

Chapter 2

Globalized Perspectives on Infectious Disease Management and Trade in Africa: A Conceptual Framework for Assessing Risk in Developing Country Settings

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Abstract In the era of globalization, internationalized representations of infectious disease threats have profound implications for understandings of infectious disease problems and their management in developing countries, particularly in Sub-Saharan Africa. By examining the policy implications of the key narratives around public health, animal health and trade, it becomes possible to clarify the relationship between global understandings of infectious disease risk and their impact on the development of local responses to disease problems. We highlight the tensions that resource-constrained countries face in the nexus of animal health-public health and trade, including the perception that resource-constrained countries are both source and victims of potential infectious disease threats. Given this scenario, it is important to think about how developing countries, particularly those in Sub-Saharan Africa, can approach infectious disease risk management as it relates to pandemic scale threats such as avian and pandemic influenza. We outline some of the key considerations in defining and assessing disease risk using avian and pandemic influenza in Zambia as an example. We conclude that the key to the feasibility of the analysis of the risk of multi-sectoral affecting emerging infectious diseases such as zoonotic avian influenza is flexibility in how risk is framed across the public health, animal health and trade systems.

2.1 Introduction

In the era of globalization, internationalized representations of infectious disease threats have profound implications for understandings of infectious disease problems and their management in developing countries, particularly in Sub-Saharan

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Africa. By examining the policy implications of the key narratives around public health, animal health and trade, it becomes possible to clarify the relationship between global understandings of infectious disease risk and their impact on the development of local responses to disease problems. We highlight the tensions that resource-constrained countries face in the nexus of animal health-public health and trade, including the perception that resource-constrained countries are both source and victims of potential infectious disease threats. Given this scenario, it is important to think about how developing countries, particularly those in Sub-Saharan Africa, can approach infectious disease risk management as it relates to pandemic scale threats such as avian and pandemic influenza. We outline some of the key considerations in defining and assessing disease risk using avian and pandemic influenza in Zambia as an example. We conclude that the key to the feasibility of the analysis of the risk of multi-sectoral affecting emerging infectious diseases such as zoonotic avian influenza is flexibility in how risk is framed across the public health, animal health and trade systems.

2.2 Trade, Agriculture and Health

2.2.1 *Setting the Stage*

It has been known for quite some time now that there are very few human-specific pathogens.¹ Much of the current disease profile in humans owes to either the domestication of animal species or their use during our evolution from hunter-gatherer to agriculturally oriented societies. The human-animal interface is the nexus that permits the cross-species transmission of infectious agents and is represented by a continuum of contacts between humans and animals, either directly or indirectly through their products and their shared environments.² ‘The human-animal interface’³ is thus a term that encompasses the wider socio-economic and biological influences of disease transmission and spread, elements which are fundamental to the examination of human-animal infectious disease management. It is the human-animal interface that has arbitrated the transmission of zoonotic diseases and the introduction of novel pathogens into new geographical areas and novel host species. However, while its role in disease transmission is not new, because of globalization, its current ecological dimensions are of a completely different order of magnitude.⁴ In essence, modern industrialized society is an

¹Lloyd-Smith et al. (2009).

²Reperant et al. (2013).

³Greger (2007).

⁴Reperant et al. (2013).

important source of the expanded ecological pressure at the human-animal interface. The human-animal interface therefore provides an important conceptual framework for the examination of the public and animal health risks of animal-sourced epidemics, and through health policy, their relationship with risk enabling anthropogenic activities. These risk enabling activities include changes in land use, livestock production, chosen routes for economic growth and trade promotion; activities that both foster and enhance zoonosis transmission.⁵

2.2.2 Globalization and the Relationship Between Trade and Health: The Microbial Perfect Storm

Globalization plays a central role in shaping the debate around trade and health. This is because it is a comprehensive, multi-faceted phenomenon that is rapidly transforming society.⁶ There are different, but important, understandings of what the term globalization means. Lee, Fustukian, and Buse,⁷ describe globalization in terms of its spatial, cognitive and temporal dimensions, useful propositions for disaggregating the important aspects of policy that impact on the management of infectious disease risk. However, the key driver of globalization remains the internationalization of commerce; to which, it has been argued, health usually takes a backseat.⁸

According to a National Academies of Science report,⁹ the globalization phenomenon has had a snowball effect with regard to infectious disease emergence. It has helped to create the microbial equivalent of 'a perfect storm'. Mann,¹⁰ states this microbial perfect storm will not subside, but will be a recurring event. Changes in land use, livestock production, chosen routes for economic growth and promotion of commerce, climate change etc. are some of the elements that go into the 'perfect microbial storm'. Under livestock intensification, for example, the larger collections of animals provide optimal incubating conditions for the expansion of emerging zoonotic diseases.¹¹ Globalization is therefore a conduit for infectious disease spread; mainly because of the increased industry, cultural, and microorganism interconnectedness it fosters.¹²

⁵Kimball (2006), Greger (2007).

⁶Huynen et al. (2005).

⁷Lee et al. (2002).

⁸Navarro (1998).

⁹*ibid.*

¹⁰Mann (1990).

¹¹Brown (2004).

¹²*Ibid.*

Recent examples of global infectious disease spread, such as Severe Acute Respiratory Syndrome (SARS) and pandemic avian influenza, have negatively impacted on both public health and economies. Such threats have led to a shift to develop policies to respond to these risks, at national, regional and international levels. But because the dynamics, and therefore the risks, of disease emergence differ from location to location, equally important is the integration, within these policy frameworks, of approaches to assessing both the risk's 'local' likelihood and 'impact' to ensure, to the extent possible, the appropriateness of policy responses.¹³ This is a challenge, for both developing and developed countries, given the myriad interests that contribute to this 'perfect microbial storm.' It is reasonable to assume, however, that the risk of infectious diseases, and in particular, pandemic scale infectious disease emergence, is unlikely to abate, and as a result, the public health and animal health communities have to think of emerging infectious diseases, their control and the assessment of their risk of occurrence in completely novel ways.

2.2.3 Villain, Accomplice or Innocent Bystander: Trade and Disease Emergence and Spread

Trade and its effects on public health, through disease spread, is a matter of both historical and contemporary policy significance. Historically, disease has spread through traded products and carriage vehicles such as ships, which served as means of introduction of infectious agents into new geographic areas.¹⁴ The link between international trade and the spread of infectious diseases has therefore been recognized for centuries, for example the fourteenth century spread of the 'Black Death' along known international trading routes.¹⁵ It was this recognition that resulted in the International Sanitary Conferences, the first of which was held in France in 1851.¹⁶ At several points in history, trade has been restricted to protect health, with the primary motivation being to minimize interference in trade from health.¹⁷ In recent times, economic interests have taken precedence over health concerns.¹⁸

¹³Mwalimba (2012).

¹⁴Cowen and Morales (2002).

¹⁵Bettcher et al. (2000).

¹⁶*Ibid.*, Aginam (2002), Hoffman (2010).

¹⁷Lee and Koivusalo (2005).

¹⁸Lang (1999).

Similar arguments have been made concerning global health policy,¹⁹ access to medicines,²⁰ food safety²¹ and infectious disease spread.²²

Considering the role that trade policy plays in disease spread and control is relevant. Key here is the view of public health proponents that health concerns most of the time plays second fiddle to the interests of global commerce. For instance, Lipson's²³ review of the World Trade Organization's (WTO) health agenda and the study by Shaffer et al.²⁴ on ethics in public health research both suggest that trade agreements in particular shape national policies on such issues as food safety and health, restricting the capacity of state agencies to regulate these areas. Within this literature are examples that speak to the increasing interconnectedness of infectious disease spread through trade, an anthropogenic activity. They also highlight the importance of the human-animal disease interface.

Admittedly, tensions between trade promotion and health protection have existed in the past, but these tensions are increasing because of globalization.²⁵ Examples of the international transmission of diseases associated with commerce include the case of Monkeypox in the US in 2003, related to the trade of prairie dogs that had acquired the infection from the African rodents they had been housed with. This led to 71 human cases in six American states.²⁶ For SARS, bat trade was proposed to be one way in which contact with susceptible amplifying hosts was made at some point in the wildlife supply chain, leading to subsequent market-related human and animal interaction and infection.²⁷ Live animal markets in Southeast Asia have been implicated in the spread of emerging diseases such as avian influenza, with subsequent human exposure.²⁸ Even for countries in Africa, African Swine Fever, an animal health problem of trans-boundary animal disease significance, spread rapidly along the Atlantic coast in the dynamic coastal trading networks of West Africa during the late 1990s.²⁹

Looking at the trade and health problem from a slightly different perspective, perhaps it is not a simple case of one set of concerns taking pre-eminence over another. The global health governance boundaries are actually being reshaped through the "legally binding" and "soft-law" provisos negotiated and adopted within the respective mandates of multilateral institutions such as the World Health Organization (WHO), the WTO, Food and Agricultural Organization (FAO) and

¹⁹Lee et al. (2002).

²⁰Kerry and Lee (2007).

²¹Rowell (2003).

²²Kimball (2006).

²³Lipson (2001).

²⁴Shaffer et al. (2005).

²⁵Lee and Koivusalo (2005).

²⁶Morse (2004), Kahn (2006).

²⁷Fevre et al. (2006).

²⁸Cowen and Morales (2002), Morse (2004), Karesh et al. (2005).

²⁹ALive (2006).

OIE (World Organization for Animal Health).³⁰ These include international health guidelines, trade agreements and approaches to disease control, all grounded in 'international standards'.

In an attempt to clarify the trade-health relationship and foster greater coherence between the international health and trade communities, a joint WHO/WTO study examining the links between trade and health was published in 2002.³¹ This effort did very little to alleviate the concerns of the public health camp and has been described as disappointing by some analysts.³² However, with the revision of the International Health Regulations (IHRs) in 2005, an important milestone for global public health was reached, enabling the global public health community to attempt to address the more contemporary problems presented by infectious disease threats. Health proponents argue that health compromises continue to be made. Meirianos and Peires,³³ for example, maintain that the revised IHRs made trade-offs between national sovereignty and global health by attempting to guard against global disease spread with minimum interference to trade and travel. So the global health and global trade communities again find themselves at a cross-road insofar as infectious disease control is concerned.

Agriculture, of which animal health is a component, has been pulled into the foray as one of the many interfaces between trade and public health. Perhaps to nudge the animal health camp in particular to align more closely to public health propositions, it has been suggested that the OIE regulations, the animal health counterpart to the IHRs, require a similar revision to better align them with the present-day threats presented by trans-boundary diseases.³⁴ No attempt has been made to overhaul the OIE regulations, but the international animal health community appears to be moving closer to health by adopting a global perspective on the control of zoonoses.³⁵ Simultaneously, the international animal health community has taken an active pro-trade stance in their address of issues surrounding trade and health protection. The OIE has been setting international animal health standards for purposes of facilitating safe trade in livestock and livestock products of trade under the Sanitary and Phytosanitary (SPS) Agreement of the WTO in its Terrestrial Animal Health Code.³⁶ Thus countries that are involved in livestock and livestock product trade are expected to comply with the SPS Agreement in order to reap the full benefits of international commerce.³⁷ Pushing a free trade agenda,

³⁰Aginam (2002).

³¹WHO/WTO (2002).

³²Howse (2004).

³³Merianos and Peiris (2005).

³⁴*Ibid.*

³⁵Blancou et al. (2005).

³⁶Bruckner (2009); OIE Terrestrial Animal Health Code 2010, available at http://web.oie.int/eng/normes/mcode/en_index.htm.

³⁷Thiermann (2005).

Zepeda et al.³⁸ uphold (the SPS regulation) that public health measures to ensure food safety and to control plant or animal diseases should be based, as far as is appropriate, on international standards, presumably freeing them from having to justify their animal health policies through analyses of 'risk'. The SPS Agreement espouses the view that measures to protect public health, animal health and plant health should only minimally interfere with trade. It is this 'clause', similarly adopted under the revised IHRs, that has been found to be problematic at national level.³⁹ Pragmatically, this also demonstrates both the increasing interaction of different areas of international policy in fostering of commercial interests within international health and agriculture.

Similarly a shift in approaches to infectious disease control has occurred, with the entry of internationally important infectious diseases such as SARS and pandemic avian influenza into the world policy arena; that of moving from nation-focused to global-focused control mechanisms.⁴⁰ While the merits of a global approach to infectious disease control cannot be disputed, in this shift is an assumed universal acceptance of what infectious diseases should be prioritized on both global and national agendas, the 'risk' they present and how they should be controlled. It is important to understand how developing countries go about responding to these 'global' imperatives, given their unique circumstances. The importance of such research is made especially relevant with the issue of zoonotic risk management.

2.3 The Development Agenda

Global and regional trade present the prospect of involving previously excluded nations in world commerce, thus enabling them to supply more prosperous markets and support and strengthen their economies. This prospect appeals to decision-makers in developing countries, because it promises the positive benefits of trade liberalization such as economic growth and poverty reduction.⁴¹ It has been argued, however, that a liberalized approach to trade, presents novel challenges to public health protection in general and disease prevention and control in particular. Few authors, except as an adjunct, have attempted to include animal health in this discourse, or highlight the combined impacts key policy debates have on development in resource-constrained countries. It is thus clear that an in-depth examination of the public health-animal health-trade nexus as it concerns infectious disease governance in resource-constrained countries is needed to better illuminate important complexities surrounding the development agenda. It is

³⁸Zepeda et al. (2005).

³⁹Merianos and Peiris (2005).

⁴⁰Fidler (2004a), Lee and Fidler (2007).

⁴¹Wilkinson and Pickett (2006).

also an important step in highlighting the myriad commonalities and polarities between the developmental needs of the global South and the demands of the global North.

2.3.1 From Global to Local: Developing Countries and Trans-Boundary Infectious Diseases

Trans-boundary animal diseases and their unlikely eradication in the foreseeable future pose a significant problem for developing countries. They almost automatically exclude them from involvement in global trade under WTO regulations.⁴² International standards have been used to restrict the direction of trade, on health grounds, from resource-enabled to resource-constrained countries. For instance, Rweyemamu and Astudillo,⁴³ state that the global distribution of Foot and Mouth Disease (FMD) mirrors the world's economic structure, with industrialized countries generally being free of the disease while developing countries were endemic, which pushes trade in a North–south direction. Furthermore, even with international guidelines and standards provided to facilitate trade, many developing countries have to deal with a range of animal diseases simultaneously; making regulation and technical considerations extremely difficult.⁴⁴

The dominant view is that developing countries pose the greatest risk as sources of infectious diseases.⁴⁵ In fact, the FAO's philosophy is to control these diseases at *this* source.⁴⁶ This perspective also implies that disease control efforts would focus on the 'global impacting' disease problems from this source, but foster particular methods of control that may not be appropriate for different contexts. Adopting such methods can harm local livelihoods or worse, inadvertently encourage further disease spread.⁴⁷ Furthermore, as argued in an analysis of the politics of the securitization⁴⁸ of health, a lip service effect may be created, as policy actors in different contexts are pressured to verbalize an infectious disease threat as a priority, but may not treat it as such.⁴⁹

For the world's poorest states, the confluence of interests surrounding global health and global trade therefore presents unique challenges. Global perspectives on infectious disease control and the policies that result have a significant influence

⁴²Thomson et al. (2004).

⁴³Rweyemamu and Astudillo (2002).

⁴⁴*Ibid*, Upton and Otte (2004).

⁴⁵Hampson (1997), Domenech et al. (2006), Kruk (2008).

⁴⁶Domenech et al. (2006).

⁴⁷Scoones (2010).

⁴⁸Securitization of health is the process through which infectious diseases are viewed as national security threats, particularly with regards to bioterrorism.

⁴⁹Lo Yuk-ping and Thomas (2010).

on development opportunities. Of note is how trade policy such as the SPS Agreements is viewed to exclude developing countries from participating in global trade. More importantly, in these debates, resource-constrained countries are dichotomously perceived as simultaneously needing the most protection and posing the greatest risk. In such contexts, the relationship between public health, animal health and trade is complex and is possibly made more so when issues such as zoonotic risk management and such things as pandemic preparedness are brought into the picture.

2.3.2 *Paradigm Shift: Moving Away from the Grown-Up Table*

Most developing countries have joined the WTO out of concern that they will be excluded from trade opportunities.⁵⁰ Ironically, it appears that by participating in the WTO, less developed countries have been disadvantaged. Therefore, is it cost effective for resource-constrained countries to attempt to meet 'international standards' in trade, or disease control? There are arguments for and against this. Authors like Rweyemamu and Astidullo,⁵¹ for example, have proposed ways in which FMD endemic developing countries could benefit from global trade in livestock and livestock products. On the other hand, others, such as Cumming⁵² (citing Jansen et al.⁵³) explain how, for instance, the Zimbabwean Government investment in the scaling up of veterinary services and abattoirs to meet European Economic Community (EEC) import standards in the 90s resulted in a net loss to the country because the cost of these renovations exceeded beef export revenues.

To counter the disadvantages faced by developing countries under the current multilateral trading system, nation states have formed alliances with similarly positioned nations. These alliances, and to some extent some civic organizations, are increasingly demanding that the interests of developing countries be better represented at the WTO.⁵⁴ Developing countries have also been inward looking, and constituted regional and economic trading blocs, which Roningen and DeRosa⁵⁵ contend, put member countries on the path to free trade and its associated benefits, and, politically, are thought to be easier to negotiate because they do not require consensus at the WTO. A plethora of regional and sub-regional committees has emerged on the African continent, forming a complex network of sometimes overlapping trade regions.

⁵⁰Shaffer et al. (2005).

⁵¹Rweyemamu and Astudillo (2002).

⁵²Cumming (2010a).

⁵³*Ibid.*

⁵⁴Labonte and Sanger (2006).

⁵⁵Roningen and DeRosa (2003).

With this shift to multilateral and regional trade, a growing interest in livestock trade among resource-constrained countries has emerged. An International Livestock Research Institute (ILRI) and the FAO study projected that by 2015, 60 % of meat and 52 % of the world's milk will be produced in developing countries.⁵⁶ This study described a "Livestock Revolution" driven by increasing demands for livestock and livestock products in low-income countries as a result of, among other factors, expanding urban populations. These investigators also projected that by 2020, livestock product trade, particularly trade in meat, milk and eggs, would likely be of increasing importance for resource-constrained countries, both in terms of trade between resource-constrained countries and trade with the rest of the world.

Recent evidence suggests that indeed there has been a general increase in the amount of trade in agricultural produce among resource-constrained countries. According to the World Trade Report⁵⁷ the share of intra-developing country agricultural exports increased from 31 % in 1990 to 43 % in 2002. It also states that 47.6 % of developing country imports originated from other developing countries. Here again, health commentators assert that the shift to bilateral and multi-lateral trade agreements is pushing an economic agenda at the cost of health and, it is argued, developing countries are likely to suffer the most.⁵⁸ But what are the policy implications of the current shift to regional and bilateral trade agreements and intra-continental trade promotion are for understandings of infectious disease threats?

2.3.3 Unpacking Risk: A Conceptual Framework for Assessing Risk in Developing Country Settings

There is some suggestion in the literature that global policy actors assume infectious disease risk is universally understood, and use this as a platform to drive collaboration in policy responses across sectors at international and national levels. Much of the available literature, understandably, does not fully examine the role that public health, animal health and trade play in multi-sectoral risk management and pandemic preparedness at national level, particularly in resource-constrained settings. While broad themes can be drawn from current knowledge, the discourse on global infectious disease governance and its relationship with global trade is still unfolding.

⁵⁶Delgado et al. (1999); Food and Agriculture Organization of the United Nations, Rome; International Livestock Research Institute, Nairobi. Food, Agriculture, and the Environment Discussion Paper 28.

⁵⁷WTO World Trade Report 2004.

⁵⁸Lee and Koivusalo (2005).

A myriad of events are now perceived to be easily amenable to risk assessment, thanks to the development of scientific approaches to, and the universalization of risk language in, the management of physical, chemical and biological threats. However, when threats such as zoonotic diseases are global rather than local, the vagaries of context, institutions and culture play important roles in the construction of such events as risks, elements that are not exogenous to the technical-scientific processes of risk analysis. This empirical section is based on a policy study that examined the avian and pandemic influenza policy process in Zambia over the 2005–2009 period to suggest a pragmatic way of increasing the efficacy of risk analysis methodology in guiding livestock trade decisions and multi-sectoral disease risk management in resource-constrained contexts. Using the World Organization for Animal Health (OIE) risk analysis framework as an illustration, we demonstrate how the cross-cutting and highly contingent nature of today’s infectious disease threats provide learning points for re-conceptualizing the use of risk analysis to inform policy, to better account for the institutional and social phenomena that frame both risk perception and management. While accepting this may be viewed as breaking the conventions of scientific objectivity in the process of risk assessment, we conclude that this approach is necessary for developing economy-friendly multi-sectoral zoonosis risk management strategies in developing countries like Zambia.

2.3.4 Theoretical Framework: Risk as a Confluence of Probabilistic Science and Social Construction

A few key theories stand out with respect to understandings of risk within contemporary global society. For instance, Ulrich Beck⁵⁹ in his seminal book *Risk Society* introduces the theory of reflexive modernization in which the processes of modernity in industrialized societies are posited to be the cause of the emergence of unprecedented and indeterminate risks and hazards, including those presented by infectious diseases. Some of these modernization processes were alluded to earlier, when we discussed the factors that have led to the emergence of infectious diseases. Within this body of work, risk creation, construction and response are intrinsically linked to modernization, and knowledge and science are argued to play a constitutive and sometimes unexamined role in these processes. Beck’s views share commonalities with those of another renown sociologist, Anthony Giddens.⁶⁰ In Giddens’⁶¹ conception of reflexive modernization, the increasing dependence on

⁵⁹Beck (1992).

⁶⁰Giddens (1998), pp. 23–34.

⁶¹see also Lupton (1999).

society's 'experts' to determine what is and how to respond to 'risk' in societies, has brought with it risk's polar opposite, uncertainty. Risk analysis, for instance, is a process of creating scenarios of risk which are based on contingent scientific knowledge and is therefore subject to change. Uncertainty arises when risk cannot be precisely calculated, e.g. when the probability of occurrence of adverse events are unknown or inestimable.⁶² Uncertainty and surprise, in turn, have led to concerns over the validity of purely scientific responses to risk.⁶³

Both Beck and Giddens propose a more reflexive approach to risk in which the underpinnings of scientific assertions are drawn out, their situational implications assessed and alternative knowledge bases co-opted, thus taking the risk assessment process out of the 'problematized' purely scientific sphere into a more discursive treatment of 'risk'. An important assertion is made by risk sociologists Douglas and Wildavsky,⁶⁴ that although the dangers are real, risk is 'politicized' through several social processes, giving risk a status which is separate from the actual dangers presented by various hazards. Slovic⁶⁵ further states that this politicization process makes risk assessment a subjective blend "of science and judgment with important psychological, social, cultural, and political factors".⁶⁶ Douglas⁶⁷ in particular, presents risk, within a social context, as attributable to an Other. The position of 'Otherness' is subsumed by developing countries, where they are presented as both source and victim of various infectious disease threats. Therefore, a primary focus is to assign blame, first in the global narrative (North to South, or West to East) and then in a regional narrative.

But infectious disease threats are not merely western obsessions misaligned with the needs and subjectivities of developing country contexts. Douglas views risk as 'a socially constructed interpretation and response' to a *real* danger. This is an important consideration in developing risk assessments in resource-constrained settings. Following this train of thought, before a context-relevant and reflexive approach to risk analysis can be proposed, it is important to understand what the framing assumptions of infectious diseases and their impacts are, how they emerge and how they influence the policy process in each context. We will now examine the narratives concerning avian and pandemic influenza, first from an international perspective, and then look at the narratives from the perspective of one developing country, Zambia.

⁶²*Ibid.*

⁶³see Stirling and Mayer (2000), Millstone (2007), Stirling and Scoones (2009).

⁶⁴Douglas and Wildavsky (1982).

⁶⁵*Ibid.*

⁶⁶see also Horlick-Jones (1998), Pidgeon (1999), Slavic (1999).

⁶⁷Douglas and Wildavsky (1982), Lupton (1999).

2.4 Timeline of the Crisis: The Epidemiology of H5N1 Avian Influenza

The H5N1 problem began at a goose farm in Guangdong Province, southern China in 1996, where it killed around 40 % of the flock.⁶⁸ It then spread to three chicken farms in Hong Kong, just adjacent to Guangdong Province, between March and early May of 1997.⁶⁹ In May of the same year, a child died of viral pneumonia; the first reported case of zoonotic H5N1 influenza.⁷⁰ Following the identification of 17 more human infections that resulted in five deaths between November and December of 1997,⁷¹ H5N1 became recognized as a zoonosis of possible public health concern. As a result, in December 1997, total and rapid depopulation of all poultry in markets and chickens farms in Hong Kong was carried out to control the outbreak, a move that both policy and virology experts believed had averted a human pandemic.⁷² In this outbreak, live poultry markets were important in the transmission of the H5N1 virus to other avian species and humans.⁷³

However outbreaks had continued to occur in poultry in Hong Kong from 2001 to early 2002, caused by a different H5N1 lineage.⁷⁴ In February 2003, during the SARS epidemic, three more human H5N1 infections with two fatalities were identified in China, and according to the WHO, this indicated viral persistence, despite the control measures that had been instituted in 1997.⁷⁵ While there is some suggestion that the H5N1 problem had been subdued in 1997,⁷⁶ it was in fact, entrenching itself in the poultry systems of Hong Kong, and possibly elsewhere in Southeast Asia, between 1997 and 2003.

Between December 2003 and February 2004, the first wave of an H5N1 panzootic in poultry was reported nearly simultaneously in eight countries in South and Southeast Asia, most of which occurred in commercial poultry establishments. This was followed by a second wave of spread from July 2004.⁷⁷ The WHO states that the second wave was associated with more rural settings.⁷⁸ The countries initially affected were China, Indonesia, Cambodia, Japan, Laos, Korea, Thailand and Vietnam, with a ninth country, Malaysia, joining the list in August 2004.⁷⁹ The pro-poor advocacy NGO, GRAIN, states that the initial outbreaks in

⁶⁸Xu et al. (1999), Webster et al. (2002).

⁶⁹Shortridge et al. (1998).

⁷⁰de Jong et al. (1997).

⁷¹Shortridge et al. (1998).

⁷²Fidler (2004b), WHO (2005a), Webster and Hulse (2005).

⁷³Shortridge et al. (1998).

⁷⁴Sims et al. (2005).

⁷⁵WHO (2005c).

⁷⁶*Ibid.*

⁷⁷Alexander (2007), Paul et al. (2010).

⁷⁸WHO (2005c).

⁷⁹Sims et al. (2005).

Vietnam, Thailand, Cambodia, Laos and Indonesia all occurred in closed, intensive factory farms.⁸⁰ During the first wave, millions of poultry either died or were culled in an effort to control the disease.⁸¹ Human infections were then reported in Hanoi, Vietnam, in January, 2004, a few days prior to a report of large H5N1-related poultry mortalities in two poultry farms in the south of the country.⁸² Vietnam had initially experienced an H5N1 outbreak in 2001.⁸³ In early 2004, during the first wave of the panzootic, the WHO declared the outbreak an unprecedented catastrophe for agriculture in Asia and a “global threat to human health”.⁸⁴

Coinciding with the second wave of the panzootic, the period between August and October 2004 saw eight more human fatalities in Thailand and Vietnam.⁸⁵ The third wave began in December 2004, involving new poultry outbreaks in Indonesia, Thailand, Vietnam, Cambodia, Malaysia and Laos.⁸⁶ Fresh human cases were reported in Vietnam, Thailand and Cambodia.⁸⁷ At this point, after reviewing the unfolding situation, a writing committee of the WHO consultation on human influenza established that Vietnam led the human death toll.⁸⁸ According to a WHO pandemic threat report,⁸⁹ by 2005, H5N1 had ‘succeeded’ in crossing the species barrier three times; in 1997, 2003, and the period between 2004 and early 2005, which recorded the largest occurrence of human H5N1 cases in the period in question. With the report of migratory birds being affected with H5N1 in Mongolia and China, particularly at Lake Qinghai in China in April 2005, concern grew that this posed a potential risk of southward and westward and therefore global spread of the virus in poultry.⁹⁰ Around 6345 birds of different species died in the weeks following the Qinghai outbreak.⁹¹ This is possibly the single most important event linking H5N1 to migratory bird spread. This outbreak singularly raised the profile of the role of migratory birds in the global spread of H5N1.

H5N1 had spread through the diverse market and poultry production systems of Southeast Asia. There is much debate around the primary causes and drivers of the H5N1 problem, revolving around poultry production and marketing practices. An important factor in the Asian panzootic is that ducks appeared to have played a key role in the maintenance of the virus, primarily as silent carriers of H5N1. By 2005, H5N1 had become endemic in the duck population of poultry, providing a reservoir

⁸⁰GRAIN (2007).

⁸¹WHO (2004).

⁸²WHO (2005b).

⁸³Sims et al. (2005), Sims and Narrod (2008).

⁸⁴WHO (2004).

⁸⁵WHO (2005c).

⁸⁶Sims et al. (2005).

⁸⁷WHO (2005c).

⁸⁸Beigel et al. (2005).

⁸⁹WHO (2005b).

⁹⁰Chen et al. (2005), Webster and Govorkova (2006), Alexander (2007), Cattoli et al. (2009).

⁹¹WHO (2005b).

of the virus for other poultry species as asymptomatic shedders of H5N1 influenza.⁹² While outbreaks in poultry were still possible, this suggests that in areas where duck production was of less significance, the chances of endemicity could be lower.

2.4.1 The International Narratives in the Global Response to Avian and Pandemic Influenza

Ian Scoones⁹³ uses ‘policy narratives’ as framing devices for understanding how disease is understood, identifying which actors are likely to be included or excluded from the policy process, what policy avenues open or close as a result and whose interests are likely to be served. Here we use this approach to outline the dominant global policy narratives in the avian and pandemic influenza crisis that was at its peak in 2005, and then see what national level policy narratives emerged in Zambia in response.

In their research, Scoones and Forster⁹⁴ found three primary outbreak narratives driving the global response to avian and pandemic influenza. These were a veterinary narrative, focused on animal health and agricultural livelihoods; a public health narrative focused on human health and disease, and a pandemic preparedness narrative which drove an emergency response. The three outbreak narratives were distilled from a typology of linked debates identifiable in the international policy discourse concerning avian and pandemic influenza. These debates largely revolved around risk and uncertainty, and drove understanding of disease, its implications, and the mitigation responses advocated.

First, the source of the H5N1 threat was Southeast Asia, referred to as an “influenza epicenter”.⁹⁵ The disease had a visible human health impact, with hundreds of cases logged in three waves by the WHO after the first 18 cases and one death in 1997. However, a lot of uncertainty still existed around both H5N1 evolution as a zoonosis and its effects on public health.⁹⁶ Although some understood that public health experts remained uncertain of the likelihood of a human pandemic,⁹⁷ the possibility of a pandemic resulted in calls to focus control on the source of this risk; Southeast Asia, and to develop contingencies in case control efforts failed.

Second, because H5N1 was viewed as largely a problem in poultry, the surveillance and control responses championed were considered to be in the veterinary space, with their arsenal of ‘tried and tested’ methods for disease control. But the

⁹²Webster and Hulse (2005); Sims et al. (2005); Sims and Narrod (2008).

⁹³Scoones (2010).

⁹⁴Scoones and Forster (2010).

⁹⁵see Hampson (1997).

⁹⁶Pitrelli and Sturloni (2007).

⁹⁷Osterholm (2005).

'standardized' approaches adopted worked in some areas and failed in others. For instance, control measures such as culling, disinfection and stamping were successful in controlling H5N1 outbreaks in Europe, but were not as effective in Southeast Asia.⁹⁸

Third involved linkages between poultry production practices, H5N1 epidemiology and disease spread through poultry and poultry product trade and/or migratory bird movement. It was suggested that all parts of the world were at risk of H5N1 incursions as a result of the globalization of trade.⁹⁹ Some authors took the view that it was migratory birds that would spread H5N1 across the globe,¹⁰⁰ while others claimed that wild birds were only capable of short range spread.¹⁰¹

Third was the potential effect of a human pandemic on the global economy. This concern also drove the 'at source' control initiative. The H5N1 risk mitigation responses largely affected the livelihoods of those in outbreak areas.¹⁰² For example, it was estimated that over 2 billion birds were slaughtered in the effort to control H5N1, and the greatest losses were suffered by the poor.¹⁰³ There was also a national level impact as well, where several countries (e.g. Thailand) had their poultry exports prejudiced and rural livelihoods affected by control interventions.¹⁰⁴ This debate thus had links to contentions between business and livelihood interests and controversies over the role of intensive vs. backyard farming in disease spread.¹⁰⁵

Fourth concerned the development of a multi-sectoral approach response to mitigate the pandemic threat. This included calls to strengthen veterinary control systems in addition to human pandemic preparedness, addressing the pandemic risk at-source but involving human health and other sectors to mitigate the risk.¹⁰⁶ Following outbreaks of H5N1 in Egypt and Nigeria, Africa also popped up on the global public health radar as the next potential reservoir of the H5N1 virus. A WHO Regional Office for Africa risk assessment¹⁰⁷ made sweeping comparisons between Asian and African poultry production systems to justify similarities in risk and provide recommendations for prevention and control. The problem was, however, that the poultry production systems in Africa and Asia are in reality, very different.

The fifth debate involved pharmaceutical interests, covering influenza virus sharing and concerns that genetic sequence information collected from outbreak areas would be used to create vaccines for market that would not be distributed

⁹⁸Yee et al. (2009).

⁹⁹van den Berg (2009).

¹⁰⁰Normile (2006), Chen et al. (2005).

¹⁰¹e.g. Weber and Stilianakis (2007).

¹⁰²Scoones and Forster (2010).

¹⁰³Stirling and Scoones (2009); also Scoones and Forster (2010).

¹⁰⁴Nicoll (2005).

¹⁰⁵GRAIN (2006a), GRAIN (2006b), GRAIN (2007).

¹⁰⁶WHO (2004).

¹⁰⁷WHO/AFRO (2005).

equitably in case of a pandemic.¹⁰⁸ The policy response was Western countries scrambling to stockpile antiviral drugs and vaccines for ‘high level pandemic preparedness efforts’, the vaccines of whose production depended on H5N1 virus strains recovered from developing countries.¹⁰⁹ In an attempt to globalize this policy response, there were also calls for affected countries to either develop pharmaceutical capacity or consider non-pharmaceutical interventions.

Linked to this was the sixth debate, involving the ‘securitization’ framing of the avian and pandemic influenza issue, which, Elbe¹¹⁰ argued, escalated the controversy over influenza virus sharing. In implementing this ‘securitization’ approach, Western countries spent massively on pandemic preparedness, with the US and European countries spending approximately US\$2.8 billion ‘at home’ versus US \$950 million ‘abroad’ for disease control ‘at-source’ by the end of 2008.¹¹¹ This forms the background against which resource-constrained countries generated their avian and pandemic influenza intervention policies guided by the WHO global pandemic preparedness plan.¹¹² These viewpoints can be grouped in four key typologies; risk and uncertainty, effects on food and farming, economy and livelihood impacts and effects on health and extent of disease.

2.4.2 How H5N1 Was Defined in Zambia

Zambia’s response to H5N1 was initially motivated by the internationalized outbreak narrative, facilitated by the tripartite alliance of the OIE, FAO and WHO.¹¹³ Furthermore, several national policy actors played a critical role in initially framing H5N1 influenza as an imminent threat, forming a multi-sectoral Task Force on Avian Influenza in 2005. The formation of this committee was facilitated by World Bank funding and FAO and WHO technical expertise. The Task Force comprised representatives from agriculture, health, the poultry industry, academia and local media.¹¹⁴ There were also representatives from the Ministry of Local Government and Housing, the Zambia Revenue Authority, the Ministry of Home Affairs, the Office of the Vice President, the Ministry of Tourism and Environment, the Ministry of Finance and National Planning, and the United States Agency for International Development (USAID). From this core membership, a technical arm of the Task Force National Avian Influenza Working Group, was constituted,

¹⁰⁸Garrett and Fidler (2007), Fidler (2008).

¹⁰⁹Elbe (2010).

¹¹⁰*Ibid.*

¹¹¹Burgos and Otte (2008).

¹¹²WHO (2005c), ALive (2006).

¹¹³Mwacalimba (2012).

¹¹⁴Mwacalimba and Green (2015).

comprising an assembly of designated personnel from the ministries of Health and Agriculture.

Zambia initially viewed H5N1 and pandemic influenza as an imminent threat. Perceptions that H5N1 was on Zambia's doorstep were fuelled by unsubstantiated local media reports of bird flu outbreaks in Zambia's poultry, no doubt mirroring the international perspective as seen through the lens of the brewing H5N1 crisis in Southeast Asia. One respondent in the Ministry of Health (Interview 11) explained that the threat to Zambia was being taken seriously at the highest level in the Ministry of Health, with a Cabinet Memo being issued by the then Health Minister, Sylvia Masebo, seeking government input to respond to 'the threat of avian and human influenza that which was coming.'

Although on face value, Zambia seemed to have initially taken a unified stance in dealing with the problem, the array of stakeholders in Zambia's Task Force on Avian Influenza also meant that a number of different understandings of the H5N1 problem were at play. These alternative framing narratives gave impetus to some policy actors, and demotivated others participation in the emergency planning process. They also impacted on the implementation of national policy.

Six unique narratives were identified from interviews with stakeholders, suggesting some different implicit ways of framing the issue in Zambia. These narratives provide insight into the framing assumptions driving the different stakeholders' actions or inactions, in the pandemic preparedness process. More pertinent to this chapter, these narratives also reveal how the threat of H5N1 was constructed as 'risk' and to whom this risk pertained. There were narratives that chimed with the global narratives on avian and pandemic influenza and others that aligned less easily with international viewpoints, in particular, the narratives relating to trade and development.

The first narrative presented H5N1 is an exotic emerging disease. From the onset, there was a strong sense among some veterinary stakeholders that H5N1 was alien to Zambia. An example of this viewpoint is provided in the words of a senior veterinary member of Zambia's Task Force on Avian Influenza, 'We don't have avian influenza as you know. It is an exotic disease to us, but it is a possible emerging disease' (Interview 4). Linked to this was a second narrative framing, which presented H5N1 is an infectious agent of poultry with limited zoonotic potential. This narrative therefore framed H5N1 as a predominantly poultry health concern, described as 'basically . . . more of an animal disease which then moves into human beings' (Interview 2). This narrative also justified the need for veterinary leadership in developing any prevention measure to be taken, and reflected the broader international veterinary narrative on H5N1, a problem that required the use of standardized, time-tested technical veterinary approaches to animal disease control.¹¹⁵

The problem with this narrative is that in Zambia, at least, the country's veterinary priority lay on controlling cattle diseases. For decision-makers, poultry

¹¹⁵*Ibid.*

production was a low priority, ‘When you look at our focus, we are more oriented towards cattle. So most of the diseases that affect cattle are given priority. Probably you will look at it and what you get is that birds or bird diseases are not so significant or are not so associated with major economic losses. I think, it’s not just because it is avian influenza and it is not there, it’s because its poultry and it’s not so significant. It’s not written but it is implied in the way we do things.’ (Interview 4, MACO). Another respondent put it this way, ‘I mean you have to remember that they [cattle diseases] already exist in Zambia. We have FMD, it’s spreading like fire, ok? So definitely the Government provides funds for FMD, because it’s there. The Government will definitely provide funds for CBPP because it’s there on the ground, right now.’ (Interview 5, MACO).

Although the funding for preparedness planning had largely come from international donor agencies, the resources spent on H5N1 were essentially viewed as wasteful.¹¹⁶ In the words of a senior veterinary officer, ‘Yes you can argue for emergency preparedness but I think over and above, a lot of resources have gone into this (avian influenza) which should have been focused on the more important diseases for the country’ (Interview 3, MACO).

The third narrative identifiable from the data was the perception that the greatest risk for H5N1 emergence was rural poultry systems because of their poor biosecurity, low awareness of the H5N1 problem in rural communities and high likelihood of contact with infectious migratory waterfowl. This also resonated with the international narrative presenting the risk of H5N1 as largely emanating from the backyard poultry production systems of Southeast Asia. There were contextual differences between the production systems of Southeast Asia and Zambia in respect to typical farming practices, for instance, the role that rice paddies, duck production and wet markets that went side by side with chicken rearing in Southeast Asia was widely dissimilar to the small flock scavenger chickens reared in rural Zambia.¹¹⁷ Furthermore, even the concept of backyard production had a different meaning in Zambia. It represented small scale, often commercially oriented stock fed flocks of broiler or layer chickens, raised to supplement household income through chicken and egg sales, using closed structures with some level of restricted access.¹¹⁸

Nevertheless, the risk of H5N1 from rural farmers in Zambia was couched in a biosecurity narrative in which smallholder, rural poultry producers were viewed as representing the biggest risk for introducing avian influenza into the country, ‘We believe that avian influenza may come from a poor farmer who doesn’t believe in biosecurity. Most of these guys lack knowledge. They don’t really understand some of these issues. So we think that it is from there, a lack of information and knowledge, that the disease can come,’ (Interview 6). Another respondent put it

¹¹⁶Mwacalimba (2012).

¹¹⁷Mwacalimba (2013).

¹¹⁸LSUAC (2008).

this way, 'It is widely accepted that... (breeders and commercial producers), because of their biosecurity levels, chances of them actually getting avian influenza are pretty minor. That's why FAO doesn't want to deal with them. So we are dealing with (sector)¹¹⁹ three and four; these are the emerging and the traditional farmers,' (Interview 5, MACO).

The fourth narrative, representing the views of stakeholders from the Health sector, centered on H5N1 as a possible zoonotic pandemic threat. This view aligned with the global pandemic preparedness narrative, 'There is an understanding that this disease of birds can now infect human beings. To what extent it affects human beings, you go back to the (WHO) avian and human influenza pandemic phases,' (Interview 11, Ministry of Health). The fifth narrative expressed concern over the potential of a global pandemic to cause widespread social disruption. It specifically focused on concerns over Zambia's capacity to respond to a full blown pandemic. It therefore presented H5N1 as a disease whose treatment in humans was highly technical and resource intensive. This was a practical narrative that weighed Zambia's health system's limited response capacity against a pandemic scale H5N1 outbreak in humans. This narrative thus implicitly favored a preventative response, rather than a preparedness focus. A communication officer put it this way, 'The nature of management of a patient with avian influenza is highly technical and we are not in a position to manage to treat a lot of patients if we had... because a lot of them would need to be managed possibly under intensive care kind of management.' (Interview 10, Ministry of Health).

The sixth and final narrative presented H5N1 as a disease that could affect Zambia's trading status. This was downplayed in the national narrative, even if it prioritized H5N1 as a real threat to trade and industry. This was especially pertinent given that perceptions of H5N1 risk, rather than actual incidence, had negatively impacted poultry and poultry product production in the country. This occurred following unfounded media reports of bird flu outbreaks in Zambia, which led to public panic and a scaling down of poultry production due to a reduction in the consumption of poultry and poultry products. The result was an estimated loss of the equivalent of US\$7 million over a 3-month period, a significant cost for Zambia's fledgling poultry industry. There was a sense foreboding concerning the impact that an H5N1 outbreak would have on trade, 'It poses a danger to our own exports because once the poultry products... from Zambia for example are found

¹¹⁹This is based on the FAO poultry classification system in which Sector 1 represent integrated poultry production systems characterized the use of standard operating procedures, high level biosecurity and commercial marketing of birds and their products. Sector 2 production is systems also commercially focused, in which moderate to high biosecurity is practiced. Ideally, poultry are kept indoors continuously, thus preventing contact with other poultry or wildlife. Sector 3 production systems are understood to mean low to minimal biosecurity production with birds and products entering live bird markets. Examples include caged layer farming with birds in open sheds, farms with free ranging poultry or farms producing chickens and waterfowl such as ducks. Sector 4 are systems of production in which there is minimal biosecurity and chickens and their products are consumed locally. FAO Avian Influenza Fact Sheet. Available at http://www.fao.org/docs/eims/upload/224897/factsheet_productionsectors_en.pdf.

to be infected with that avian influenza then we cannot export it' (Interview 17, Ministry of Commerce, Trade and Industry). The Poultry Association of Zambia (PAZ) also embraced this narrative, 'You may wish to know that in the region, it's only this country that has not recorded any major disease outbreak and hence we are considered the cleanest environment in the whole region. And we would want to remain as such' (Interview 16, PAZ).

These narratives tell us a lot about the different perceptions of risk evoked by stakeholders across the animal health, public health and trade sectors. The risk of avian and human influenza was presented in three distinct ways. First, the reality, as understood by decision-makers, was that H5N1 was an 'exotic' disease that was a trade threat. Secondly, there was the understanding of its zoonotic potential and where some of the risks lay, that is, a condition of poultry whose risk of spread is related to poor 'biosecurity'. Third, were public health concerns about the implications for Zambia should an H5N1 incursion occur and become fully zoonotic.

Despite these local understandings, the construction of the policy framework for avian and pandemic influenza preparedness in Zambia was largely driven by the actions of, and financial aid provided by, international agencies.¹²⁰ In Zambia's situation, two key points of contagion were identified in the policy process; the first being the traditional sector (as suggested by the FAO), and the second being Zambia's neighbors, with borders consistently described as "porous"¹²¹ (also suggested by the FAO). This prioritization of disease risk mitigation, sidelined the trade and development narratives which spoke to broader public health concerns, including locally important trade and development imperatives, which limited the effectiveness of pandemic preparedness.¹²²

The financial pull of the World Bank, FAO and USAID shaped the policy response, reinforcing the animal health framing of the H5N1 problem through several processes.¹²³ First, they defined the H5N1 problem and its possible sources; Zambia's multiple neighbors, interfaced by porous borders, and its 'high avian influenza risk' traditional poultry production sector. Second, they influenced the nature of intervention programs. Third, the bulk of financing was skewed towards animal health, which, by default, placed a reluctant veterinary department at the helm of policy development. With the agricultural ministry controlling most of the resources, the flow of finances affected the understanding of risk and the politics of the policy process, sustaining an emergency framing from the period between 2005 and 2009 and sending both government veterinary and research institutions alike searching for the elusive H5N1 virus in traditional poultry and wild birds.¹²⁴

¹²⁰Mwacalimba (2012).

¹²¹*Ibid.*

¹²²Mwacalimba and Green (2015).

¹²³*Ibid.*

¹²⁴*Ibid.*

2.5 Understanding Policy and Risk in the Assessment Risk in Developing Country Settings

In this final section, we will suggest the ways in which understanding policy processes and context could inform risk analysis in such a way as to foster better policy coordination in cases like avian and pandemic influenza prevention and control, paying attention to wider issues such as livestock and livestock product trade. Here we determine (1) the feasibility of conducting an OIE type risk analysis in a manner that informs the development of risk management policies across multiple policy sectors in a resource-constrained country context and (2) present a policy relevant model for risk analysis appropriate for this context.

Thus far, we have reviewed how Zambian policy makers presented their understanding of H5N1 risk in response to the ‘global’ H5N1 threat. It is important to determine the potential use of these narratives in assessing risk, particularly if assessment outputs are intended to inform the development of context-appropriate policy responses. Because H5N1 is an animal disease with zoonotic potential, we will focus on OIE risk analysis framework, which, by WTO rules, provides the gold standard for the assessment of animal infectious disease risks. Drawing on the preceding discussion, we will begin by highlighting some of the key policy limitations of the current OIE approach to risk analysis, to better define what would aid the risk analysis process in developing country contexts, and what might be lost by conducting a risk analysis in this way. A national level model for an OIE risk analysis within this context will be proposed and its context-specific policy implications assessed, particularly which stakeholders are likely to influence or be influenced by a risk analysis in this context.

2.5.1 *Risk Analysis and the Policy Context: Reconceptualising the OIE Risk Analysis Framework*

As discussed earlier, separate from the actual dangers presented by various hazards, ‘risk’ is socially constructed.¹²⁵ This has been demonstrated in how different policy actors understood the threat of a zoonotic avian influenza incursion into Zambia. Risk analysis can benefit from social processes like policy making. Perceptions of H5N1 risk were framed differently across various sectors, including the poultry and allied industries, the media, health, agriculture and trade. This implies that different risk perceptions influence policy processes in different but significant ways.

The OIE risk analysis framework,¹²⁶ is a science-based method for the assessment of infectious disease risk that is based on the system developed by Covello

¹²⁵Douglas and Wildavsky (1982), Horlick-Jones (1998), Slovic (1998).

¹²⁶Murray et al. (2004).

and Merkhofer.¹²⁷ It is a ‘Red Book’ model¹²⁸ heuristic device conceptualized to involve four interacting and iterative stages; hazard identification, risk assessment, risk management and risk communication.¹²⁹ This structure makes the framework amenable to a discussion on the policy considerations relevant to its application in different contexts. The OIE risk analysis framework’s importance to policy is highlighted in the fact that, since the inception of the WTO in 1995, the OIE framework in general has achieved recognition within the WTO SPS agreement as the standard for facilitating trade in animal and animal products.¹³⁰ The framework has been, and continues to be, applied to assess animal disease risks for scenarios other than those that are trade-related¹³¹ and has been successfully adapted to a human health setting.¹³² It therefore provides a structured approach to risk assessment and is considered to be an iterative and transparent standard for quantifying risk and informing policy.¹³³

In the OIE framework, risk assessment is the most technical component of the process and can be a qualitative, semi-quantitative or quantitative assessment of risk on the basis of expert knowledge and/or empirical data.¹³⁴ The entire framework, however, is subject to the policy processes of the particular context in which the risk assessment is conducted. This is because the framing of risk, and therefore its assessment, involves the interplay of both contextual and social factors. A weakness of the framework therefore is that it primarily relies on the engagement of expert knowledge, and *their* presentation of the underlying assumptions and the steps followed in the determination of risk.¹³⁵ By relying primarily on the knowledge of scientific experts, the framework is blind to social influences, and, in the case of risk management policy development in resource-constrained countries, partial to the narratives on risk voiced by the international agencies holding the purse strings. This is a pertinent potential flaw. As noted with similar technocratic models,¹³⁶ funding agencies could select only experts whose viewpoints resonate with their policy agendas, making their assessments of risk highly contestable. Another concern is a lack of robustness in this approach’s dealing with the ambiguities of scientific uncertainty and surprise¹³⁷ and, a failure to fully engage

¹²⁷Covello and Merkhofer (1993), p. 318.

¹²⁸According to Millstone (2007), the term comes from the red cover of a seminal report produced in 1983 by the National Research Council in the US. This report presented a version of inverted decisionism or technocratic model that is very similar to the OIE risk analysis framework.

¹²⁹Vose (2000), WHO/FAO (2006), OIE Terrestrial Animal Health Code 2010.

¹³⁰Thiermann (2005), OIE Terrestrial Animal Health Code 2010.

¹³¹MacDiarmid and Pharo (2003).

¹³²e.g. Clements et al. (2010).

¹³³WHO/FAO (2006), Murray et al. (2004).

¹³⁴Vose (2000), Murray et al. (2004).

¹³⁵Vose et al. (2001), Pfeiffer (2007).

¹³⁶Van Zwanenberg and Millstone (2006), Millstone (2007).

¹³⁷Stirling and Mayer (2000), Stirling and Scoones (2009).

political processes and social choices in addressing risk.¹³⁸ One solution is “to develop a more holistic perspective” of risk “that includes explicit consideration of the roles of policy, disease management, and feedbacks between ecosystems and societies.”¹³⁹

There are novel approaches that suggest ways of better combining science and policy making such as Millstone’s¹⁴⁰ ‘co-evolutionary model’. But the preceding critique is not a basis to reject the OIE framework. It is important to suggest *how* it can be made more amenable to social processes. Part of its appeal, as argued by Hueston,¹⁴¹ is that the framework holds promise for the consideration of policy processes in the assessment of risk. Hueston, however, does not offer any suggestions on how this may be achieved. But the OIE risk analysis framework is useful for assisting decision-makers thinking around particular aspects of risk, which helps inform resource allocation in risk mitigation.¹⁴² We will therefore examine the OIE framework through a policy lens, drawing on insights developed by Millstone¹⁴³ wherever they may apply.

2.5.2 Developing a Feasible Risk Analysis for Zambia

The OIE risk analysis framework places the OIE squarely in the centre of the highly political arena of international animal trade. The evolution of the emergency response to avian and pandemic influenza in Zambia, for instance, was a highly political process,¹⁴⁴ a state that cannot be detached from any risk analysis. However, as part of the OIE framework, the OIE’s veterinary services evaluation process sets as a benchmark independence from political influence.¹⁴⁵ This separation is impractical. Furthermore, the veterinary profession is potentially limited by this dependence on scientific or authoritative opinion and its exclusion of political and social phenomena.¹⁴⁶ Political and contextual dimensions are just as important as the biological considerations when it comes to the multi-sectoral risk management of emerging, albeit limited zoonosis such as H5N1.¹⁴⁷ As discussed in our case study on Zambia, there were differences in the understanding of risk among sectors at the interface of animal health, public health and trade. The result

¹³⁸Millstone (2007).

¹³⁹Cumming (2010b).

¹⁴⁰Millstone (2007).

¹⁴¹Hueston’s discussion speaks of the OIE risk analysis framework in very general ways.

¹⁴²MacDiarmid and Pharo (2003).

¹⁴³Millstone (2007).

¹⁴⁴Mwacalimba (2012).

¹⁴⁵e.g. Vallat and Pastoret (2009).

¹⁴⁶Hueston (2003).

¹⁴⁷Mwacalimba (2013).

was an amorphous understanding of H5N1 risk, stakeholder exclusion in risk management and some inefficient resource considerations.¹⁴⁸

2.5.3 Policy Considerations for Hazard Identification

There is need to examine the ‘what’ ‘how’ ‘when’ and ‘who’ interactions of risk as it relate to policy. The first step in conducting an OIE type risk analysis is identifying ‘what’ the hazard, or source of risk, is. This is hazard identification, defined by the OIE Terrestrial Animal Health Code as “the process of identifying the pathogenic agents which could potentially be introduced in the commodity¹⁴⁹ considered for importation”.¹⁵⁰ A hazard is defined as “any pathogenic agent that could produce adverse consequences on the importation of a commodity.”¹⁵¹ This is the technical definition, but there is also a policy equivalent of hazard identification that could be factored into the risk analysis. In a policy sense, hazard identification is the framing of the problem. This is not simply how the agent, for instance, H5N1 avian influenza, is conceptualised, but also how it is *perceived*, as a problem, i.e. its social construction. Perceptions of H5N1 risk were constructed by different international and national policy agendas and evidence in Zambia. Cognisance of these sometimes conflicting interactions in perceptions of risk could potentially enhance the applicability of the OIE risk analysis framework in the context of a country such as Zambia. Tensions such as H5N1’s status as a global health concern due to its pandemic potential, a poultry industry or trade concern, or its “exotic” status in the Zambian context, need to be acknowledged before context-specific consensus of this policy problem can be achieved.

As discussed earlier, the H5N1 problem in Zambia was expressed in the three ways conveying how the H5N1 ‘hazard’ was understood by policy makers across animal health, trade and public health. First, the H5N1 ‘hazard’ was seen as “exotic” condition that threatened trade. Secondly, it was a *potential* zoonosis whose risk of incursion lay in traditional poultry flocks with poor “biosecurity”, and finally, it carried *plausible* implications for public health if H5N1 became fully zoonotic. These different animal health, trade and economy, and public health framings of the H5N1 problem formed the internal policy response, bringing specific actors to the policy process. The resulting policy framework then addressed four contiguous disease and disease management issues. First, there was the root consideration of H5N1 (or H5N1 *emergency* preparedness) second, there was the consideration of general avian influenzas, third, there was the aspect of human

¹⁴⁸Mwacalimba (2012).

¹⁴⁹This definition explicitly mentions commodities intended for importation because the Code’s purpose is to facilitate free and safe trade.

¹⁵⁰OIE Terrestrial Animal Health Code 2010, p. xvii.

¹⁵¹Murray et al. (2004), p. v.

seasonal influenzas and fourth, there was the core policy issue of human influenza pandemic *preparedness* and capacity building. These multiple perspectives are the ‘framing assumptions’ that a risk analyst can use to provide advice in policy making.

In essence, rather than just ask *what* the hazard is, it is also important to ask for *whom* (and *how*) H5N1 avian influenza presents a ‘hazard’. To be feasible as a tool to inform policy in a setting such as Zambia, the process of hazard identification should first unpack and properly categorize different policy perceptions into risk statements germane to each policy-relevant stakeholder. This essentially entails that a hazard identification be performed in such a way that it ‘maps’ how the H5N1 ‘hazard’ relates to general avian influenzas, human influenza and pandemic preparedness *across* sectors. The importance of this is that, as a standalone problem, different levels of priority were accorded to H5N1 in Zambia.¹⁵² It was a high priority in the public health sector and low in the animal health sector, and while other local stakeholders did not know how H5N1 affected them, just the *perception* of H5N1 risk resulted in real consequences in the poultry industry.¹⁵³

A national level risk analysis in a resource-constrained country context would theoretically have a broad audience with divergent conceptions of risk and priorities. The objective in Zambia was to develop a coordinated, multi-sectoral risk management framework. This entails understanding different framings of risk in order to think more adaptively about information gathering for hazard identification. This requires bringing scientific and non-scientific considerations more explicitly in policy processes, thus allowing the appropriate actors participate in the risk analysis process.¹⁵⁴ The process of information gathering may therefore benefit from a stakeholder analysis, beyond international agency considerations, to identify important stakeholders, their viewpoints and information contributions. This is necessary to comprehensively define the hazard and capture information about how the hazard affects, and, more importantly, maybe *affected* by different policy relevant stakeholders. This data gathering process is also important for the risk assessment stage, which is discussed next.

2.5.4 Policy Considerations for Risk Assessment

Risk assessment is “the evaluation of the likelihood and the biological and economic consequences of entry, establishment and spread of a hazard within the territory of an importing country”.¹⁵⁵ It has four stages, a release assessment, exposure assessment, consequence assessment and finally, risk estimation. The

¹⁵²Mwacalimba (2012).

¹⁵³*Ibid.*

¹⁵⁴Slovic (1998).

¹⁵⁵OIE Terrestrial Animal Health Code 2010. p. xxii.

OIE suggests that the processes of release and exposure assessments require the skills of a veterinary epidemiologist, while the consequence assessment may require an economist's input.¹⁵⁶ However, in addition to being equipped with the framing assumptions of the various interested parties, a risk analyst would be at an added advantage if they had some working knowledge of policy processes beyond a purely 'scientific' viewpoint.

The process of risk assessment begins with a risk question. This defines what can go wrong and how. After hazard identification, the relevant stakeholders formulate the risk questions they intend the risk assessor to help answer, thereby defining the boundaries of the risk assessment. Answering these questions requires a comprehensive process of gathering and collating evidence that describes the risk-relevant epidemiology of the hazard such as host range, vehicles of carriage and transmission, and survival under different environmental conditions.¹⁵⁷ The sources of information considered reliable included libraries, the internet and specialists.¹⁵⁸ While the framework accommodates grey literature,¹⁵⁹ it is partial to 'expert' sources to elucidate, for instance, the virology of H5N1. This is understandable. However, the question of what can go wrong needs to be oriented towards *whom* and *how* each negative outcome is pertinent. The stakeholder analysis at the hazard identification stage and the engagement of these stakeholders at the risk assessment stage could provide important data for an inclusive assessment of risk. Especially in resource-constrained settings where data are scarce, this multi-sectoral data collection process provides a viable data source.

2.5.5 Risk Framing in Zambia and Its Implications for Risk Assessment

In the context of Zambia, although H5N1 had economic impacts and potential health system effects, the risk question actually revolved around H5N1's zoonotic risk. The policy framing and disease mitigation approach focused on preventing an external incursion of H5N1 and less on the local and regional contextual factors that could potentially influence its transmission, establishment and spread. This is typical of approaches to disease control. They emphasize preventing 'contamination' and are sometimes uncritical of 'configuration' or context.¹⁶⁰ In Zambia, decision-makers focused on mitigating disease contamination, as exemplified for instance, by the institution of a partial poultry and poultry product import ban even

¹⁵⁶MacDiarmid and Pharo (2003).

¹⁵⁷Pharo (2003).

¹⁵⁸MacDiarmid and Pharo (2003).

¹⁵⁹Wooldridge (2000).

¹⁶⁰Leach et al. (2010).

from countries unaffected by H5N1.¹⁶¹ But this was a valid concern, given Zambia's prioritization of disease freedom for the purposes of trade.

Zambia's National Response Plan for avian and pandemic influenza prevention and control lists five potential introduction routes for H5N1; live bird imports; poultry product imports; illegal poultry and poultry product trade; returning travellers previously in direct or indirect contact with infected poultry or poultry premises overseas; and aquatic migratory birds. For a risk analyst, these are the modes of 'release' considered pertinent by policy makers in Zambia.

There are deeper issues to consider. For example, In Zambia there were tensions between the preoccupation with the temporal concern of H5N1 risk (when will this happen?), and externally defined evidence on the spatial concerns of risk (how could this happen?): "According to Food and Agriculture Organisation (FAO), although Zambia is currently free of the virus, the country is at high risk because of many neighboring countries, which has led to increase in human traffic and trade in poultry and poultry products".¹⁶² What policy makers really lacked was a clear mapping ('configuration') of how an H5N1 incursion and outbreak might occur in the Zambian context. A risk assessment, guided by stakeholder-relevant risk questions, would assist policy-makers and stakeholders focus more deeply on 'how' an incursion and outbreak might occur. This would help to better define resource allocation in risk management.

In Zambia, commercial breeders were perceived to have high biosecurity. However, it was argued by the independent NGO GRAIN¹⁶³ that many of the H5N1 outbreaks in Southeast Asia occurred in large commercial institutions with poor biosecurity. If such perspectives can, at the very least, be considered, then, other than illegal cross border trade, human travelers and migratory birds, Zambian breeders provided an important link to the global poultry industry. Potentially, 'big poultry' in Zambia (Sector 1 and 2) was also at risk of acquiring H5N1. Another important factor is that the poultry industry in Zambia had orientated itself towards poultry exports, implying that should Zambia have an outbreak, it could be a potential source of H5N1 for its trading partners. In terms of risk assessment, it is thus very important to consider the 'configuration' of the risk system to better inform disease management.

For Zambia, three interlinked risk systems would have to be considered in the weighing of H5N1 risk release in this context. These three risk systems are the biological risk, the ecological risk and the policy risk. These are essentially the 'map' that a risk assessor should develop to determine the risk of release, exposure and consequence(s) of an H5N1 incursion. The biological risk system would draw on virology and epidemiology, as this is a technical exercise. The ecological risk system is the poultry production system at play in the Zambian context, encompassing production characteristics and the nature and extent of interaction

¹⁶¹Mwacalimba 2013.

¹⁶²Zambia's National Response Plan on avian influenza, 2008 version, p. 6.

¹⁶³GRAIN (2007).

among production systems, processing systems and market distribution systems. In the case of Zambia, the production systems include the traditional backyard production systems, semi-commercial housed production systems, emergent production systems, commercial production systems and commercial breeding systems. Together, the biological and ecological risk systems determine the likely points at which first, the production systems interface each other (and hence the routes by which H5N1 could spread from system to system), and second, the human exposure to H5N1 may occur (defining the human-animal interface for Zambia). The policy system includes, but is not limited to; the identification of the institutions, resources, stakeholders and policies available for risk management. These are important in identifying the type and feasibility of interventions that already exist to mitigate this risk.

A release assessment would begin by determining the current disease status of countries with which Zambia has trade dealings (existing trade agreements, known trading partners etc.). The next step would then focus on verifying the claim that Zambia's poultry breeders, of which only six hatcheries supplying the entire commercial poultry industry (including emergent and small scale production systems),¹⁶⁴ in 2009 actually had the levels of biosecurity and surveillance systems in place to support the claim that they were at low risk of an H5N1 incursion.¹⁶⁵

A conceptual scenario diagram for the assessment of multi-sectorial zoonotic risk in Zambia should represent the routes for introducing (contamination) zoonotic H5N1 into the population of interest and potential routes of spread (configuration) (Fig. 2.1). In determining the risk of H5N1 release, the product is diseased poultry or their products and the possibility of biological carriage via human travel or via aquatic migratory birds. For poultry and poultry products, a risk analyst can trace the movement of these commodities through the entire production system, by conceptualizing physical pathways through the supply chain from hatcheries, producers, small scale producers, finally to markets (formal and informal), overlaid by a biological pathway defining host-pathogen interaction and an examination of biosecurity measures throughout the supply chain. Additional details would include pathways for the biological carriage of H5N1 via human travel and aquatic migratory birds.

Interestingly Fig. 2.1 presents many of the key issues around risk identified by a policy analysis. It is a conceptual example of how a risk assessment might present H5N1, incorporating trade, public health and animal health. These sectors provide possible policy mitigation points, trade "surveillance" (through border and import controls, including poultry and poultry products in transit), veterinary surveillance (domestic commercial and traditional poultry, food safety, poultry markets and wild poultry) and human surveillance (port health, hospital and health centre

¹⁶⁴According to Zambia's National Response Plan for Avian and Human Influenza (2008), the country has four poultry production systems. These are commercial sector, emerging sector, small scale (also called backyard production) sector and the Village/free range sector.

¹⁶⁵Mwacalimba (2013).

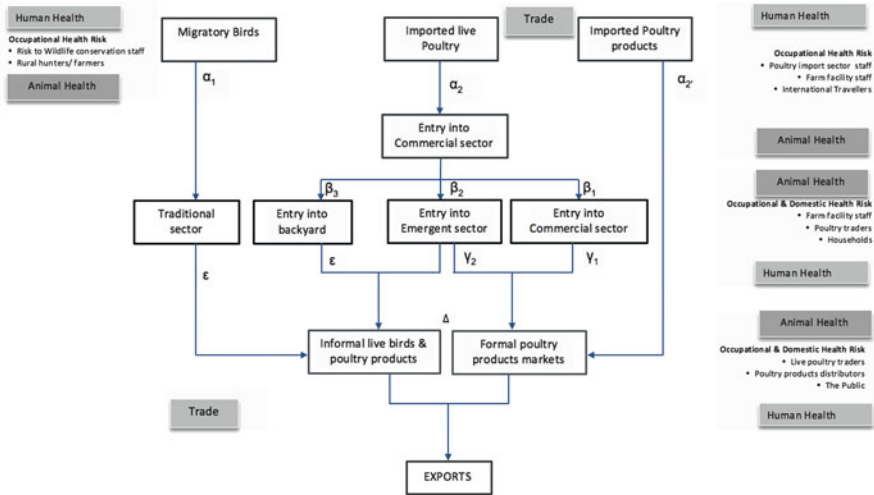


Fig. 2.1 A conceptual risk model for the assessment of the risk of H5N1 introduction in Zambia. A different version of this risk scenario has been presented elsewhere (Mwalimba 2013). This representation however, does not explicitly differentiate distributive and occupational exposure risks for H5N1. It highlights instead the ecological foci for Human Health, Animal Health and Trade. The arrows show the direction of poultry and poultry products flow within the supply chain (physical pathways) as well as the routes of H5N1 within Zambia (biological pathways). Greek symbols represent data inputs for this risk scenario (presented in Table 2.1)

surveillance and food safety). This is a ‘policy pathway’, or more accurately, a ‘risk management policy pathway’, since the movement of poultry and poultry products is defined by complex socio-economic and policy interactions. The physical pathways in Fig. 2.1 could consider trade agreements and SPS protocols, poultry production and marketing, avian influenza surveillance in humans and poultry and food safety.

We should also bear in mind that resource and managerial aspects of risk should not be separated from the assessment process.¹⁶⁶ The scenario diagram here attempts to include these critical aspects of risk management. For a risk assessment to be policy relevant, it must relate avian and pandemic influenza control to trade policy activities to zoonotic H5N1 risk. This includes an assessment of each sector’s roles and actions in each risk pathway, including some consideration of existing legal and policy frameworks, mandates and provisos. This implies the ‘practical’ data inputs for a risk assessment to inform avian and pandemic influenza control policy. In Fig. 2.2, we aggregate the biological, ecological and policy risk systems, with the primary focus being on how public health is affected, which was the root concern for the development of the avian and pandemic influenza control policy. The Greek letters represent the parameters of the risk areas that could

¹⁶⁶Horlick-Jones (1998).

Table 2.1 Conceptual parameters explaining symbols used in the conceptual risk model shown in Fig. 2.1

Risk pathway parameter	Interpretation	Data input
α_1	<ul style="list-style-type: none"> Seasonal migration of wild aquatic birds Contact rates with local aquatic ducks Contact rates with traditional poultry from communities living near large water bodies with the most migratory bird activity 	<ul style="list-style-type: none"> Ornithological data for Zambia Husbandry practices in traditional flocks Identification of areas where contact between traditional and aquatic birds is most likely
α_2 α_2'	<ul style="list-style-type: none"> Border entry protocols for live poultry Inspection protocols (SPS) Source verification Transit vehicle inspection protocols Quarantine procedures Personnel at checkpoints Border entry inspection for poultry products Inspection protocols (SPS) Source verification Transit vehicle inspection protocols Quarantine procedures Food safety protocols 	<ul style="list-style-type: none"> SPS protocols at ports of entry Import data Import permits Quarantine procedures for imported breeding stock avian influenza surveillance and control
β_1 β_1' β_2 β_3	<ul style="list-style-type: none"> Monitoring of biosecurity measures and husbandry in the commercial producer sector Monitoring of biosecurity for poultry from the emerging sector coming into the producer sector Monitoring of biosecurity and husbandry in the emerging sector Monitoring of biosecurity and husbandry in the small scale sector 	<ul style="list-style-type: none"> Poultry sector description data Sectoral activities around avian influenza surveillance and control Human influenza surveillance Food safety
γ_1 γ_2	<ul style="list-style-type: none"> Monitoring of poultry product food safety for the commercial sector prior to marketing Monitoring of poultry product food safety protocols for the emerging sector prior to marketing 	
Δ	<ul style="list-style-type: none"> Informal product markets Surveillance of poultry products from the formal (emerging) sector Surveillance of poultry products from the informal (small scale) sector 	
E	<ul style="list-style-type: none"> Informal live animal markets Monitoring of poultry health in informal markets Monitoring of health and mixing in informal markets 	

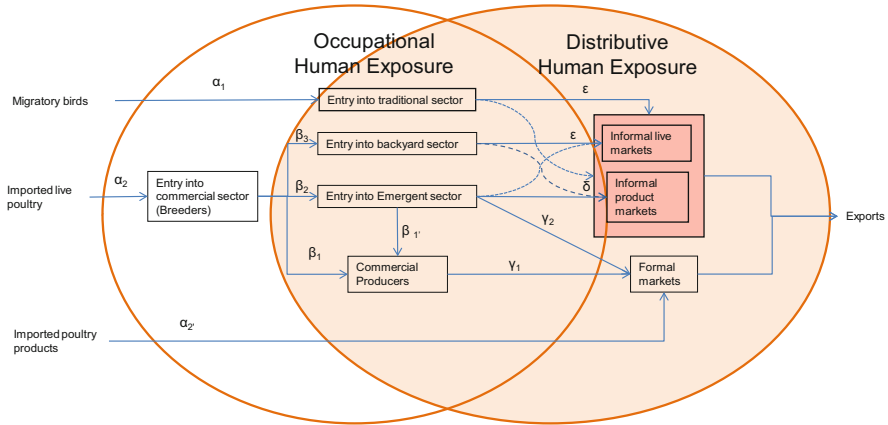


Fig. 2.2 A conceptual risk model for the assessment of the risk of H5N1 introduction in Zambia

potentially be assessed in relation to H5N1 epidemiology, ecology and policy that would need to be instituted to reduce the risk of trade-related H5N1 introduction. These parameters are explained in the summary provided in Table 2.1. In addition to expert opinion and the literature on H5N1 epidemiology, this could potentially form the basis for the analytical framework for the risk release, exposure and consequence.

Such a model would examine (1) Release assessment; involving a consideration of the trade-related, human travel related and aquatic migratory bird related pathways through which viable H5N1 could be introduced into Zambia from affected trading partners and regions including border inspection and SPS protocols; (2) Exposure assessment; involving a consideration of the pathways through which Zambian poultry and poultry products and high risk humans (occupational exposure) and consumers (distributive exposure) could be exposed to H5N1 following trade-related, human travel-related and aquatic migratory bird-related introduction. This would examine biosecurity, husbandry, wild bird and domestic bird contact rates and food safety protocols (3) Consequence assessment; involving a consideration the ways in which an H5N1 outbreak(s) would affect public health, the economy, or be spread further to Zambia's export markets. This would examine losses to the poultry and related industries, health system effects and the wider economic consequences (4) Risk estimation; involving a summary of the previous estimates.

Conceptualized like this, such a risk model would examine zoonotic H5N1 entry into poultry production systems, release *into* these poultry production systems, possible routes of exposure of other poultry flocks and the risk of human beings contacting potentially infected poultry and poultry products. The aspect of exposure of human beings to zoonotic H5N1 is fundamental, since in Zambia, for policy-makers at least, the zoonotic risk was more important than the effect on poultry industry productivity.¹⁶⁷ Broadly speaking, the human populations at most risk

¹⁶⁷Mwacalimba and Green (2015).

would probably be those working very closely with poultry (occupational exposure) and those working in poultry trade (distributive exposure). An important aspect for the risk assessment to address is actually ‘when’ human exposure is likely to occur following detection of outbreaks in poultry. The literature shows that in other contexts, human cases occurred between a month (Egypt) to a year (Nigeria) after poultry outbreaks were detected.¹⁶⁸ This provides the possible timeframe in which the health system would have to respond in order to reduce the risk of further spread.

2.6 Roles in Multi-Sectorial Risk Management in Zambia

In the OIE code, risk management is defined as “the process of identifying, selecting and implementing measures that can be applied to reduce the level of risk”.¹⁶⁹ The stages of risk management are risk evaluation, option evaluation, implementation and monitoring and review.¹⁷⁰ Risk evaluation involves determining whether or not the risk calculated by a risk assessor requires intervention. Option evaluation seeks to define the nature of this intervention and identify the various approaches available to manage risk.

An important policy question that contextualizes a modified version of the OIE risk analysis framework is ‘who’ manages risk? In the scientific risk literature, it has been stated, rather definitively, that risk management, is undertaken by *risk managers* knowledgeable in policy and in possession of the appropriate level of technical know-how to communicate efficiently with persons assessing risk.¹⁷¹ The same body of work states that risk analysis is intended to assist *decision-makers* weigh the risks posed by particular courses of action.¹⁷² It is important to unpack the terms ‘decision-maker’ and ‘risk-manager’; in developing country contexts, they could refer to different sets of policy actors or the same set of people. In the development of multisectoral zoonosis risk management policy, for instance, the term ‘risk manager’ is actually fluid, applicable to a multitude of stakeholders. In Zambia’s case, for example, there was a 20-person Task Force on Avian and Human Influenza, the Department of Veterinary and Livestock Development, the Ministry of Health, the FAO, the WHO, USAID, the National Agricultural Information Service (NAIS) and the Ministry of Health’s Health Education Unit, all working to ‘manage’ the same risk. In addition, there were stakeholders such as the Poultry Association of Zambia, who acted to manage media-generated *perceptions* of risk: ‘We realized that avian influenza gained a lot of prominence in the press and the prominence was full of fake things and people were just downloading the

¹⁶⁸WHO (2010).

¹⁶⁹OIE Terrestrial Animal Health Code 2010, p. xxii.

¹⁷⁰Murray et al. (2004).

¹⁷¹Vose et al. (2001).

¹⁷²MacDiarmid and Pharo (2003).

Turkey situation or the China situation and making it appear as if it was a Zambian situation. In the 3 months of the AI prominence in the media . . . So we woke up from slumber and took a leading role in the sensitization of our members and also the general public. . .’ (Interview 16 PAZ).

Another consideration for conducting risk analyses in this setting is the importance of the *risk analyst* understanding policy processes, and being comfortable with *explaining* the technical aspects of the risk assessment in accessible ways to different stakeholders. In the context of Zambia and H5N1, at least, there were various technical and non-technical strands to the preparedness effort as it related to the management of H5N1 risk; the public health response, based on the Integrated Disease Surveillance and Response (IDSR) framework; the animal health response, guided by a National Response Plan and also the omitted, but potentially important, trade response, based on their capacity to translate, support or implement trade agreements for the purpose of animal health, plant health or human health protection.¹⁷³ It would be unrealistic to expect that ‘risk managers’ in these different policy communities would have “the appropriate level of technical background to communicate effectively with risk assessors.”¹⁷⁴

The risk analysis process should assist effective risk management by highlighting response system vulnerabilities *across* sectors in the process of characterizing the dynamics of zoonotic risk, and explain these vulnerabilities to the appropriate audience. Risk analysis’ role in informing decision making would be enhanced if risk is considered across the entire policy spectrum and not just from one viewpoint. In this endeavor, a risk analyst should understand that in multi-sectoral settings, there are differences in priorities, norms and policy frameworks which can impact upon the development of a risk management policy. Such challenges include properly linking the risk management policy response to livestock trade and holistically addressing the various conceivable modes of disease introduction and routes for human exposure. The purpose of this exercise is to bring different stakeholders to view risk management in mutually inclusive ways. The risk management process should therefore draw both on multiple framings of risk and the resources of a wide pool of policy relevant stakeholders, to aid the process of assigning roles and resources more appropriately across sectors.

2.7 Policy Considerations for Risk Communication

As long as a policy issue is on the agenda, risk communication is not just about a unidirectional communication to stakeholders about risk, but an evolving process of continuous dialogue across sometimes different epistemic communities. The OIE Code defines risk communication as “the interactive transmission and exchange of

¹⁷³Mwacalimba (2013).

¹⁷⁴Vose et al. (2001), p. 814.

information and opinions throughout the risk analysis process concerning risk, risk-related factors and risk perceptions among risk assessors, risk managers, risk communicators, the general public and other interested parties".¹⁷⁵ For the OIE risk analysis to be useful, there has to be a consideration of who the policy relevant *risk communicators* are for a given risk problem in a given context. There is need to also think about how risk is communicated to, and by, different policy stakeholders, including the public, the media, farmers, medics, veterinarians, decision-makers across different sectors and even the donor community. Equally important is that in the process of risk communication, a context appropriate *forum* is used, allowing for as much dialogue and feedback in the risk analysis process as possible. Such a risk analysis process would derive most benefit if presented both on a forum capable of reaching the largest number of policy relevant stakeholders and in ways that engages the interests of each policy relevant stakeholder. This entails structuring risk in flexible and stakeholder inclusive ways across public health, animal health, trade and more widely. Such a forum and approach would provide an audit of the multi-sectoral zoonosis risk management policy, including the identification of the institutions, resources and policies available for risk management. More importantly, it would be able to mobilize the necessary resources and institutions to enforce and evaluate the risk management response.

2.8 Conclusion

This chapter analyzed narratives on public health, animal health and trade, to better understand the relationship between global understandings of infectious disease risk, and how they impact on the development of local responses to disease problems. We discussed the tensions faced by resource-constrained countries in animal health-public health and trade, with particular emphasis on these countries being potential sources of infectious disease threats. This raised the question of how developing countries, should approach infectious disease risk management as it relates to pandemic scale threats such as avian and pandemic influenza.

Framing assumptions have significant, but sometimes unacknowledged influence on the policy process. Millstone¹⁷⁶ states framing assumptions influence the questions posed, the type of evidence used or excluded, and even how this evidence is interpreted. Therefore, the key to the feasibility of the analysis of the risk of multi-sectoral affecting emerging infectious diseases such as avian and pandemic influenza is flexibility in how risk is framed across the public health, animal health and trade systems. This requires taking explicit notice of multiple risk framings from a diverse cross-section of stakeholders, to better negotiate risk analysis and risk management. Based on the understanding that risk is socially constructed, we

¹⁷⁵OIE Terrestrial Animal Health Code 2010, p. xxii.

¹⁷⁶Millstone (2007).

argued that in the process of hazard identification, it is the recognition of the various framing assumptions that construct the risk in each context that will help foster wider stakeholder inclusion. This, in turn, will take into account the multiple perspectives that exist in resource-constrained countries.

By basing the hazard identification on framing assumptions, the OIE risk analysis framework can be made amenable to more open and inclusive evidence gathering and interpretation, thus treating ‘risk’ and its assessment in a more discursive manner. For instance, rather than seeking to answer one, externally influenced, risk question as the current conception of the OIE risk analysis framework would probably do,¹⁷⁷ this approach uses framing assumptions to develop *multiple* risk questions that speak to the interests of multiple policy relevant stakeholders. Furthermore, by acknowledging these framing assumptions throughout the various stages of the risk analysis process, a better map of the local risk management context can be developed that examines both the scientific aspects of local configuration and the politics of policy processes.

Adopting this approach would help reshape the face of the current multi-sectorial risk management response in developing countries, in which exist uncoordinated, narrow and fragmented framings, overly influenced by international agency funding, evidence and advice. The risk analysis would need to be applied in such a way that it assists stakeholders align resource and institutional priorities to the prevention and management of an infectious disease incursion. By analysing the feasibility of the applicability of the OIE risk analysis framework through a policy lens, this chapter attempted to demonstrate that given the interactions between local context, risk assessment and risk management policy, the relationship between policy and risk cannot be viewed as linear. Therefore, in the context of multi-sectorial risk management, risk assessors should consider taking into account political and social phenomena in the process of risk assessment.

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¹⁷⁷see MacDiarmid and Pharo (2003).

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