a rigorous and consistent set of programmes in a highly decentralised and politically dynamic environment which has not, as yet, provided the opportunity for significant trust to develop between civil society and authority, or vice versa. The scale of the problem, and the emergency nature of the response, has precluded much in the way of reflection, and the response to date has been driven by an overarching 'outbreak' narrative (cf. Wald 2008), with veterinarians, doctors and communications specialists creating and driving modernist sub-narratives of surveillance, control, and behaviour change. But what constitutes an 'effective' response in the views of these different players? Is a science led, risk mitigation framing obscuring the sorts of disease drivers and related factors Farmer (1996) identified: ecological change, demographic change, change in human behaviour, increasing complexity, and poverty? Only now are alternative narratives, including food security, food safety and animal welfare[84] being proposed as relevant to HPAI in Indonesia.

Further details of the response are offered below, divided into sections covering agriculture, human health and communications. These distinctions reflect both the national administrative structures, and the competencies and responsibilities of the international agencies involved. One question is whether such divides are appropriate, or helpful? A bigger one is what happens when the international community, driven and justified by science, and proclaiming public good objectives, arrives in the vague and relatively unruly world of the Indonesian countryside?

CHASING THE CHICKENS

> "The plan was put together in a hurry in order to have something for the Beijing meeting[85], but it was a good plan. The challenge is to make it work"[86].

In mid-2005, the MoA in collaboration with FAO, WHO, and other international partners, developed a National Strategic Work Plan for the Progressive Control of HPAI in Animals for 2006 – 2008 (Ministry of Agriculture 2005). It had an indicative, and ambitious, budget of $322,146,000 over three years and consisted of nine elements: campaign management, enhancement of HPAI control in animals, surveillance and epidemiology, laboratory services, animal quarantine, legislation and enforcement, communications, research and development, and industry restructuring. As the quote above

[81] Interview, Jakarta 14 August 2008
[82] Interview, Jakarta 28 August 2008
[83] Interview, Jakarta 11 August 2008
[84] The chief executive of KOMNAS began his key-note address to a national veterinary conference on 19 August 2008 by suggesting that AI threatened the supply of the 1.2 billion chickens consumed annually. At the same conference, startling evidence was presented of the detection of the H5N1 virus in nearly half of 83 poultry markets surveyed in Java (Indriani et al 2008), and another paper pointed to the unacceptability of a transport system that results in up to 5% of animals arriving at market dead, 5% sick and 5% injured. (Mudiarta et al 2008).
[85] International Pledging Conference on Avian and Human Influenza, Beijing, 17 - 18 January 2006
[86] Interview, Jakarta 13 August 2008

indicates, its production was driven more by an international timetable than a national one. A Campaign Management Unit (CMU) within the Directorate General of Livestock Services (DGLS) was charged with implementation through nine Regional Management Units (RMUs), which were based around nine Disease Investigation Centres (DICs) and 35 Local Disease Control Centres (LDCCs). To date, in line with international advice, disease control has focused on culling with compensation recommended, vaccination, surveillance and community awareness, improved biosecurity, and movement controls. Until late 2007, this activity was almost exclusively focused on the 'backyard' sector.

Early in the outbreak, in January 2004, the government responded to international pressure by announcing that it would cull infected birds, and compensate small farmers[87]. Later that year, in July, the policy was extended to include mass culling within a radius of three km of infected sites and testing within 20 km, and Rp82.5 billion ($8.42 million) was set aside to finance the measures and compensate farmers[88]. Only three days later however, in Tangerang, close to where the first fatal human case had occurred, only 31 pigs and 40 ducks were slaughtered, with the Minister of Agriculture, Anton Apriyantono, saying that the government lacked the money to live up to its promise[89]. Despite a significant decrease in the number of scavenging chickens in some urban areas, this pattern of unfulfilled intention has very largely been repeated across the country, with Apriyantono explaining that mass culls would cause serious social unrest[90].

The focus then turned, strategically at least, to focal culling and ring vaccination, and by mid-2008, "very restricted voluntary culling" had become the norm[91]. Most surveillance is now active – MoA teams are actively searching for cases in the field – but faced with poultry deaths showing clinical signs of HPAI, backyard farmers are supposed to contact their village head who informs the local livestock services office. In endemic areas MoA staff will then collect samples from sick or recently deceased birds, perform a rapid test for Influenza A, and if positive implement a cull in the immediate area. Commercial farmers are supposed to report the event to their distributors who inform the local livestock services office, which sends a veterinarian to do a rapid test and/or take samples to a laboratory for PCR and virus isolation tests. As part of the integrated plan, humans living nearby are sometimes tested too.

In practice, many backyard farmers are reluctant to report die-offs, especially if no family members appear to be sick. There is often suspicion of government officials, stigma associated with having an outbreak (Padmawati and Nichter 2008), and uncertainty about how to identify HPAI (particularly how to distinguish it from Newcastle disease) and to whom outbreaks should be reported. In some areas HPAI is referred to as 'new' or 'strong' Newcastle disease (*tetelo*) or just 'plok', the sound of a dead chicken falling from a perch (Normile 2007). Compensation has arguably raised more problems than produced solutions. According to government decree, the value of each culled chicken is set at Rp10,000 ($1 approximately), with only farmers having flocks up to 5,000 eligible. But poultry market prices differ from one region to another, not every die-off is a result of HPAI, and there are practical difficulties in distributing any funds that might be available. Simmons (2006:442-3) found only one of five producers interviewed on Bali and Lombok had been compensated. One interviewee, an egg producer, had had 2,000 birds destroyed and was paid Rp2,000 per bird, which he claimed had been negotiated down by government officials from the official Rp10,000.

An informant explained:

[87] Jakarta Post 30/1/04
[88] Jakarta Post 22/7/04
[89] Jakarta Post 25/7/04
[90] Jakarta Post 12/11/05
[91] Interview, Jakarta 13 August 2008

> There is money available, but there is not enough and the mechanism is unclear. The provinces are supposed to make an estimate and send a request to central government, which will then disburse funds, but a/ how do you make an estimate in these circumstances, b/ any estimate then becomes a subject for drawn-out negotiation and c/ in a low-wage environment where it is culturally acceptable for everyone to shave a slice for themselves or their organization, it's hard to make a system work where you have to deliver small amounts of cash to large numbers of people. The compensation itself becomes a matter of individual negotiation. Infrastructure, probity, efficiency, equity are all alien concepts[92].

Another respondent described the other side of the coin: "Chickens die for all sorts of reasons, and there are many cases where a farmer has applied for compensation even though he knows that they have not died of AI"[93].

The eye of the needle

Vaccination, which decreases susceptibility and virus excretion, is a familiar procedure in the industrial sector and widely used for a variety of poultry diseases, including Newcastle disease, but is unusual amongst backyard and mid-sized operations. Mass vaccination was first proposed in March 2004 with plans to provide 300 million doses of a locally produced vaccine – an inactivated H5N1 isolate from the Legok strain – free of charge to backyard and small farmers. Due largely to limited vaccine supply and a realisation of the costs of such large scale provision, mid-2006 saw a change of strategy to targeted vaccination using an inactivated LPAI vaccine, with eleven of the most affected provinces targeted[94]. At that time, a decision was also made to prioritize control in animals, epidemiological surveillance, and information and public awareness, as these were determined to be most likely to impact on the spread of the virus (Samaan 2007).

Implementing and managing mass vaccination campaigns in backyards and villages is a different order of activity from vaccinating in relatively ordered industrial settings, and Indonesia has achieved only partial success (cf. Thornton 2007). A cold chain is required and Indonesia has seen recurring controversies over vaccine quality from both domestic and foreign suppliers, particularly China. Confusion has also arisen regarding the legality of importing vaccines, and a scandal erupted in October 2005 in which officials were allegedly complicit with vaccine producers in lowering vaccine quality in order to boost profits[95]. Mass vaccination is doubtlessly hard to accomplish in a backyard setting, and is unpopular with veterinarians. It requires repeated administration, and owners are suspicious as birds sometimes die after vaccination (Padmawati and Nichter 2008).

One respondent explained:

> In theory vaccination solves the problem, but implementing it on the scale required here is impossible. Imagine... you arrive in a village with 500 chickens wandering about the place. They belong to everybody and nobody. There are no fences and no coops. In all each bird will need five or six injections over a year – an initial dose, a booster after three weeks, and then a booster every quarter. This means that the catchers and the vaccinators will need to visit five times with the right vaccine which has been sourced and stored properly, and the right equipment, and deliver it correctly to the relevant animal. In the long term it is just not sustainable[96].

[92] Interview, Jakarta 11 August 2008
[93] Interview, Jakarta 13 August 2008
[94] 'Vaccine shortage hampers government's bird flu fight' Jakarta Post 11/04/06
[95] Jakarta Post 8/10/05
[96] Interview, Jakarta 13 August 2008

This situation is exacerbated by a lack of veterinarians and appropriately skilled people, particularly in provincial and district government service. A senior veterinarian with the Bogor Institute of Agriculture, is quoted as saying that there are only 200 animal health posts nationwide, and that "half of the posts are not functioning"[97]. Five veterinary faculties (Aceh, Bogor, Yogyakarta, Surabaya and Bali) produce only 70 to 120 graduates a year each, and industry provides better wages than government employment. Commonly quoted statistics suggest that there is one vet active for 20,000 people or 4,500 sq km, with less than 20 working on average per district, and with some outer provinces (Papua, Maluku, East Nusatenggara are considered the worst provided for) having only one or two vets[98]. In March 2007, the MoA estimated that 154,000 vaccinators were needed for the country, and that costs per year would total $166,593,000[99].

The medical community too has reservations about the vaccination programme. The director of one of the leading avian influenza designated hospitals has suggested that improper vaccination may be helping to spread the virus[100]. An interviewee was more explicit:

> Half-baked vaccination programmes do nothing to help. The vaccine is too widely dispersed and there is no monitoring of drift. There are also questions about the virus strains being used. Vaccination seems to have repressed the virus to a degree, but it may well just be concealing the virus and complicating surveillance[101].

Another said: "We have some answers and one of them is that mass vaccination is NOT a strategy in Indonesia"[102].

Vaccination is a clear example of a rational, technocratic, international-led solution running into the finely grained sand of Indonesia's numinous, high variegated, here-and-now culture. Another is the notion of clear and comprehensive movement controls. The Quarantine Service operates under Regulation 82 of 2000 on Animal Quarantine, and is responsible for protecting each island from contamination by foreign and domestic animal diseases. It is however not under the control of the Directorate of Animal Health and suffers even more severe challenges of competence and resources than other parts of the national civil service. It should be noted that the complex geography makes comprehensive control virtually impossible, but in theory at least, had this agency been aware and active in the early days of the outbreak, there is a chance that HPAI could have been contained on Java. In 2004, transport of live birds (including fighting cocks) was banned between Java and the eastern islands, including Bali and Lombok. However DGLS certified day-old chicks and chilled and frozen poultry meat were still traded (Simmons 2006:442). Poultry also continued to be smuggled, or moved by small traders who were unaware of the ban. Ketutsutawijaya[103] suggests:

> Poultry smuggling in Indonesia can happen from island to island, and smuggling city to city within the same village [sic]. Smuggling is common due to the price differentiation is so big between each areas [sic]. Example, smuggling ducks from East Java province to Bali province. In Bali, duck price can up to Rp35,000 each, since many people demand ducks as one of the main component in their religious ceremony. While in East Java, duck price only Rp15,000 each [sic]. Chicken smuggling from Sulawesi and Surabaya heads to Papua. In Papua, chicken price is up to Rp150,000 each (*kampong* chicken). While in their origin place (Sulawesi and Surabaya), the price is only Rp30,000 each. Another smuggling area is Lampung to Java.

[97] Jakarta Post 8/08/07
[98] KOMNAS presentation at the 10th National Veterinary Conference of the Indonesian Medical Association, Bogor, 19 August 2008.
[99] Ministry of Agriculture presentation 'HPAI Vaccination Program in Indonesia' at Scientific Conference on Vaccination, Verona, Italy, 20 - 22 March 2007
[100] Jakarta Post 14/09/06
[101] Interview, Jakarta 28 August 2008
[102] Interview, Jakarta 12 August 2008
[103] Available at http://ketutsutawijaya.wordpress.com/2007/03/16/11/ accessed 3 November 2008

As an interviewee put it: "Anybody can move anything around. There is legal and illegal trading over a vast area. If you are stopped, you simply pay a tax and go on"[104]. Similar practical issues often pertain to matters such as caging, bio-security and the disposal of infected carcasses. One respondent explained: "In the poorer parts of the eastern islands, for example, many houses are not much better than what would be called chicken coops in the West"[105].

Science meets society

Since January 2006 the core of avian influenza control in Indonesia has been the Participatory Disease Surveillance and Response (PDSR) project, a collaboration between the Ministry of Agriculture, local government livestock services and the FAO, supported primarily by USAID, AusAID, and the government of Japan. The project is based on a qualitative approach to epidemiology known as participatory epidemiology, which has the objective of developing and supporting a community-based response to detecting and preventing the disease by using local knowledge of where and when outbreaks are occurring, and enlisting the local population in control efforts. It has much in common with established techniques of participatory rural appraisal (PRA) but has evolved significantly in Indonesia. The first phase of the PDSR project emphasized the detection and control of HPAI by separate surveillance and response teams primarily in 'backyard' settings at the household level. Now, a broader village-level approach encompasses all poultry farmers, traders and community leaders; a greater stress is put on empowering communities to understand the origin, prevention and control of all poultry diseases; and better links are sought with veterinary services, where capacity is being developed through PDSR.

Four pilot studies were initially run in four LDCC (Local Disease Control Centre) locations across three provinces in Java, involving 52 local government livestock services officers. By mid-2008, 2,112 officers, including 353 qualified veterinarians and 945 people with no official animal health qualifications, were operating in 27 of 33 provinces across 331 of Indonesia's 448 districts. Supported by large-scale awareness campaigns in the national and local media, the PDSR teams visit villages, meet with community leaders, key informants and poultry farmers, with the objectives of gaining trust from the community and understanding historical and active poultry disease better. Each team reports their activities to a LDCC, which enters reports into a LDCC database, which is then sent to the MoA, where all LDCC databases are compiled into a central database. When active outbreaks are encountered, the teams have rapid tests[106] available to confirm HPAI, and with support from the affected community, infected birds are subsequently culled and disposed of, infected properties disinfected, movement controls implemented, and the local medical authorities or District Surveillance Officers contacted. From January 2006 to September 2008, PDSR teams made 177,306 surveillance visits, responded to 6,011 cases of HPAI and worked with over 2.1 million community members[107].

In its totality, the FAO-supported project has grown into a remarkably large enterprise involving recruiting, training and managing a large number of staff spread over a wide geographical area. Much work has also gone into database development and management. After an initial focus on households, since 1 April 2008 the database has been based on the village as the epidemiological

[104] Interview, Jakarta 14 August 2008
[105] Interview, Jakarta 13 August 2008
[106] The influenza type A rapid test (Anigen©) only distinguishes between HA or HI virus/titers. PCR (Polymerase Chain Reaction) tests are more specific, and can take only two hours, but a laboratory is required, negatives need to be confirmed, and results may not be available for a week. A definitive isolation test – culturing the sample in a medium – usually takes seven to ten days. According to Padmawati and Nichter (2008:40) testing delays are often used to 'harvest' healthy chickens.
[107] FAO unpublished

unit[108]. The second phase of the project has also broadened the range of stakeholders involved to include district, provincial and central governments as well as local communities, and incorporates conventional, quantitative epidemiological techniques. Other FAO-supported activities include running workshops designed to inform and enlist local government officials and decision makers, developing procedures for collecting and transporting virus samples for laboratory testing, local-level focus group discussions, commercial industry profiling, newsletter and communications production, testing vaccination protocols, and studying poultry movements, marketing and socio-economics.

At a number of levels, the PDSR project is doubtlessly a success. Non-veterinarians associated with the broader response comment admiringly on the scale of the operation, its organization and sense of purpose[109]. The locally orientated, boots-on-the ground, approach represents a significant attempt to meet the requirements of Indonesia's diverse complexity on its own terms, and the human face it puts on a necessarily massive enterprise is valuable. An interviewee associated with the project said:

> In some areas, such as Lampung province in Sumatra for example, the programme has had significant success in disease control. More widely, the high number of reported cases for Indonesia in 2007-8 is due entirely to PDSR, and the data-collection, processing and analysis system, especially in its second-generation form, is providing an understanding of the dynamics of disease spread and control that just did not exist before. Looking to the future, I'd say that it is projects like this that stand the best chance of helping to rebuild veterinary services post decentralization and the financial crisis, and to evolve into a surveillance, prevention and control programme that addresses other animal and zoonotic diseases in the way that the One World One Health initiative is calling for[110].

Other respondents, some close to the project, are more critical. One suggests:

> The problem is with the R in PDSR. The teams can measure but they can't respond effectively. They don't have the authority to cull. They can't vaccinate. All they can do is talk. This sometimes has the required outcomes, but what is required is an assured, standard cull and compensate response to isolated outbreaks[111].

There are other challenges, some very prosaic and frustrating. The FAO, for example, has been struggling to obtain the appropriate tax-exempt status for 480 motorcycles before deploying them to the field[112]. As one respondent put it: "FAO is tasked with making this happen in the field but FAO is not traditionally an implementer on such a scale. It is working remarkably well with MoA, but I do wonder whether the role of the organization is to run a branch of the national civil service"[113]. Another suggested: "The expansion has been too fast. This is one problem of being driven by donors, who are always asking how big can you make it, how fast can you go? Here we train people for two weeks and push them out of the door. We've created a response platform, but the strategy is questionable"[114].

One less obvious good, which is seen as tangible by some, is that communication with industry is better given hard facts about what is going on in the environment surrounding their facilities[115]. One interviewee suggested:

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[108] FAO AIDE News July 2008
[109] Interview, Jakarta 12 August 2008
[110] Interview, Jakata 27 November 2008
[111] Interview, Jakarta 12 August 2008
[112] FAO Eleventh PDSR Quarterly Report, April-June 2008
[113] Interview, Jakarta 13 August 2008
[114] Interview, Jakarta 26 August 2008
[115] Two remarkably detailed and relevant studies completed in association with the FAO in 2008 are: 'Poultry Market Chain Study in Bali' by Made Mastika (OSRO/RAS/602/JPN) and 'Poultry Market Chain Study in North

> Industry is now more willing to talk about zoning and compartmentalization. We know that small farms are awash with the disease. We know that industry has problems, but not much more. The problem is probably linked and self-perpetuating. We need to know more about the market chains. We need to know more about feed. Only now is that work starting to be done[116].

The Operational Research (OR) project is one of the most ambitious and recent initiatives, launched in June 2008 in 16 districts of three provinces (West Java, Central Java and Yogyakarta). Led by the MoA, working in collaboration with FAO and the International Livestock Research Institute (ILRI), OR examines the feasibility and impact of alternative controls through a longitudinal study to measure the effectiveness and feasibility of four measures: a) a PDSR control group, b) PDSR plus HPAI vaccination, c) PDSR plus HPAI and Newcastle Disease vaccination and d) PDSR with immediate compensation for culled birds. Alongside procuring and delivering vaccines and testing kits, and moving samples to laboratories, and monitoring, the project involves 1,088 vaccinators. "We have to find them, train them, employ them, and supervise them," said one interviewee. "At the moment it is simply a huge vortex that is sucking everything in. We are at the stage where we are snowed under just working out what is going on, let alone doing anything about it"[117]. Even with all the work done to date, it is clear that the response is still in its relatively formative early days, and that effort, expertise and funding, will be required for years into the future.

Although relations between the international agencies and the government are significantly better in agriculture than in health (see Viruses and sovereignty below), and by all accounts the FAO in particular has a good working relationship with the MoA, political complications exist further up the ladder. One informant said: "There needs to be priority and focus. This is basically an agricultural problem and agriculture should be leading. But agriculture people don't have the influence"[118]. Another suggested:

> I don't believe agriculture has a high enough priority on the national agenda – the future is seen as development through industry and services – and I don't believe avian influenza is a high enough priority within the MoA. The CMU [HPAI Central Management Unit] sits too low in the hierarchy. By a lucky fluke the country is self-sufficient in rice this year and the minister thinks that's enough. There are people struggling to do good work, but it's not resourced well enough, it lacks influence, it's ad hoc, and it's not supported internally. Funding is going down right now, and only the most long-sighted of the donors are prepared to commit to more than a year. You can't successfully address a protracted problem like this on a year-by-year basis. We are dealing with a number of donors too, and they have subtly different objectives. In these circumstances it's difficult to put together a coherent programme"[119].

Even in this less than ideal political and operational environment, the veterinary and agricultural responses to HPAI have been determined and well co-ordinated across a remarkably large geographical area and range of activities. Those close to the programmes are at pains to stress that despite the challenges, there have been successes in controlling the disease in some regions. However, even if this is now appreciated in the control room of the MoA, together with the scale of problem, and the time and effort that is going to be required to bring the disease under control, there are still significant uncertainties as to which aspects of the activities have been responsible. A standard cull and compensate approach ('stamping out') is inevitably challenged and unpopular

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Sumatra' by Albiner Siagian, Philipus Sembiring, Zulfikar Siregar, Ma'ruf Tafsin, Nevy Diana Hanafi, Rasmaliah, Dwi Suryanto, and Rosdanelli Hasibuan (OSRO/INT/501/NET).

[116] Interview, Jakarta 15 August 2008

[117] Interview, Jakarta 15 August 2008

[118] Interview, Jakarta 11 August 2008

[119] Interview, Jakarta 13 August 2008

unless the mechanisms and delivery of compensation are consistent, transparent and timely, which they are not. Given Indonesia's geography, lax regulatory regimes and under resourced and inefficient enforcement processes, movement controls are not going to reach the required standards soon either. "It only takes one chicken,"[120] was how one interviewee put it, and that ignores feed, feet, feathers, meat, unwashed eggs, manure and more. Vaccination, the ultimate technological fix, solves the problem in theory, text-book style, but a question mark hangs over the practicalities of implementing it across every village and backyard in the country, placed there most clearly by those who have been in the field trying to do it.

What is more difficult to measure, however, and what therefore is in danger of being, if not ignored, at least undervalued, is the human face presented by thousands of people on the ground concerned primarily with the welfare of poultry. Whilst those involved in managing the response, especially those from the international community, have a clear understanding of the necessity of a robust response, and the (global) public good attached to it, as discussed previously, such conceptions are not widespread amongst the population. A respondent involved in a socio-economic study in Jakarta explained:

> The people did not want to tell us they had poultry. They hid from us and they hid their poultry from us. We were blamed. They said we were stupid. Even though we were officials trying to help they were rude to us and didn't welcome us. It's very difficult to make them understand as they have been farming like this for centuries. They say: 'Look at us. We have chickens but we are not sick'.[121]

As 'enhanced bio-security' emerges as a further component of the veterinary and agricultural response, the educative potential of trained people on the ground is going to become even more important, along with trust in them and what they say. As will be discussed in the following section, people do sometimes get sick, and die.

HUMANS AT RISK?

> "The biggest issue is that there is practically no understanding of germ theory in the population, almost no conception of it at all"[122].

The first WHO lab-confirmed Avian Influenza A/H5N1 human case, and death, was reported in July 2005, a 38 year old man from Tangerang near Jakarta, whose two daughters, aged one and eight, also died[123]. By 12 December 2008, Indonesia had more human cases, and more deaths, than any country in the world. Of the 139 laboratory confirmed cases, 113 have been fatal. West Java, the capital Jakarta, and Banten (on Java's most western tip) have seen the majority of events with 95 cases and 81 deaths. In comparison, Central Java has had 11 cases and ten deaths, East Java seven cases and five deaths, Bali two cases and two deaths, South Sulawesi one case and one death, and Sumatra 23 cases and 14 deaths.

Compared with other causes of death in Indonesia – infectious and chronic diseases, accidents, malnutrition and aging – avian influenza cannot even be described as a blip on the chart. This, as illustrated by the final comment in the previous section, causes a huge disconnect between the (global) public good construction driving the eradication of HPAI, and constructions and

[120] Interview, Jakarta 26 August 2008
[121] Interview, Bogor 21 August 2008
[122] Interview, Jakarta 12 August 2008
[123] One explanation for the time-gap between outbreaks in animals and human cases is that the animal outbreaks initially occurred in the industrial sector where there was limited human contact with diseased birds (Samaan 2007:18).

understandings of the danger on the ground. More than anyone, the Indonesian and international doctors and epidemiologists working in the MoH, realise what the consequences of a pandemic will be, especially for a relatively poor and relatively unprepared country like Indonesia. But they are faced with huge challenges in making the case that HPAI is an urgent problem that needs concerted effort and action at all levels. If the government's response is largely reactive, there has been little to drive attention or action in the human health domain. Chickens are everywhere, especially in the countryside, but the disease is so rare as to be barely noticeable. Furthermore, concerning matters of disease and death, fatalistic, numinous notions push forwards strongly in many cultures, not just in Indonesia.

Even in Tangerang, immediately north-west of Jakarta, which has had a remarkable number of cases, life remains essentially unchanged. An interviewee explained:

> It's obvious that human cases are concentrated very much around Jakarta and the western end of Java, where the population density is the highest. This is possibly a surveillance artefact - Jakarta is better informed, and better off, so people are more likely to report. But you walk between the tower blocks and you find a village with live markets, teeming life, even chickens scratching around. This is life in Indonesia. Tangerang is the hottest spot. There is still a concentration of poultry farming and processing there, and a high level of traffic movements in and out of the city. In my opinion, the markets drive the problem in Jakarta, the movements of birds and people in and out of the city[124].

Adult deaths divide into roughly equal numbers of males and females. Sedyaningsih et al (2007:524) investigated 598 suspected cases in Indonesia between July 2005 and June 2006, of which 54 were confirmed and 41 fatal: a case-fatality proportion of 76%. Confirmed cases ranged in age from 18 months to 45 years, 53% were under 20 and 24% under ten. Forty-one case patients (76%) had had direct or indirect contact with poultry during the preceding two weeks, and six case patients (11%) had poultry-related occupations, including three farm workers, two live market workers and one shuttlecock feather selector. More than one third (54 cases) occurred in seven clusters among blood relatives, suggesting a possible genetic susceptibility; and increases in human cases have been observed in the cooler, wetter months. One interviewee complained: "Cases decline in the annual dry season, so interest drops off and people forget about it. Then when cases rise again in January and February, there's a realisation that the problem has not gone away. It's very difficult to keep AI in people's minds"[125]. The same, medically trained, informant made the comment on the popular understanding of germ theory, which began this section. It is not just with respect to avian influenza that the medical community is faced with uphill work.

Nevertheless, some very detailed work has been accomplished. An analysis of 340 cases globally to 14 December 2007 found that direct avian-to-human virus transmission is the predominant means of infection, and handling sick or dead poultry is the most commonly recognized risk factor (WHO 2008:262). Bird-to-human transmission is believed to occur largely by infected bird secretions being inhaled or transferred with contaminated hands to the mouth, nose or eyes (Vong et al 2008:1304) with the virus replicating primarily in the human respiratory tract. Slaughtering, defeathering, or preparing sick poultry for cooking; playing with or handling diseased or dead poultry; handling fighting cocks and ducks that appear to be well; and consuming raw or undercooked poultry or poultry products have all been implicated in transmission. There is evidence that the virus replicates in the gastrointestinal tract and that infection is possible through ingestion of contaminated food and water (ibid). In Indonesia, contact with fertilisers containing poultry excreta is also considered a risk factor (Lye et al 2006:472).

[124] Interview, Jakarta 15 August 2008
[125] Interview, Jakarta 12 August 2008

The fact remains that H5N1 is a very rare disease in humans (Sedyaningsih et al 2007:527). It is also difficult to diagnose and confirm. The most common symptoms are fever, shortness of breath and cough, with pneumonia showing on chest radiograph. Testing involves confirming viral RNA in throat swabs, endotracheal aspirates and lung biopsy samples (from the deceased) by conventional or real time reverse-transcriptase polymerase chain reaction (RT-PCR). Serum samples can also be tested for H5N1 using H5-specific antisera. These tests are available in Indonesia, but WHO confirmation requires samples to be tested in a WHO reference lab, which for Indonesia is (or was, see Viral sovereignty, below) usually the University of Hong Kong or the US Centers for Disease Control and Prevention (CDC) in Atlanta. Rapid antigen tests are also used, but Lye et al (2006:472) suggest that the results have been 'almost uniformly unhelpful'.

The Ministry of Health, supported by the WHO and donors that include USAID, AusAID and the government of Japan, has responded by designating 44 hospitals nationwide (previously SARS centres) as specialist H5N1 referral centres, providing antiviral treatment at provincial and district levels, training health care workers, building laboratory capacity (currently there are two labs in the country with BSL-3 capacity), providing personal protection equipment for health workers, developing information systems, and establishing a command post in the ministry. Sero-surveillance programmes and information campaigns have also been run, aimed at market and poultry workers particularly. In November 2006, MoH launched a community level initiative focusing on 12,000 remote villages, and in April 2007 the Integrated Surveillance for Avian Influenza (ISAI) Project was launched linking human surveillance with animal surveillance through collaboration with MoA and FAO. By the end of 2007, 170 District Surveillance Officers in nine provinces had been trained and equipped[126].

Compared with the numbers trained to recognise and respond to the disease in chickens, however, this number is miniscule. Those involved, on both the medical and agricultural sides, would say that the virus is most prevalent in poultry, and that the threat to humans is best addressed there. One interviewee, commenting on the involvement of the international community more broadly in Indonesian agricultural affairs, said: "If it wasn't for avian influenza, we wouldn't have much to do here. Except perhaps on the eastern islands, particularly when the weather goes wrong, the country is doing all right. It's feeding people and going forwards"[127]. An international veterinarian agreed, citing the spread of rabies as the only other significant zoonotic threat currently facing the country[128].

But with respect to human health, difficult questions of priorities inevitably arise. It is accepted that Indonesia made substantial improvements in health care in the 1970s and 1980s (Kristiansen and Santoso 2006), but H5N1 is doubtlessly putting a further strain on an already stretched system. Malaria, pulmonary tuberculosis, diarrhoeal diseases, pneumonia and HIV/AIDS are prevalent. Typhoid, tetanus and rabies are continuing problems, as is child under-nutrition in some regions, and significant outbreaks of Dengue Haemorrhagic Fever occurred in 2004 and poliomyelitis in 2005. With demand for healthcare increasing due to economic growth, urbanisation and ageing, government spending is falling. According to Kristiansen and Santoso (2006:249) spending on primary health care reduced by 25% per capita between 1996/1997 and 1999/2000, and fell a further 38% during the years 2000-2004. The number of medical doctors to 1,000 people is the lowest in the region at 0.13[129] and the World Bank currently considers Indonesia's health spending to be 'low' at less than 3% of GDP[130], which WHO suggests is $33 per capita (in US dollars) and $118 (in

[126] USAID CBAIC Avian Influenza Roundup Issue 2 April 2008
[127] Interview, Jakarta 13 August 2008
[128] Interview, Bogor 20 August 2008
[129] WHO – '11 health questions about the 11 SEAR countries' available at http://www.searo.who.int/LinkFiles/Country_Health_System_Profile_5-indonesia.pdf accessed 9 November 2008
[130] Indonesia: Economic and Social update World Bank April 2008

international dollars[131]). In July 2007, the president announced that central government had allocated Rp20 trillion ($2.22 billion) or about 2.6% of the state budget for health[132].

Since 2001, managerial and financial responsibilities for public health care have been decentralized from central government to the district level, and health care is increasingly privatized. The healthcare system is also in the middle of a major transformation characterised by what has been described as contradictory trends in which centralization co-exists with decentralization and strong state control parallels market-driven healthcare (Ramesh and Wu 2008:174 citing WHO 2004). The private sector accounts for 67% of all hospitals. Public health clinics (*puskesmas*) and family planning clinics are free, and public hospitals charge fees based on the class of accommodation. About 15% of the population are covered by private health insurance schemes and 21% by public programmes (Kristiansen and Santoso 2006:250). In 2005, the National Social Security System (*Sistem Jaminan Sosial Nasional*) was launched to cover some 60 million of the poorest, with a budget allocation of US$144.33 million, or approximately $2.4 per person[133]. Nevertheless, social and geographic disparities in access to, and quality of, health services are considered to be on the increase, with about two thirds of total health expenditure coming out of pocket (Ramesh and Wu 2008:174).

Thus there is a common reluctance among the poor to seek medical assistance due to the fear of high costs (Kristiansen and Santoso 2006:252 citing Hunter 2004), and very different pictures between the different strata of society as to the availability of medical care, and what it should constitute. To date, avian influenza has been a disease of the poor and either the rural, or those living on urban peripheries. If anyone of any significant financial means became ill with the disease, especially in Jakarta, they would quickly be in hospital and receiving care. This may result in under reporting of H5N1 infection, and the relatively high mortality rate. In some areas treatment of human H5N1 infection is reputed to be free[134], but as an interviewee explained, this does not necessarily solve the problem: "What happens if you report to hospital like a good citizen and it turns out you don't have the disease? Do you then get a bill? There's not much trust"[135]. Only the more severe cases may reach medical attention (Lye et al 2006:474), and late initiation of therapy appears to be a major factor in the high mortality rate (WHO 2008:268). The non-specific clinical presentation of H5N1 has also resulted in mis-diagnosis of subsequently confirmed cases (WHO 2008). In other likely cases, specimens have not been available for testing, and some infections have probably not been identified due to the use of unsuitable primers and probes in the RT-PCR test process.

Despite these grim facts, informants familiar with the Indonesian health system, and the H5N1 response, suggest that the designated referral hospitals are now reasonably well equipped to deal with sporadic cases. One said:

> The hospitals are getting better. They have isolation facilities, protocols and drugs. Staff are trained in technical specifics, but nurses lack access to basic training – simple things like waste management, occupational health and safety. Similarly, there are labs that can detect the disease, grow the virus and test at a genomic level, but there are questions about the skills available to interpret data, and I've seen work I can only describe as sloppy. The variability of influenza viruses calls for frequent updating of primers and probes and that doesn't always happen. There are always financial pressures, and sometimes they are used as excuses to cut corners. There are no lab bees obsessed with getting it right. You are never sure about quality control[136].

[131] An international dollar has the same purchasing power as the US dollar has in the US.
[132] Jakarta Post 17/07/07
[133] One treatment course of Oseltamivir (10x75mg tablets) costs $15 even at discount rates.
[134] 'Free medication care on offer to people with flu symptoms' Jakarta Post 14/09/2005
[135] Interview, Jakarta 28 August 2008
[136] Interview, Jakarta 28 August 2008

Others stress the low capacity and poor adaptability of the health system. One respondent suggested: "There is no shortage of funds for AI but it is hard to spend the money because the baseline is so low. The ministry of health and the culture here is so slow. There is no sense of urgency at all"[137]. Another spoke of poor medical understanding:

> Sometimes Indonesian doctors leave me aghast at their decision-making. I've seen mis-diagnosis, mis-prescription and over-prescription. What this means is that flu patients might get to hospital on day four or day six and are told that they have dengue and are sent home. Others with the disease who do get to hospital decide to go home for no reason other than they want to. There is often what I can only describe as a mystical approach[138].

Yet detection of H5N1 in humans is rated as reasonable. An interviewee said: "Sure, there are sporadic deaths that are not investigated – like any disease – but I'd say that there is now the capacity to detect clusters. Karo, for example, is a very remote area, but the second case there in 2006 was detected"[139].

The medical community falls into two (not uncomplimentary) camps. One focuses on the need for more pure research. An interviewee said:

> A lot of research is needed. What is going on with the clusters of blood relatives? Why are more poultry workers not catching the disease? How is the virus changing? The fact is that the countries where cases are occurring rarely have the capacity to do this work, and the countries that don't have many cases are not inclined to do the work. But here research raises a red flag in the ministry. It's so sensitive[140].

The other focuses more on the need for organizational change, capacity building and skill-set improvement. A medically qualified interviewee suggested:

> In the medical sphere there's too much emphasis on lab capacity strengthening and analysing the virus, as if that is going to fix the problem. In other countries, public health experts, civil servants, managers have all made useful inputs. Here the scientists are the designers and they usually don't have much idea about what is going to work in the real world[141].

All agree however that real world politics, particularly the style and manner of leadership in the MoH, have intervened in the medical response and made basic and important medical work more difficult, if not impossible. This situation is examined in more detail in the penultimate section, Viruses and sovereignty. As things stand, however, as far as H5N1 is concerned, the most salient facts are that Indonesia is totally dependent on the international community for the provision of front line anti-viral drugs (of which some stocks exist in the country, ticking towards their expiry dates[142]) and any human vaccines that might be produced in the months following the outbreak of a human epidemic. Oshitani at al (2008) argue that developing countries will probably be more badly affected by a pandemic than industrialised countries. Changing these circumstances will be the work of years, or

[137] Interview, Jakarta 12 August 2008
[138] Interview, Jakarta 15 August 2008
[139] Interview, Jakarta 28 August 2008. The Karo cluster is also noteworthy as a situation where the local population did not see national or local governments as legitimate sources of information, resulting in the Bogor Agriculture Institute (IPB) and the WHO being called in (Padmawati and Nichter 2008: 43).
[140] Interview, Jakarta 28 August 2008
[141] Interview, Jakarta 12 August 2008
[142] Kompas (11/12/08) reports that 7 million 'doses' of Tamiflu worth Rp200 billion were due to expire in January 2009.

decades[143], and faced with the low capacity and competing priorities associated with health care, even the doctors most determined to have some influence in the H5N1 response realise that a utilitarian public good, most certainly one with a national perspective, would focus on TB, dengue fever, or diarrhoeal diseases, for example, rather than the threat of an influenza pandemic. Despite the fatalistic nature of the culture, the individuals and organizations dealing with such future-leaning aspects of the response as pandemic planning and emergency preparedness may actually be having an easier time than the international medical community, who give the impression that they are simply keeping their heads down and trying to get some work done. Natural disasters hit Indonesia regularly, and few have yet forgotten the death and devastation caused by the Indian Ocean tsunami at the end of 2004.

There is also a well-founded appreciation in the medical community that H5N1 is best dealt with before it infects humans. As well as attacking the disease in animals, this involves increasing awareness of the virus and its potential consequences amongst the population, and attempting to change behaviour that puts people at risk. This is the subject of the next section.

AGITATING FOR CHANGE

> "A dead chicken is a dead chicken. There's no demand from the population to discover why. Avian mortality is just not an issue. On Bali for example, about a third of the birds are eaten, a third are used in ceremonies, and a third die. This is the way it always has been. The challenge is to encourage the communities to understand what is going on and be responsible"[144].

A wide range of organizations are involved in public communications and information initiatives, led by KOMNAS FBPI. They are all challenged by attitudes that see regular poultry deaths as normal and unavoidable, as illustrated by the comment above. UNICEF and Development Alternatives, Inc. (DAI), working with government, national, regional and other international groups, run the largest projects, which are focused on raising awareness and spreading information about how to recognize the disease and stop its spread. There is significant cross over, but UNICEF leans more to addressing the disease in humans, and DAI to addressing the disease in animals. Broad objectives include supporting community planning and mobilization, promoting community-based disease surveillance, and building local subcontractor capacity. Not all activities are centrally monitored or funded. One respondent said: "There are literally hundreds of activities, nearly all of which are useful. But they are fragmented and this means they are less effective"[145].

DAI's USAID-funded Community-Based Avian Influenza Control (CBAIC) project was launched in July 2006. It operates in three main spheres. One links with KOMNAS, and other government ministries, to strengthen pandemic preparedness at national, provincial and district levels. This involves facilitating meetings to improve coordination within and between the relevant ministries and local government offices, training government spokespeople, and drafting and producing leaflets and other communications material. The second sphere is more local: managing and coordinating community mobilization and training. This involves running events and training workshops, and producing a wide range of materials including booklets, banners, T-shirts, calendars, videos, posters and stickers. By mid-2008, DAI counted around 25,000 volunteers trained to recognize HPAI symptoms and respond to outbreaks, and the involvement and activities of local organizations such as Muhammadiyah, one of the country's biggest Muslim groups, and the Indonesian Red Cross, were seen as significant successes in broadening the scope and the appeal of the communications response. The third,

[143] On 24 April 2007, WHO approved initial grants of $2.5m each to six manufacturers from Brazil, India, Indonesia, Mexico, Thailand, and Vietnam to establish production capacity for flu vaccines. See http://www.bmj.com/cgi/content/full/334/7600/925-a accessed 5 October 2008
[144] Interview, Jakarta 13 August 2008
[145] Interview, Jakarta 12 August 2008

overlapping, sphere of activity (in partnership with the Johns Hopkins Bloomberg School of Public Health's Center for Communication Programs) is to develop and implement a range of behaviour change communication programmes. The most recent and prominent of these was a series of nationwide television and radio public service announcements (PSAs), which ran from January to April 2008. These 30-second TV spots were dramatic and hard hitting – dead chickens, alarms, hospitals, human deaths – with the messages of burn and bury infected chickens and report the incident. The broad objective was to raise the level of perceived threat of human disease amongst the general population.

In September 2006, UNICEF, with funding from the government of Japan, and working closely with KOMNAS, launched a national awareness raising campaign called '*Tanggap Flu Burung*' ('Take Action on Bird Flu'). The campaign's keystone was a memorable thumbs-up hand symbol with four key messages on the fingers: don't touch sick or dying birds; wash your hands before eating and cook poultry well; separate new birds from the flock for two weeks; and report flu-like symptoms and seek medical attention, especially after contact with birds. The campaign included public concerts (one notable event in October 2006 brought more than 10,000 people together in Gowa, South Sulawesi for a celebrity pop concert), billboards, and the production and distribution of leaflets and other materials. Most prominent however was a four-month radio and television campaign consisting of four light-hearted 30-second spots (one for each of the four key messages) introduced by a well-known talk-show host.

In May 2007, the 'Take Action' campaign was expanded with a social mobilization and education programme that involved distributing 1,200 avian flu kits, containing masks, gloves, soap, banners, stickers, an instructional booklet and video compact discs, to community leaders in some 100,000 villages in high-risk areas, and this is now being extended to over 50,000 schools across Indonesia. The focus is on Java, South Sulawesi, Bali, and four provinces in Sumatra, with smaller-scale programmes running in Papua, Maluku, Aceh, and East Nusatenggara provinces. The school kits include a comic book and other material using the characters of a popular television show, and teachers are being encouraged to incorporate avian influenza related material into the curriculum. More recently, UNICEF has implemented a related child-orientated programme that includes games, an animated film and television advertisements. In addition to these mass media and grass roots campaigns, UNICEF also supports media relations and communications at KOMNAS FBPI, is involved with the same group in developing pandemic preparedness planning, and conducts avian influenza related training for journalists. Looking to 2009, UNICEF plans to roll out a radio drama series, produce a new set of public service announcements, and distribute a booklet for religious leaders[146].

Aside from this centrally coordinated activity, a wide range of events including rallies, parades and health walks have been initiated by all sorts of independent groups. In December 2006, for example, a student group was sponsored by the Ministry of Agriculture to travel around the country spreading a poultry hygiene message and encouraging people to eat chicken. In West Java, a Sundanese performance group has produced the Flu Burung Longser Show, a comic opera using songs, drumming and dances. Professional groups such as the Hotel & Restaurant Association have also been engaged and UN system organizations not seen as central to the avian influenza response have been active. The International Labour Organization (ILO) and the International Union of Food Workers (IUF), for example, plan to replicate a project run in Thailand promoting good workplace practice in the commercial poultry sector. UNESCO, with partners, has been distributing poultry cages and running workshops on Bali.

This blizzard of activity has been very successful in raising general awareness, but has not yet had time to show convincing behaviour change. KOMNAS data show that 97% of Indonesians are aware of avian influenza, but only 15% regard it as a direct threat to themselves and their families[147].

[146] Interview, Jakarta 15 August 2008
[147] Jakarta Post 7/06/07

Padmawati and Nichter (2008) found no farmers who expressed personal fear of avian influenza, with most speaking of avian influenza as some form of *tetelo* (Newcastle disease). What was feared more than illness was loosing chickens due to culling, or the price of chicken falling. One informant explained:

> The awareness among at risk groups is quite high but the perception of the risk is low, and changes in behaviour and practices are less than optimal. The community is only at the level of knowing, and people tend to forget. The next stage must go beyond the media and confront people face-to-face. We have to keep reminding people. When human cases decrease, people are not on the alert. Constant communications, year after year, are vital[148].

One of the greatest challenges for avian influenza communications in Indonesia is that there are so many different regions, cultures and groups involved. A respondent suggested:

> The usual idea with communications programmes is that you have one clear message. If you don't have one message you risk confusing people. But here we need different messages for different groups. How do you reach cock-fighters and housewives with the same message? How do you communicate both with those who live in modern air-conditioned apartments and with those who live in communal longhouses with no taps or toilets? It's impossible. They key is trust and this is hard. You have to get the leaders to trust you first, community leaders, religious leaders. If they believe you, they can take the message to the community[149].

Another said:

> Culturally it's very complicated. There is a tradition of authoritarian central control, and a very long tradition of people living close to animals, particularly chickens. You can't change this sort of thing overnight. The relationship between humans and the environment is key. Washing your hands before eating might save you, but it won't solve the problem. We need deeper reflection. The question is not just how to change habits, but how to change the way people live. That's not easy[150].

Aside from targeted communications, other activities associated with the response have had powerful short-term effects on awareness, but little on long-term behaviour. In Jakarta, the capital, backyard birds were banned in January 2007, and moves were announced to move poultry markets and abattoirs out of residential areas[151]. It has proved difficult however to win public backing. One interviewee explained:

> In the first few months there were cullings. They were on TV. But this was only for three months and there was opposition in the press. Reporting concentrated on the concerns of low-income poultry farmers. This made the government reluctant to go forwards. The middle classes and the rich stood aside. This was not their concern. Democracy has a price. It is that the scale of priorities has been compromised[152].

Another informant said:

> There was a 50% price drop following the announcement. Those with flocks of five to 500 were hardest hit. Around 40% - 60% of people who were making a living, or part of their living, from poultry had to find another job. Some did. That's possible in Jakarta. Others just moved

[148] Interview, Bogor 20 August 2008
[149] Interview, Jakarta 21 August 2008
[150] Interview, Jakarta 12 August 2008
[151] Jakarta Post 30/01/07
[152] Interview, Jakarta 25 August 2008

> their little farms from around their houses to unoccupied land nearby. The wet markets were seriously affected for about six months. Now you see live birds being sold again. The bottom line is that poultry numbers halved, poor people's incomes dropped by one third, and you still see and hear birds in the city[153].

Another high-profile event was a three-day pandemic simulation involving nearly 1,000 people in Jembrana regency in Bali[154]. An attendee said:

> I was very impressed. Roles and responsibilities had been defined. There was disinfectant, food, drugs, transport. Things worked. It showed that this country is not the basket case most people make it out to be. Then, just two or three days later, it was back to normality, everybody seemed to have forgotten about it. But the question left hanging in my mind was: how do you contain panicking people without the army using their guns?[155]

A comparison might be made between avian influenza and the threat of volcanic eruption, which is significant in Indonesia. The EM-DAT database[156] identifies 130 active volcanoes in the country and lists 39 deadly eruptions in the last century. In the 19th century, Krakatoa and Tambora, became famous worldwide for their devastating eruptions. Studying three highly volcanic areas on Java – Sumbing/Sindoro, Dieng and Merapi – Lavigne et al (2008) found only a few people aware of the volcanic threat. Nobody in the nearby communities was afraid of volcanic eruption, and in a number of instances, agriculture was actually being expanded upslope into more dangerous areas. Lavigne et al conclude that local people often underestimate the scientifically or statistically estimated risk, and that the perceived risk was very dependent on whether the volcano could be seen. Around Merapi, 97% of those surveyed thought eruptions were an admonition from the supernatural world and did not see death as a negative event. Rather it was a regenerative process that should be accepted with human humility.

These attitudes to the risk of volcanic eruption show similarities to those amongst the rural population in particular with respect to H5N1, as well as the strong sense of fatalism in society. If Indonesians have been living with chickens for centuries, they have been living with volcanoes for longer. Wildavsky (1979) posited both the environment and risk as social constructs, suggesting that individuals and groups with different world views will have different risk views. Douglas (1992) concurred from a more anthropological perspective: different societies fear different sorts of threats which correlate with differences in social structure. This cultural theory holds that people value things they participate in or identify with, and suggests a functionalist explanation: social structures generate attitudes that serve to uphold the social structure. Social organizations will emphasize the risks that hold the group together. Common values lead to common fears. What one sees depends on where one stands.

Coupled with the disconnect that exists between the international response, which is driven, and funded, most significantly by the global public good associated with preventing a human influenza pandemic, and the weak Indonesian conception of a national public good (let alone one that links Indonesia with the rest of the world), there is a significant disconnect between the global construction of the risk associated with H5N1, and the Indonesian one. World views, social structures and values all differ radically between Washington DC (or London, Geneva and Rome) and the villages of western Java, or the low-rise sprawl of Jakarta's periphery, so it is inevitable that there are going to be radically different constructions of risk associated not just with H5N1, but almost everything.

[153] Interview, Jakarta 15 August 2008. A detailed assessment of the impact of the Jakarta ban is available: 'Livelihood and Gender Impact of Rapid Changes to Bio-Security Policy in the Jakarta Area and Lessons Learned for Future Approaches in Urban Areas' ICASEPS & FAO (2008).
[154] Jakarta Post 26/04/08
[155] Interview, Jakarta 12 August 2008
[156] Available at http://www.emdat.be/ accessed 1 November 2008

Furthermore, in Indonesia's stratified society, the rich and the poor, the urban and the rural, and many other groups, construct risks in widely varying ways. Which common values are going to lead to which common fears? Which groups are to be held together by commonly constructed risks? This makes the communications aspects of the response particularly challenging. Whose risks are really being addressed, and why?

Another difficulty emerging from the number, scale and range of the internationally led communications initiatives, is working out what has had the most effect, especially concerning the thorny and important matter of provoking long-lasting behaviour change. Here the greatest value may be found in involving cohesive groups, such as Muhammadiyah and the Hotel & Restaurant Association, for example. They share common values, and so start closer to the position of sharing common constructions of the risk. Similarly, children can be more easily encouraged, as a first step, to see that they have commonalities, and are less dependent on existing values and routines. In risk communications, however, trust above all is imperative, especially trust in the institutions behind the messages (cf. Jasanoff 1982, Wynne 1992, and Irwin and Wynn 1996). As previously discussed this is lacking at many levels in Indonesia.

VIRUSES AND SOVEREIGNTY

The previous sections have shown how the response to HPAI in Indonesia has been hampered by political and bureaucratic processes, the lack of a coherent idea of a public good, especially a global one, and significantly different constructions of risk associated with the international organizations which are driving the response, and the people who are being affected by the disease, and the response. These themes coalesce in the geo-political storm which began on 20 December 2006, when Indonesia's minister of health, Dr Siti Fadilah Supari, decided that the country would stop sending human H5N1 virus samples to the WHO as long as it followed the 'imperialist' GISN[157] mechanism (Supari 2008:24). It would only resume if the system were changed to give Indonesia control over where viruses originating from Indonesia went, and a share of profits resulting from research and commercialisation. Two years later, shockwaves are still rippling through the international health, diplomatic and academic communities[158]. Timely samples are vital to track changes in the virus, and the global community was quick to respond. In mid-February 2007, WHO representatives met with Supari and her team in Jakarta, offering anti-viral drug and vaccine supplies, and support for developing laboratory and vaccine manufacturing facilities. This smacked too much of 'charity' to Supari (ibid:33), and after seven hours of negotiations (with much energy apparently expended in trying to make Supari's notion of 'empowerment' meet the WHO's notion of 'capacity building'), the matter remained unresolved. Supari was insisting on a Material Transfer Agreement (MTA) that recognised the viruses as Indonesian, and the WHO was required to "establish the mechanisms for more open virus and information sharing and accessibility to avian influenza and other potential pandemic influenza vaccines for developing countries". One model was the International Treaty on Plant Genetic Resources[159]. Another was the Convention on Biological Diversity, which recognizes the sovereign right of states over genetic resources[160].

A more public series of events followed. In late March, two 'high level' meetings were convened in Jakarta, which included 13 ministers from 'like-minded' countries, and resulted in the 'Jakarta

[157] Since 1952 the WHO Global Influenza Surveillance Network (GISN) has monitored evolving viruses and made twice yearly recommendations for the formulation of seasonal influenza vaccines. See http://www.who.int/csr/disease/influenza/surveillance/en/ accessed 8 November 2008

[158] See Garrett and Fidler (2007) for example, Fidler (2008), or "Sovereignty' That Risks Global Health' by Richard Holbrooke and Laurie Garrett (Washington Post 10/08/08).

[159] See: http://www.fao.org/ag/cgrfa/itpgr.htm accessed 1 November 2008

[160] See: http://www.twnside.org.sg/ accessed 5 November 2008

Declaration'[161]. In mid-April, a meeting in Geneva ended deadlocked, but the 60th World Health Assembly (WHA) in May saw the 'Jakarta Declaration' included as resolution 60.28, Supari elected to the WHO executive board, and three samples released. The resolution received support from 24 countries including Iran, North Korea, Vietnam, Iraq, Cuba and Myanmar; and at the first Non-Aligned Movement Health Ministers' Meeting, held in conjunction with the WHA, 112 countries voiced their concern at existing arrangements. In June, civil groups from around 50 Asian and African countries announced the 'Bandung Message' from a meeting in West Java, and in November and December, tense negotiations continued at an intergovernmental meeting in Geneva, and at the international ministerial conference on avian and pandemic influenza in Delhi.

Despite an international diplomatic offensive, during 2008 Supari has remained robustly unswayed. February saw the publication of her book, *Saatnya Dunia Berubah Tangan Tuhan di Balik Flu Burung*, in English: 'It's Time for the World to Change, Divine Hand behind Avian Influenza'. In April she made charges of spying against Jakarta-based US Naval Medical Research Unit Two (NAMRU-2)[162] and in May, she announced that H5N1 human cases, and deaths, would no longer be reported on a case-by-case basis to the press. Throughout, at public meetings, Supari has accused the WHO of colluding with rich world pharmaceutical companies to trick poor nations into giving away virus samples, to be processed into drugs and vaccines that are then denied to countries that can't afford them. "The conspiracy between superpower nations and global organizations is a reality," she is quoted as saying. "It isn't a theory, isn't rhetoric, but it's something I've experienced myself"[163].

Few in the international community fail to accept that Supari has raised an important matter that needs addressing, but her intransigence in the face of increased global transparency[164] and genuine offers of support has caused an unusual mixture of hurt and confusion. There are some tricky issues at the root of the matter. With global (seasonal influenza) vaccine production capacity currently running at no more than 500 million doses annually, and a total population of over six billion, a large number of people are certain never to see any vaccine in any circumstances. There are also doubts as to whether the virus actually originates from Indonesia, and questions emerge which are almost philosophical. An interviewee asked:

> Even if you accept that the virus is Indonesian, what happens if an Australian, say, gets infected, and goes home? Does the virus then become Australian? Or does it even become the personal property of the patient? It is an impossible matter to wrap up legally[165].

Another respondent said:

> Everyone agrees with the basic point, but Supari has overplayed her hand. Her motivation is a mystery, but I'd say the problem boils down to a poor understanding of the issues. She was instructed by the president to buy a stockpile of drugs, but didn't have the money. So she's scratching her head when Indonesian viruses start turning up in prototype vaccines[166] and

[161] Available at http://www.who.int/hpr/NPH/docs/jakarta_declaration_en.pdf accessed 3 November 2008
[162] Although not an official WHO collaborating centre, NAMRU-2 provided confirmation of all human cases of H5N1 in Indonesia from June 2005 to January 2007.
[163] AFP News Briefs 13/10/2008 available at https://bart.france24.com/en/20081013-indonesias-bird-flu-warrior-takes-world accessed 20 October 2008
[164] See 'A summary of tracking avian influenza A(H5N1) specimens and viruses shared with WHO from 2003 to 2007' available at http://www.who.int/csr/disease/avian_influenza/TrackingHistoryH5N1_20080131.pdf accessed 5 November 2008 for example.
[165] Interview, Jakarta 28 August 2008
[166] According to Supari (2008:25), representatives of Baxter International Inc. first visited her, and staff from PT Biofarma, the state-owned pharmaceutical company, at the end of 2005, promoting their vaccine production capability and offering a human vaccine developed from a Vietnamese strain. In February 2007, Supari appointed Baxter to develop a vaccine from the Indonesian strain. In the same month, she learnt that Australia-based CSL Ltd. had developed a vaccine based on the Indonesian strain, which she accused CLS of 'stealing'.

> she thinks 'Bingo!' Now she's dug herself into a hole and she's turned it into a bigger crusade. Speculatively, I'd say that she is also looking to deflect attention from her failures, and not just with avian influenza. It's sad. It's not an easy problem and she should not take it personally[167].

Other analysts see a wider agenda. One interviewee suggested:

> In case it's not obvious, the whole matter is driven by nationalism. The main tension in the country is now between Islamic nationalism and secular nationalism, and Siti is trying to play both cards. The nationalists are getting more strident, and it's pushing to extremes, verging on paranoia. It's not difficult to work through her logic[168].

Supari's own writings back this up:

> For a second time[169] Indonesia would lead other developing countries, which for a long time had been the victims of the greediness of the people of developed countries in the field of health. With spirit burning in my chest, I determined not to step backwards. "Ever onward, no retreat," as Soekarno, the first President of the Republic of Indonesia, put it. Bismillaahi rahmaanir rahiim! (ibid:25).

Supari has also put her Islamic faith at the centre of her struggle, claiming divine guidance, and is reputed to be associated with groups such as Hizbut Tahrir, which believes in replacing Indonesia's secular government with a Muslim caliphate. Elson (2008:53) offers a detailed exposition of the complexities of Indonesian nationalism, which fits the situation well: an ongoing project characterised by 'a confused and unproductive tension between leaders' assumed roles as popular agents of their people's drive towards modernity and their desire to retain or restore what they see as essentially "Indonesian"'. Citing Weinstein (1971), he suggests that a long-established view of the international realm as 'distant, unreliable, powerful' and essentially unsympathetic to Indonesian interests, continues to enjoy broad support.

A cardiologist before being selected in 2004, Supari "came from nowhere" according to one interviewee:

> Her appointment was a surprise. Maybe she was useful to fill a quota of four women in the cabinet. Or it might have been because she is not a member of any political party. Some say that she is a friend of SBY's wife, which would not have done her any harm, either. In any case, 2009 is election year and there are rumours that she's looking for the vice president position. That means that she must not be seen to be pushed around. She has to drive it through. Alternatively, the elections might mean the end of the problem[170].

Another respondent suggested: "You need a psychologist's analysis maybe, but she might see herself as being in competition with some of the other women in the cabinet[171]. The explanations are not necessarily rational"[172]. Nevertheless, Supari is winning over the masses. Lifestyle magazines profile her as a 'hero' of Indonesia, and the weekly television programme which she hosts (and sponsors) is popular viewing. Informed Indonesians, however, profess to be mystified by her persistence, asking:

[167] Interview, Jakarta 15 August 2008
[168] Interview, Jakarta 28 August 2008
[169] In 1965, Indonesia, under Sukarno, was the first country ever to withdraw from the United Nations Organization.
[170] Interview, Jakarta 14 August 2008
[171] Finance minister, Sri Mulyani Indrawati, and trade minister, Mari Pangestu, are both widely regarded as highly competent and effective.
[172] Interview, Jakarta 21 August 2008

"Indonesia does not have stated objectives. Just 'equity'. How do you negotiate with someone who does not know what they want?"[173] Others see a simple logic at play: "This is a very quid pro quo culture, where everything is negotiated. Siti realises that the threat of widespread avian influenza, or worse a human pandemic, has economic value, and is looking to milk it"[174].

No matter what the logic might be, according to one informant:

> Everything is bogged down. The ministry is not happy with WHO and WHO is not happy with the ministry. Nothing is moving. We can't even get agreements signed to disburse money we have waiting. In one case we have been waiting over a year. We talk to our friends and colleagues in the hierarchy and they apologise saying there is 'anti-western sentiment' at the top. It's insane[175].

Another interviewee paints a blacker picture:

> Everyone has been polite so far because she has a fair point. But let's say their patience runs out and they [the international community] decide to play hard ball. They turn the money taps off, pull the troops [vets, medics, agronomists, communications people] out, point a satellite at the country, and watch the virus kill every chicken in the country, and then start taking the children[176].

This debate over the 'nationality' of a virus has provoked unprecedented passion, and despair, on both the Indonesian side and that of the organizations charged with responsibility for global health. The international response to Severe Acquired Respiratory Syndrome (SARS) in 2003 was seen as an almost ideal model of global cooperation and coordinated action to bring a new and dangerous disease under control. Similarly, the new International Health Regulations (2005)[177] (which were actually implemented early by some countries in response to H5N1) were seen by many as a break-through in global understanding, cooperation, and cross border disease control. Yet, despite signing up to IHR 2005, Indonesia has thrown this optimistic new world order in doubt. Few would disagree that the system did not need revising to give poor and middle-income countries more say, and better access to affordable medicine. Similarly, few would disagree that Supari's actions are reprehensible if motivated purely by personal political ambition, and it is easy to see unfashionable nationalistic narratives in the debate as well as more fashionable pro-South ones. More worryingly, it also appears that religious disjuncture is being exploited. But Supari has seen first-hand the move away from a paternalistic conception of power in her own country to a noisy sort of anarcho-democracy, and she is doing little more than reproducing this shift on the world's stage. Yet again the rational, technical and universalist solutions of the 21st century global community come unstuck in the Indonesian political, economic, social and cultural context. The consequences for the health of the world, and more importantly for Supari, the consequences for the health of the Indonesian people, are not yet known.

CONCLUSION

> "Unless we are all prepared, no one is prepared."

[173] Interview, Jakarta 14 August 2008
[174] Interview, Jakarta 11 August 2008
[175] Interview, Jakarta 15 August 2008
[176] Interview, Jakarta 22 August 2008
[177] See: http://www.wpro.who.int/NR/rdonlyres/61AE8DBE-4C7E-43F8-867E-B21C355301F2/0/IHR_booklet.pdf for an outline of IHR 2005, and Fidler and Gostin (2006) for an analysis accessed 10 November 2008.

The globally driven response to highly pathogenic avian influenza (H5N1) has seen some tremendous successes. Between 2006 and 2008, the number of countries reporting H5N1 reduced from 53 to 19, and in 2008, just eight countries were responsible for 90% of outbreaks[178]. Before 2003, HPAI was rare, with only 20 outbreaks reported between 1959 and 2003 (caused by H5N1 and other subtypes of the virus)[179]. Since then there have been an uncountable number of outbreaks, and roughly 2.5bn of the estimated 18bn poultry birds in the world have been killed by the disease, or culled to prevent its spread[180]. As yet, H5N1 has not mutated, or reassorted, into a form that transmits between humans, but other subtypes of the virus caused at least two of the last century's three major influenza pandemics. The 1968-69 event resulted in over 700,000 deaths (WHO 2005), and in 2005 the World Bank estimated that an influenza pandemic would cost the world economy around US$800 billion (World Bank 2005).

Between 1940 and 2004, 335 new infectious diseases emerged globally, over half of which (60.3%) were zoonoses – diseases resulting from pathogens transmitted from animals to humans (Jones et al 2008:990). Such zoonotic Emerging Infectious Diseases (EIDs) include Marburg and Ebola hemorrhagic fevers, Nipah virus encephalitis, Lassa fever, SARS, and HIV/AIDS. Glinski and Kostro (2005) suggest that 75% of future epidemics will result from zoonoses. In these circumstances, HPAI is not only "one of the most devastating animal diseases in the world"[181], but also an invaluable example of one of the greatest threats facing humankind. This has resulted in an unprecedented gathering of global forces around the 'One World One Health' concept[182], focusing on the animal-human-ecosystems interface. Jones et al (2008) suggest that EID origins are significantly correlated with socio-economic as well environmental and ecological factors. Disease ecology is entwined with social, environmental and technological change, which is occurring at an increasing rate, particularly in developing countries, where a growing population lives in increasingly densely inhabited areas in conditions that have major consequences for trans-species virus transfers (cf. Bloom et al 2007). South East Asia, in particular, has been identified as a major 'hot zone' due to the massive growth in pig, fowl and other domestic animal populations in the last 25 years.

Indonesia, particularly western Java and the area around the capital, Jakarta, offers a prime example of these conditions. The free-ranging ducks and paddy (rice) fields that have been implicated in studies of HPAI in other South East Asian countries (cf. Gilbert et al 2008) are also present. Many factors – size, geography, ecology, politics, and socio-economics – conspire against the control of HPAI in Indonesia, but a remarkably dense population living closely with a remarkable number of poultry, and other birds, makes the response a severe challenge, and despite a greater effort than anywhere in the world, greater funding, and some valuable local successes, the disease is still widespread. The opportunity presents to build on the H5N1 response to encompass other diseases at the human-animal interface. In Indonesia there is little scope for the 'fatigue' reported elsewhere[183].

At the Sixth International Ministerial Conference on Avian and Pandemic Influenza, held in Sharm el-Sheikh, Egypt, 25-26 October 2008, a high level review, prefaced by the observation quoted at the beginning of this section, identified seven factors as crucial to success in responding to the

[178] Kent Hill, Assistant Administrator for the Bureau for Global Health, USAID, Presentation at Sixth International Ministerial Conference on Avian and Pandemic Influenza, Sharm el-Sheikh, 26 October 2008
[179] See http://www.medicalnewstoday.com/articles/6306.php accessed 14 March 2008
[180] Charles Lambert, Deputy Under Secretary, USDA, Presentation at Sixth International Ministerial Conference on Avian and Pandemic Influenza, Sharm el-Sheikh, 26 October 2008
[181] Ilaria Capua, Head of Virology Department, Istituto Zooprofilattico Sperimentale delle Venezie, Presentation at Sixth International Ministerial Conference on Avian and Pandemic Influenza, Sharm el-Sheikh, 26 October 2008
[182] See http://www.oneworldonehealth.org/ for the origins of this concept. Also http://www.oie.int/downld/AVIAN%20INFLUENZA/OWOH/OWOH_14Oct08.pdf and http://www.onehealthinitiative.com as examples of the collaboration it has inspired. All accessed 12 December 2008
[183] Interviews, Sharm el-Sheikh 25 October 2008

disease[184]. The first was high level political commitment. The second was the ability to scale up in key sectors, with improved management of veterinary and medical services, and transparent sharing of information, given as the third. The fourth was clear incentives to encourage reporting, with effective compensation schemes, and the fifth, effective strategic alliances of civil society, the private sector, and all levels of government. The sixth identified research, product development and technology transfer, and the seventh, collective government support for mass communications on HPAI and healthy behaviour.

This paper has indicated that Indonesia is challenged in all these areas, except some aspects of the last. Despite the attention of some determined and dedicated individuals, the national government is not committed to eradicating the disease, nor are there significant demands for this to happen from the population, or the poultry industry. Many other pressing priorities exist for all groups, and the situation is complicated greatly by an ongoing process of finely grained decentralization, and a weak regulatory environment. Scaling up and improving the management of veterinary and medical services in Indonesia will be the work of decades rather than years, given the low levels currently existing, as the challenges of disbursing funds into them have shown[185]. Incentives to encourage reporting are at best patchy given the confusion and inconsistent regimes of compensation attached to culling infected birds, and the stigma and unwelcome attention of owning them. The high levels of disease reported from Indonesia are due entirely to Ministry of Agriculture teams actively searching for it. Regarding transparent sharing of information, research, product development and technology transfer, again Indonesia starts from a low baseline[186] and political wrangling emanating from the Ministry of Health has made even dialogue designed to move these elements in the right direction difficult. Finally, effective strategic alliances of civil society, the private sector, and all levels of government suffer from the wider conceptual challenges given below, as do nearly all other aspects of the response.

Three main conceptual factors underlie the relative failure of Indonesia to address HPAI effectively. The first is the lack, or emergent form, of a modern Weberian bureaucracy, coupled with the assumption by many in the international agencies leading the H5N1 response – mainly based in Rome, Geneva, Paris and Washington – that such does, can, or should exist. According to Rosen (1993:215) cited in Wald (2008:17) epidemics indicate the need for regulation with "terrifying urgency" and set in motion "the administrative machinery for disease prevention, sanitary supervision, and, in general, protection of community health". Europe has lived with the idea of the 'medical police' (*Medizinischpolizei*) for 250 years, and has partially been formed by it, but such a concept really only arrived in Indonesia with the HPAI response. Paul Farmer (1996:261) quotes David Satcher (1995:3), then director of the US Centers for Disease Control and Prevention (CDC): "the health of the individual is best ensured by maintaining or improving the health of the entire community," but goes on to ask: 'what constitutes the entire community?' In Indonesia's dynamic young democracy, the answer is far from clear, and the rational, legalistic, bureaucratic response based on surveillance, intervention and control runs into difficulty. In actor network terms, the situation is characterised by a very large number of actors, sharing few commonalities, which are only now beginning to coalesce into the sort of networks that might yield coherent action. A simplified actor network diagram is presented in Appendix E.

The second, and related, factor underlying the challenges in Indonesia, is a mismatch between the clear moral right, and imperatives, that the international community associates with acting in pursuit of a (global) public good, and again, the lack, or emergent form, of such a concept in Indonesia. Inside

[184] David Nabarro, UNSIC, Presentation at Sixth International Ministerial Conference on Avian and Pandemic Influenza, Sharm el-Sheikh, 25 October 2008

[185] Interviews, Washington 11 June 2008, Jakarta 28 August 2008, Sharm el-Sheik 27 October 2008

[186] An informal analysis of PubMed's (www.ncbi.nlm.nih.gov/pubmed/) 18 million citations ranks Indonesia's academic output as the lowest in the region with a score of 1.8 compared with Vietnam at 5.4, Malaysia at 11.8 and Thailand at 14.7.

this vast, diverse and rapidly developing country, clannish, regional, and socially stratified conceptions of common goods exist, but the idea that there is a good of benefit to every Indonesian finds little traction. This is reflected in Indonesia's international interactions, where there is an undeveloped understanding that the people of Indonesia share commonalities with those of the rest of the world, especially those in industrialized countries, and an overdeveloped understanding that there is political capital to be gained by suggesting they don't. Indonesia's young and ex-colonial national identity is so challenged by internal diversity – ethnic, cultural and socio-economic – that it has little option but to lean heavily on the idea of 'otherness'.

The third, and most pertinent, conceptual factor relates to a wider domain than H5N1 in Indonesia. Put simply, scientific experts cannot just prescribe and expect obedience. This increasingly difficult relationship between science and society (cf. Jasanoff 1990 and 2004, Renn 1992, Stirling 1999, Van Zwanenberg and Millstone 2005) can be seen in attitudes to nuclear power, genetically modified organisms, nanotechnology and even global climate change. The H5N1 virus is a construction of science, and science, particularly bio-medicine, an emerging mesh of power relations linking health, industry, institutionalism and governance, has constructed the threat, designed the response, and defined its own terms of success and failure. Faced with such a consistent and clearly constructed threat – an invisible virus – the global response can only present as a consistent, unified discourse, a paradigm of centrally planned and enacted intervention. Yet science's truths are not universal. Its boundaries and competencies are drawn differently by different people, whose voices and alternative approaches may be obscured by the prominence and power of science. Context, as well as trust in the individuals and institutions making prescriptions, therefore matters, and Indonesia's context, as has been shown, is diverse, complex, and as yet unsympathetic to modernist models of authority and rationality. The narratives – the storylines – of the international organizations do not fit naturally, or necessarily, with those that exist or are emerging nationally, and to ignore this – as well as to assume a rational technocracy – risks generating uncertainty and unexpected outcomes.

Furthermore, if scientific knowledge is created by people and institutions with particular situated and partial perspectives, it will ask partial questions responding to partial interests (Fairhead and Leach 2003). Given that scientists frame policy issues by defining what evidence is significant and available, and policy-makers frame scientific enquiry by defining what is relevant, unhelpful self-sustaining routines of co-production can emerge, which are shaped by political and economic forces (cf. Jasanoff and Wynne 1998). Interests therefore align in a particular historical-cultural context, which can be called the political economy. Given Indonesia's diversity, complexity, history and current position in geo-politics, it is in this realm that new ways to engage civil society, create effective public-private partnerships, and generate genuine trust must be found.

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APPENDIX A: INTERVIEWEES AND RESPONDENTS, JAKARTA, BOGOR AND MAJALENGKA, 11 TO 28 AUGUST 2008

Serani Abeyesekera, FAO
Ronello Abila, OIE
Robyn Alders, FAO
D.A.K. Arifin, Majalengka
Warief Djajanto Basorie, LPDS
Edi Basuno, ICASEPS, Ministry of Agriculture
Glenn Bruce, Jakarta
Piers Cazalet, British Embassy
Ivo Claassen, Indonesian-Dutch HPAI Partnership
Suzanna Dayne, UNICEF
Lynleigh Evans, AusAID
Jonathan Gilman, FAO
Heru Hendratmoko, Alliance of Independent Journalists
Lisa Kramer, USAID
Bayu Krisnamurthi, KOMNAS FBPI
Stacie Lawson, FAO
Steve Leenhouts, FAO
Ignacio Leon-Garcia, OCHA
Jeffrey Mariner, ILRI
James McGrane, FAO
François Meslin, WHO
Soedjasmiran Prodjodihardjo, FAO
Iqbal Rafani, ICASEPS, Ministry of Agriculture
Gina Samaan, WHO
Heru Setijanto, KOMNAS FBPI/Bogor Institute for Agriculture
Elly Sawitri Siregar, HPAI Campaign Management Unit, Ministry of Agriculture
Jeffrey Straka, CBAIC
Graham Tallis, WHO
Ron Thornton, FAO
Elisa Wagner, US Foreign Agriculture Service
Emma Watkins, FAO
P. Bimo Wicaksana, USDA
Iwan Willyanto FAO
Mary Young, FAO
Irsyad Zamjani CENAS (Centre of Asian Studies)

and three people who did not wish to be named.

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APPENDIX B: COMPARATIVE DATA FOR INDONESIA

National facts and figures	Total population	225,630,000 (2007, WDI - http://siteresources.worldbank.org/DATASTATISTICS/Resources/POP.pdf)
	Total land area (km^2)	1,905,000 (2005, WDI - http://siteresources.worldbank.org/DATASTATISTICS/Resources/table1_1.pdf)
	First H5N1 outbreak	August 2003, Pekalongan, Central Java (Ministry of Agriculture quoted in Jakarta Post 26/1/04). Outbreaks ongoing at December 2008.
	First human death, numbers to date	First confirmed death - 12/07/2005, 113 deaths to 12/12/2008 (WHO - http://www.who.int/csr/don/2008_12_09/en/index.html)
	Numbers of poultry Note: difference sources give different estimates.	1. The overall broiler population in 2007 is estimated at 889 million birds. Out of the total poultry population, 69% are estimated to be broilers, 21% native chicken, and 7% layers. (USDA Indonesia Poultry And Products Poultry Annual 2007 quoted at http://www.thepoultrysite.com/articles/901/indonesia-poultry-and-products-poultry-annual-2007) 2. The poultry population in Indonesia comprises: broilers: 919.7 million, indigenous poultry: 87.3 million, layers: 85.1 million, ducks: 48.1 million (FAO EMPRES Transboundary Animal Diseases Bulletin 25) 3. According to livestock statistics from 2007, Indonesia has an estimated standing population of 317 million native/village poultry, 106 million layers, 175 million broilers and around 35 million ducks. Thus, more than 620 million chicken and ducks are estimated to be the standing population of the country. (Sumiarto and Arifin 2008:9).
	Poultry export value	None (http://www.fao.org/docrep/010/ah876e/ah876e14.htm)
	Structure of industry (FAO Sectors 1-4)	Sector 1: 9.7m: Sector 2: 58.2m: Sector 3: 32.39m: Sector 4: 175m; Total 275.29m (Rushton et al 2005:5 citing data from CASERED 2004)
	National GDP	US$432,817,000 (current) (2007, WDI - http://siteresources.worldbank.org/DATASTATISTICS/Resources/GDP.pdf)
	Agriculture as % of GDP (poultry industry as % of agric GDP)	The agriculture sector contributes 14% to the country's GDP and employs nearly 40% of the active population (January 2008, FITA - http://www.fita.org/countries/indonesia.html). The contribution of the livestock sector to agricultural GDP in 2006 was 12.75% (Sumiarto and Arifin 2008:6). No data is available on the poultry industry within the livestock sector.

	Aid dependency (% GDP)	In 2005, Indonesia received US$2,524,000 net official development assistance. This compares with US$1,654,000 in 2000. The 2005 figure represents 0.9% of Gross National Income, or US$11 per capita. (WDI - http://siteresources.worldbank.org/DATASTATISTICS/Resources/table6_11.pdf)
Risk, uncertainty, perceptions	Major hazards/disasters since 2004	2004: February - earthquake in Papua; October - car bomb in Jakarta; December - Indian Ocean tsunami. 2005: March - earthquake off Sumatra; October - passenger aircraft crash in Medan; October - suicide bombings on Bali. 2006: April - mudflow in East Java; May - earthquake near Yogyakarta in central Java; July - earthquake off Java; December - ferry sinks in Java Sea. 2007: January - passenger aircraft crash off Sulawesi; February - floods in Jakarta.
	Framing of risk/uncertainty in policy	Indonesia suffers regular natural and man-made disasters. Avian influenza is seen as one of several lethal poultry diseases which hit poor small-holders particularly. The threat to humans is only one of a number challenges to the health system.
	Social constructions of risk and uncertainty by public	Indonesia is a numinous society. There is very little understanding of the idea of a human influenza pandemic. Poultry consumption falls temporarily, and behaviour changes temporarily, following reports of avian influenza outbreaks, or human deaths. Dengue is widely perceived as more dangerous.
	Media coverage of avian influenza	Avian influenza is widely reported in the press on television news. There have also been extensive public service announcements relating to avian influenza on television.
Politics, governance and political culture	Styles of decision-making in bureaucracy	Indonesia's system of government is both presidential and parliamentary in style, and displays strong tendencies towards political compromise. Since 2001 the country has seen far-reaching decentralization. Despite some bright spots, the civil service is broadly seen as inefficient and ineffective.
	Patronage politics and influence on policy	Efforts are being made to counter the 'corruption, cronyism and nepotism' of the past, but some commentators suggest a high degree of continuity exists between the new democratic politics and those of the authoritarian past.
	Form of democracy – role of civil society	Parliamentary democracy with a directly elected president, and significant regional autonomy. Protests and demonstrations by civil society are frequent and widespread.
	State structure – level of decentralization	Indonesia is a republic which has seen significant decentralization since 2001. Now 456 autonomous local governments are responsible for major sectors such as education, health, culture, public works and the environment, as well as raising revenue.
	Regulatory cultures/styles	Historically authoritarian and top-down. Now highly decentralized.

HPAI response	Major donors/international agencies involved in avian influenza (rank?)	Major donors include: USAID, World Bank, AusAID (also the governments of Germany, Japan and the Netherlands). International implementing agencies include UN FAO, UN WHO, UNOCHA and UNICEF. Bilateral support includes that from US Department of Agriculture Foreign Agricultural Service.
	NGOs, civil society groups involved	The Indonesian Red Cross (International Federation of Red Cross and Red Crescent Societies) and Muhammadiyah (a faith-based organization) are significantly involved. Many other national and international NGOs – such as Save the Children, CARE, Vision International - are, or have been, involved in smaller projects.
	Key interventions for HPAI control and response	The January 2006 National Strategic Plan for Avian Influenza Control and Pandemic Preparedness outlines ten strategies based on principles advocated by the FAO, the WHO and the World Organization for Animal Health (OIE): 1. Control in animals; 2. Management of human cases; 3. Protection of high-risk groups; 4. Epidemiological surveillance for animals and humans; 5. Restructuring the poultry industry; 6. Risk communication, information and public awareness; 7. Strengthening relevant laws; 8. Capacity building; 9. Action research; 10. Monitoring and evaluation. In August 2006 a decision was made to prioritize strategies 1., 4. and 6. as they were considered to impact more rapidly on the spread of the virus and thereby reduce the number of human cases.
	Areas of government responsible – coordination	Departemen Pertanian (Deptan), the Ministry of Agriculture (MoA) and Departemen Kesehatan (Depkes), the Ministry of Health (MoH) are primarily involved, with national co-ordination provided by the Komiti Nasional Pengendalian Flu Burung dan Kesiapsiagaan Menghadapi Pendemi Influenza (KOMNAS FBPI), the National Committee for Avian Influenza Control and Pandemic Influenza Preparedness. This is a ministerial-level committee, headed by the Coordinating Minister for People's Welfare, which has 14 members, including the Agriculture, Health, Forestry, National Planning (Bappenas) and Industry ministers, the Economics co-ordinating minister, the army commander, the police chief, and the chairman of the Indonesian Red Cross.
	Vaccine/drug manufacturing capacity	No human vaccine, or anti-viral drug, production capacity. PT. Medion in Bandung has significant poultry vaccine production capacity, and PT. Vaksindo, and PT. IPB Shigeta Animal Pharmaceuticals, a collaboration between Bogor Agricultural University (IPB) and SHIGETA Animal Pharmaceuticals Inc. Japan, have smaller capacities.

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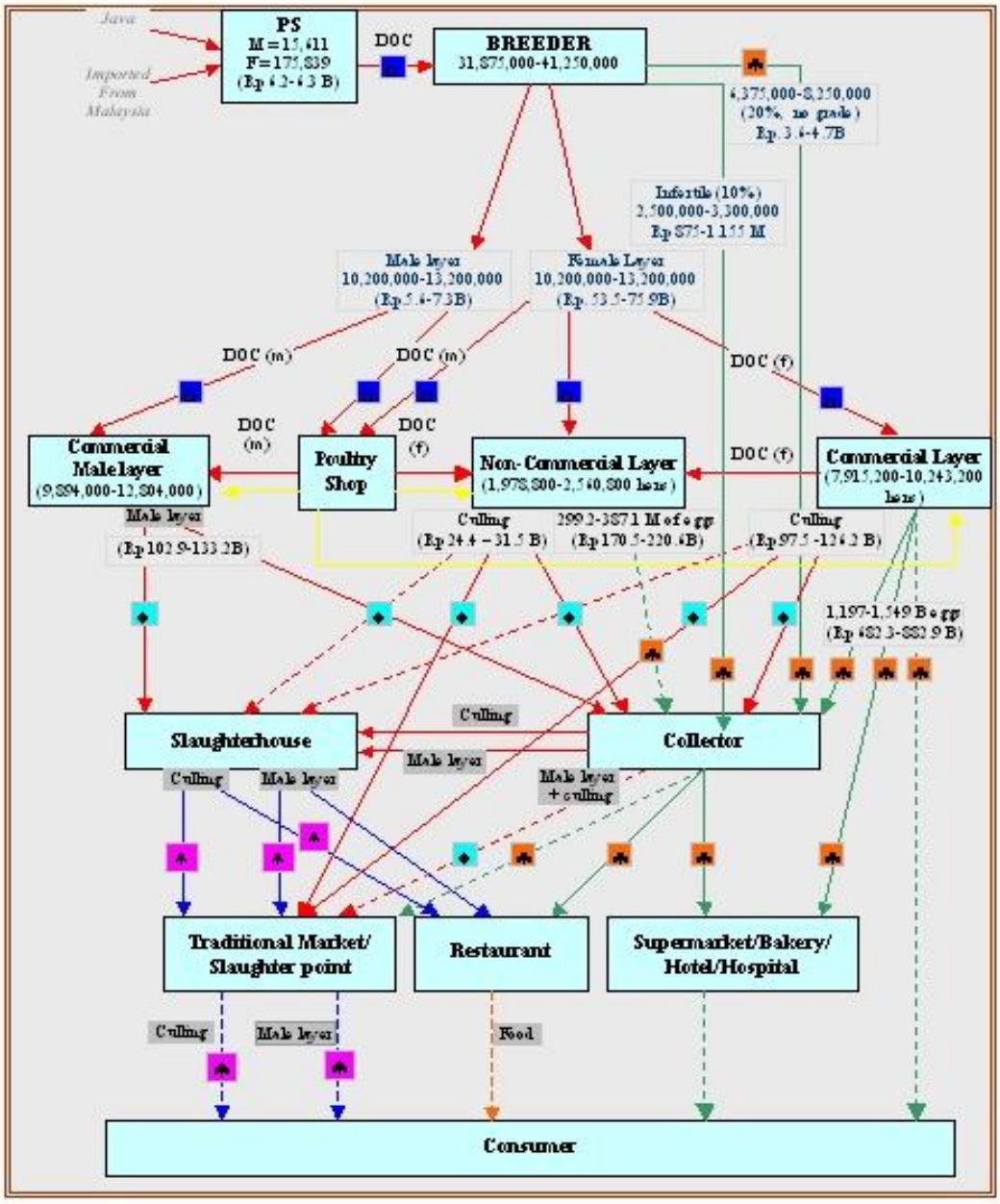
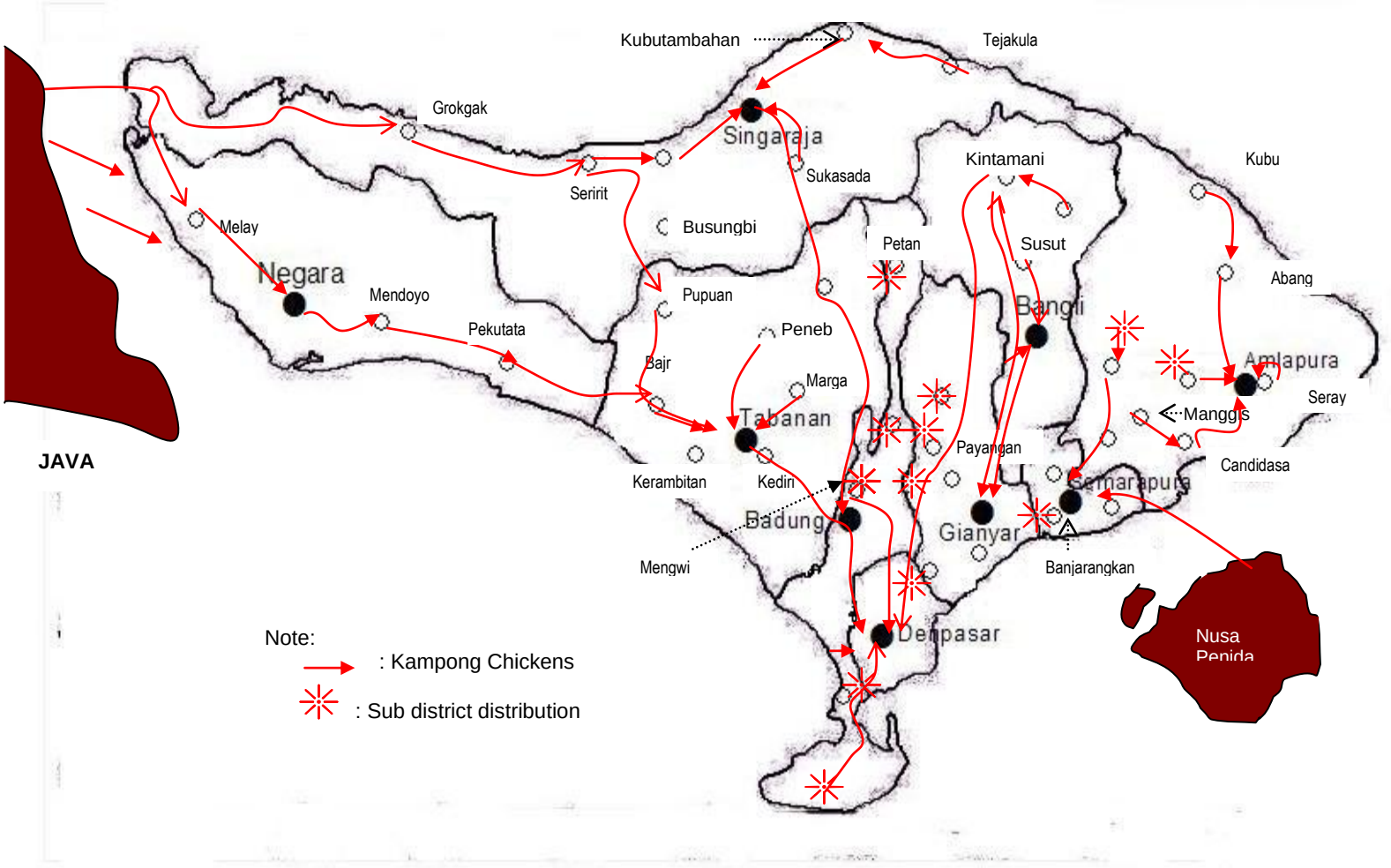
APPENDIX C: LAYER MARKET CHAIN IN NORTH SUMATRA.



Source: 'Poultry Market Chain Study in North Sumatra' by Albiner Siagian, Philipus Sembiring, Zulfikar Siregar, Ma'ruf Tafsin, Nevy Diana Hanafi, Rasmaliah, Dwi Suryanto, and Rosdanelli Hasibuan (OSRO/INT/501/NET). FAO (undated) Page 16

APPENDIX D: ROAD MAP OF KAMPONG CHICKENS IN BALI

Road map of kampong chickens in Bali. Source: 'Poultry Market Chain Study in Bali' by Made Mastika (OSRO/RAS/602/JPN) FAO (undated) Figure 4



APPENDIX E: ACTOR NETWORK DIAGRAM