

Effective management of food safety networks

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Summary

Emergency networks consist of a range of organisational actors who assemble to respond to all types of risks to public health. As such they are a crucial element of governance and public safety, which is why their successful operation is so important. There has been much scholarly interest in the management of permanent and stable networks. Can this literature provide insights into emergency networks, which, by nature, are likely to be sporadic and unanticipated? This thesis addresses this question using a case study of the 2017 fipronil incident in the Netherlands where the illegal substance fipronil was found in eggs from over 200 Dutch farms. The clear-up process for this contamination was long and costly, financially and to reputations of the egg sector and Dutch government alike.

The research reported here used a conceptual model as well as a theoretical framework that connected two disparate bodies of literature: crisis networks and governance networks. The research reconstructed the network that assembled around the fipronil incident. It also examined the perceptions and strategies of actors within the network through an analysis of factors that influenced the network's operations: media attention and the complexity this adds to governance processes, as well as the interventions taken by the Netherlands food and consumer product safety authority (NVWA) to manage the network's operations as a whole.

The actions of the NVWA in managing the emergency network were examined. The following conclusions can be drawn from the research: firstly, hindering the flow of information in a network is likely to lead to disruptions, increased complexity and possibly even conflict between actors in the network. Secondly, a horizontal organisational structure is valuable in an emergency network not only to enable flows of information but also to facilitate interactions between actors finally, emergency networks benefit from a fluid structure, and these features will not necessarily appear on their own: a network manager might be needed to achieve them. As this research examined two bodies of literature that have previously remained disparate, it demonstrates the importance of broader network thinking, and also suggests opportunity for further research.

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Glossary of abbreviations and names

EZ: Ministry of Economic affairs
 State Secretary, Martijn van Dam
 Minister of Economic Affairs, Henk Kamp

VWS: Ministry for Health, Welfare and Sport
 Minister for Health, Welfare and Sport, Edith Schippers

NVWA – Netherlands Food and Consumer Product Safety Authority
 BuRo: Bureau for risk analysis and research for NVWA
 IOD: Intelligence and investigation body of NVWA
 ICB: Incident and Crisis Management department

COKZ: Central body for issues in dairy

NCAE: Dutch control authority for eggs
RIVM: Netherlands National Institute for Public Health and the Environment
CTGB: Board for the Authorisation of Plant Protection Products and Biocides in the Netherlands

COBK: Central Organization for Hatching Eggs and Chicks
LTO/NOP: Organisation for Agricultural entrepreneurs and the Dutch Organization of Poultry Farmers. Together, the National Poultry Farming Department.
NVP: Dutch Trade Union for Poultry Farmers
CBL: Industry association for supermarkets
FNLI: Umbrella organisation and advocacy group for processing and importing countries in the Dutch food industry
AVENEI: The General Dutch Association of Egg Traders and Egg Product Manufacturers. The trade association for wholesalers of eggs and egg products in the Netherlands

IKB Egg: Quality assurance system for the production of eggs.
PLUIMNED: Poultry meat sector
AVINED: Cross sectoral topics and general support
OVONED: LTO/NOP, NVP and ANEVEI, COBK
RvA: Private foundation and has been designated by the Dutch government as a national accreditation body. The Accreditation Council is an autonomous administrative body accountable by designation Minister of Economy and Climate (EZK). The RvA tests include certification authorities and monitor the quality of their work through audits.

FAVV: Belgian public health authority

1. Introduction, case and problem statement/research question

1.1 Introduction

Food safety networks emerge around food safety crises, like contamination scares. Actors in these networks are bound by their connection to the issue and their mutual need for one another's resources to resolve it. It is likely that these networks are latent: that is, they do not emerge around a single, one-off issue, rather they convene at such times. They have agreed upon norms, protocols and procedures in place. Interactions between actors within these networks shape the next round of action taken by each member of the network, resulting in a complex adaptive system emerging that responds to pressures from the environment (the crisis situation) and also pressure from the actors within the system (Comfort and Kapucu 2006; Teisman 2000). The reactions and food safety measures of the network are thus informed by the network's characteristics and interactions.

An example of such a situation was the fipronil contamination of eggs from the Netherlands that was discovered in July 2017. The emergency network around the egg contamination was made up of actors from a range of spheres: poultry farmers and their representative associations, supermarkets, consumer organisations, parliamentary MPs, departmental government actors, the media and the governmental agency the Netherlands Food and Consumer Product Safety Authority (NVWA). The operations in the food safety network were characterised by unpredictability, nonlinearity and constantly shifting dynamics (Comfort and Kapucu 2006). Upon the occurrence of the contamination being detected after an investigation, action was triggered in the network to resolve the issue. Acting in an oversight position, the NVWA intervened to manage the processes of the network, which in turn activated reaction strategies from other actors in the network. The NVWA's interventions were critically examined by the media, as were the strategic actions of other actors in the network. In fulfilling their oversight role as the governmental body in the network, the intervention of the NVWA had a range of effects, both intended and unintended. This provides a case study in which the intervening management strategies of the NVWA as a public manager can be examined, in terms of its impact on the strategic decision-making process of other actors in the network. It is a case study that allows not only the effects of a

public manager in an emergency governance network to be examined, but also the effects of the media on the actions of both governmental and private actors.

The case itself will now be described briefly in the following chapter, and the corresponding research question(s) will then be outlined. A literature review will follow, connecting relevant theory from a range of fields that deal with crisis networks, governance networks, media attention, network management strategies and management of emergency networks to form a theoretical framework. After a conceptual model is introduced in Chapter 3, methods for data collection and analysis will be outlined in Chapter 4. Chapter 5 will outline the rules and regulations of the Dutch egg supply system for context and introduce the actors in the emergency network and their respective positions. A section on media attention concludes Chapter 5. Chapter 6 will analyse the events of the fipronil incident using the rounds concept, and strategic features of the network (Teisman 2000; Klijn 2007; Klijn and Koppenjan 2016). Chapter 7 examines the interventions of the NVWA with respect to network management activities. Chapter 8 evaluates the outcomes of the network to examine the extent of its success. Chapter 9 draws conclusions from the case study about the operation of emergency networks as governance processes, the impact of media attention on such networks and the effect that interventions of network management can have on these situations.

1.2 The case

The following chapter briefly describes the case study that will be used to examine governance processes in emergency networks.

1.2a Chickfriend

The food safety network surrounding Dutch eggs for sale in supermarkets sprang into action in July when, on the 7th, the NVWA performed an initial inspection of a cleaning company they received information about, Chickfriend. Chickfriend had been in operation since 2014. One of the services it provided was the removal of blood lice from hens, which is a notoriously difficult task. Chickfriend had been used by around 25% of farms and was reported as being highly effective in removing blood lice via a cleaning agent. According to farmers, this cleaning agent had been tested by WUR. Its van also had the IKB logo on it,

leading to assumptions that it was IKB certified to control pests. Chickfriend was certified by IKB to perform some cleaning tasks but not to control pests. When queried about its successful cleaning agent, the company cited natural oils as the miracle ingredients, and something called 'Dega-16'. Chickfriend wouldn't share detailed information about this chemical because of competition. Farmers who had requested analyses of the chemicals received certifications without mention of fipronil (Personal interview, 2019). According to sector representatives, the legal obligation of the sector had been fulfilled.

1.2b Discovery of fipronil

During the inspection on July 7th, two tonnes of non-permitted biocides were found on the premises. A second inspection revealed fipronil on the premises. The NVWA seized administrative records of the company on the 18th, and when the wide use of this cleaning agent throughout farms in the Netherlands was understood, the situation was officially declared an 'incident'. On the 20th of July, the EU Commission of Food Health and Safety were alerted and oversee the NVWA's actions to halt the contamination.

1.2c Blocking and media

By August 1st, 180 Dutch poultry farms were temporarily closed from sale of eggs based on Chickfriend's records and 78 more farms came forward to say that they used this cleaning agent from Chickfriend. In all, 258 farms were temporarily blocked by the NVWA throughout the incident.

Millions of Dutch eggs were blocked from sale in Belgium, Germany and the Netherlands after levels of fipronil were detected. This chemical is classified as moderately hazardous and not fit for human consumption (WHO 2017). Some supermarkets announced that they had pulled all eggs from sale until more was known about the risk to public health. By this stage, in mid-August 2017, 17 European countries had been affected, and markets outside the EU as far as Hong Kong had found fipronil-contaminated eggs. A simple search on news database NexusUni reveals that 3,730 news stories on fipronil from Belgium, Germany and the Netherlands were published in August alone in 2017. Media coverage ranged from reported raids on the homes of the convicted directors of Chickfriend to statements from various other actors in the network, to the progress of the removal process of contaminated eggs from sale.

1.2d Risk to public health

Less noticeable in the media coverage of the events were statements clarifying the relatively low risk that fipronil posed to humans, if consumed. Despite the initial advice from the NVWA advising that eggs from only 27 farms should not be eaten by children (Boffey 2017), a follow-up statement from the NVWA advised people to avoid Dutch eggs until more was known. This was labelled 'fear-mongering' by Eric Hubers, head of the Dutch poultry farmers association, as all eggs that were at risk of contamination had been recalled and destroyed by this point (Pieters 2017). The clean-up took many months and resulted in the livelihoods of many producers being damaged, as well as an injured international reputation of the Dutch egg sector, and of the Dutch public health authority. The relationship between the sector and government actors became strained and tensions were high throughout the incident.

From this series of events, a number of key points in the decision-making process can be observed: the initial intervention of the NVWA to advise that fipronil was present, the response from other actors in the network, the changing nature of the situation as media attention increased, and the subsequent interventions and responses from the NVWA and other actors in the network. The following chapter presents the problem statement and research questions to be answered.

1.3 Problem statement and research question

1.3a Problem statement

In cases of emergency like a food contamination scare, actors from a range of organisational backgrounds assemble quickly into a network to resolve the issue. By their nature, these networks are loosely formed and latent in nature. They networks convene in times of uncertainty, when an unpredicted and usually dangerous incident occurs. The network assembles to achieve the goal of resolving an emergency situation concerning the food supply, so the outcomes of the network are relatively high stakes. They are also made up of actors that, due to the range of organisational backgrounds, hold varying perceptions and interests (Klijn and Koppenjan 2016). While the network likely has some established

protocols and norms, the institutional backgrounds of the actors will form a strong presence. Actors will strategically pursue their objectives, informed by their specific perceptions, but clustered around a single goal: resolving the crisis situation (ibid). Public managers assume a critical oversight role in these periods as public governance tends to take precedence over any voluntary private protocol (Albersmeier, Schulze, Jahn and Spiller 2009: 927).

1.3b Media attention to emergency networks

Additionally, and importantly, emergency networks will also likely be monitored very closely by the media. Actors, particularly public managers, must cope with this scrutiny and the magnification it throws onto their decision-making. However, there is little research in the emergency response field that focuses explicitly on the governance of these networks (Tierney 2012). Some recent scholarly attention to emergency networks has reframed them as complex adaptive systems, the management of which is covered in governance network literature (Comfort 2007). In this context, the oversight role of public managers in the processes of these emergency networks can be looked at further, particularly with regard to network management strategies. There is also room for further investigation into the interactive relationship between public managers and media actors in the context of complex governance processes (Klijn and Korthagen 2018).

1.3c Managing emergency networks

It has been established that such networks assemble in relatively high-stakes circumstances, and the outcomes of these networks are therefore likely to be important to controlling public exposure to risk. Ensuring these outcomes are achieved, then, is crucial in protecting the health of populations. This is why oversight roles in these networks are so important: some steering is required to navigate issues that are faced by the networks.

It has been shown that a set of steering techniques labelled 'network management strategies' can address issues related to complex processes in governance networks, and also issues related to media attention (Klijn et al 2010; Klijn 2016). These management strategies have been shown to improve the performance of governance networks in situations where policy activity and organisational infrastructure are established and ongoing. These strategies

are hinged on the proviso that time can be spent on such activities (see Koppenjan and Klijn 2016: 150, Klijn 2016: 124).

It has also been shown that issues related to complexity and media attention exist in a different kind of policy situation; unexpected or emergency events where special-purpose and ad-hoc policy arrangements are called for. It may be that network management strategies can enable this, as with governance networks in other policy areas, but not enough is known at present to advocate this approach be applied by public managers in emergency policy situations. The existing literature on emergency network effectiveness suggests this may be so, but there is room for exploration at the intersection of crisis management and network management.

Whether a 'food scare', faulty infrastructure or another event that puts public health at risk, governance mechanisms that effectively manage the networks handling these unpredictable incidents are needed. The fipronil case in 2017 is an appropriate example for analysis because the handling of the case shows that these networks are made up of actors with multiple and often diverging perceptions, creating substantive complexity. It also provides a good example of the impacts of media attention.

1.3d Research questions

Firstly, there is a question as to what impact the strategies used in this emergency policy situation had on the outcomes of the case. The main research question is therefore *'Which strategies were used by actors in the 2017 fipronil contamination network, what was the role of the media, what was the impact of intervention strategies by the NVWA on the outcomes of the network and what can be learnt for future interventions?'*

This thesis will then use sub-questions to delve further into the main question.

- a) *What does the network around the fipronil contamination case look like with regards to the actors involved and their corresponding perceptions?*
- b) *What are the corresponding strategies (and objectives) of actors in the network?*

- c) *What effect did media attention (and framing) have on the strategies of actors in the network?*
- d) *Which management (intervention) strategies were used by the NVWA and what was their impact?*
- e) *What can we learn for future interventions by examining the outcomes of this network?*

The chronology, actors, communication and network/media management strategies in the 2017 fipronil contamination event in the Netherlands will be examined to assess the (1) strategies used by actors in the network (2) intervention by the NVWA in managing the network (3) impact of media attention on the strategies of the actors and response of the NVWA (4) fit between problems encountered in this case and the problem conceptualisations used to support network management and (5) between administrative structures and practicalities of this case and the practices/strategies prescribed in network management.

2. Theoretical framework

2.1 Crisis networks

An emergency network is defined here as a number of organisational actors, linked by their mutual interdependence on one another's resources to resolve a crisis situation in a dynamic environment. The network is latent until the period of crisis, when it springs to life. Response to the situation requires co-ordination and decentralized decision-making rather than command as organisations must seek to control damage 'outside their defined areas of control, within their respective arenas of operation' (Comfort et al. 1989: 19). Public, private and non-profit actors mobilise resources and resolve these complex events only through combined efforts.

By their nature, emergencies span across organisational and institutional boundaries. As such they require a co-ordinated, collaborative approach. The context of a crisis adds considerable complexity to the already difficult task of interorganisational, horizontal management (Christensen Lægreid and Rykkja 2016). Effective communication and co-ordination, then, is a focal point of research in this field, which has led to management theory

being employed by some (Kapucu 2006). Another crucial aspect is the contextual significance of decision-making in a situation of crisis: risk, uncertainty and their impact on decision making therefore play an important role in crisis management (Anand and Forshner 1995). Standard emergency management literature then tends to revolve around ‘the three C’s’: communication, coordination and control (Comfort 2007: 189).

2.1a Existing literature

Crisis & disaster theories can be divided into four broad categories of literature: decision making and decision theory, followed by leadership and management, then social theories generally calling for a better understanding of social aspects of crises and disasters, and finally economic theories projecting financial impacts and calculating risk (Sementelli 2007). These categories can be organised according to their concern for tools (a more tactical focus), or concern for processes (a more reflective process) (Sementelli 2007:499). Tool-based literature like decision theory and management focuses on ‘hyper-rational structures’ and models, rather than the more critical approach of ‘process’ approaches like social and economic theories (Sementelli 2007; Boyd, Chambers, French, Shaw, King and Whitehead 2014). There have been calls for the more popular tool-based approaches to be modified to include more reflective elements, as a purely technical approach can have issues, such as ignoring the importance of media in transmission of messages (Sementelli 2007; Anand & Forshner 1995: 231). So-called ‘hyper-rational’ approaches to crisis management can be bolstered by the inclusion of these social contributions that acknowledge the ‘messiness and politics’ of reality (Boyd et al. 2014).

This theoretical framework does not include literature concerning strategic planning for individual organisations, firstly because the focus of the research is on networks, but also because the network literature acknowledges the chaotic conditions under which decisions are made in crisis situations better than the literature covering strategic planning for firms. There has been much less attention on crisis *networks*, but we now look at the existing areas of focus in this literature.

2.1b Horizontal networks and interdependence

There is general a consensus amongst crisis network scholars that a horizontal, fluid organisational structure is necessary for effective operation. However such a structure also presents a series of tensions for actors in the network. The 'paradox of interdependence' explored by Comfort, Abrams, Camillus and Ricci (1989) for example, refers to the dual effect of interdependence in communities to increase productivity and effectiveness, while simultaneously enabling the transmission and amplification of errors. In answer to this, a dynamic system of information sharing is put forward, to increase the collective capacity for action within and between organisations in crisis situations (Comfort et al. 1989: 37). A second tension is the transformation that organizational structures must take in times of crisis: from the usual bureaucratic compartmentalisation particularly common in public organisations, crisis networks must take on a much more fluid, horizontal form (Kapucu 2006; Lagadec 2005: 162; Comfort 2007; Comfort et al. 1989: 37). Information sharing and connectivity are key to problem solving and collective action in emergency environments. A hierarchical structure has the potential to isolate parts of a network if any 'nodes' at the top experience failure (ibid). Horizontal structures enable much more access across the network and, in turn, better information sharing and general connectivity, so can therefore better underpin research on emergency networks.

2.1c From a static model of emergency networks to a complex adaptive system

The static, 'standard model' of emergency response of communication, co-ordination and control is focused around successful information sharing, shared professional norms and standards and effective leadership (Kapucu and van Wart 2008: 280). However, Comfort (2007) calls for a conceptual reframing of interorganisational crisis management to enhance its flexibility and adaptivity to the dynamic, ever-changing environment of an emergency. The standard model lacks cognition, or 'the capacity to recognise the degree of emerging risk to which a community is exposed and to act on that information' (Comfort 2007: 189). Adding this 'fourth C' to the framework of communication, coordination and control increases the ability of a response network to react to information. Reconceptualising the response network as a complex adaptive system acknowledges the need for the network to recognise and correct mistakes where necessary (Comfort 2007: 189; Heylighen 2008). This goes some way in answering the complaint that theories of crisis management are too based in 'hyper-rational structures', as by modelling response networks as complex adaptive systems there is

room for the network to evolve according to what the environment calls for. Acknowledging the need for cognition enables correction and feedback loops in strategic plans. However, existing literature still tends to ignore the ‘messiness’ of reality, as Boyd et al. (2014) call it. Another missing element in existing literature is how crisis networks can be organised in such a way that these conditions can be achieved. This research will answer these current deficits, and will approach crisis networks with the importance of self-organisation, feedback loops and *design* in mind (Comfort 2007: 195; Gerrits 2012). Such systems require design to enable this cognition, communication, and co-ordination.

To answer this deficit, the research will turn to literature that acknowledges the complexity of decision-making in collaborative networks of governance. Decision-making through collaborative networks and the design, or management of these networks are dealt with in public administration literature. The next section looks at this literature, specifically that around networked governance, as a framework for better understanding decision-making processes that take place horizontally across a range of organisational actors in complex networks.

2.2 Governance Networks

This section will connect literature on networked governance to the phenomenon of emergency networks. Society currently faces issues of great complexity, requiring a breadth of expertise from actors of many different organisational and professional backgrounds. Scholars have therefore observed a shift from government to *governance*: a more horizontal approach to problem solving. For example, Sørensen (2006: 98) describes the exercise of sovereign rule by a ‘parliamentary chain’ of governing making way for a host of stakeholders and private actors who have gained the ability to partake in public decision-making. In a similar vein, Rhodes (1996: 652) defines governance as a departure from direct power exercised by traditional nation state institutions, towards the involvement of market and civil society actors alongside traditional hierarchies. This *networked* form of policymaking, implementation and service delivery has been defined as a ‘governance network’. Klijn and Koppenjan describe this increasingly horizontal approach to solving such complex problems (2016: 11): ‘[M]ore or less stable patterns of social relations between mutually dependent

actors, which cluster around a policy problem, a policy programme, and/or a set of resources and which emerge, are sustained, and are changed through a series of interactions’.

Governance networks are characterised by a collection of actors from different societal spheres around a policy or policy issue. Actors in this network are connected through their need for one another’s’ resources, creating interdependence. Some actors are in possession of particularly crucial resources, and therefore may hold a greater amount of power in the network than other actors with more substitutable resources.

Governance networks are most frequently seen to form around policies or policy issues that are complex in nature, because these issues can’t be solved effectively by a single governmental department but instead require the expertise from a range of societal actors (Klijn and Koppenjan 2016). Complexity here is defined as the phenomenon of dynamic systems in which components interact in unpredictable and ever-changing ways, components themselves are subject to change, and the system as a whole is shaped by the interactions between these components (Gerrits 2012; Heylighen 2008; Klijn and Koppenjan 2016: 12). It can be distinguished from chaos because enduring patterns between components do emerge for periods of time (Klijn and Koppenjan 2016: 12).

While most definitions of governance networks do not include emergency networks that assemble in times of crisis, this thesis will determine whether the definition can be extended to include these circumstances. One of the key conditions that will be established is whether the unique conditions of a crisis and its response network allow the application of governance network literature. The next two sections detail the complexities faced in governance networks, and examines the applicability of these complexities to emergency networks.

2.2a Substantive complexity and ways of knowing: Policy problems are not objective

In governance networks, each actor that enters the network does so with its own range of perceptions and values, due to the substantive difference in their organisational backgrounds. This can create contested knowledge and diverging perceptions about the problem that should be addressed, its nature, and the solution to the problem (Klijn and

Koppenjan 2016: 41). Klijn and Koppenjan (2016:12) observe what they refer to as substantive complexity in governance networks: ‘uncertainty and lack of consensus over the nature of problems, their causes and solutions’. This type of complexity emerges in part as a result of multiple problem perceptions being present in a governance network and cannot be easily eradicated because the information and research findings informing ones’ view of the problem and its solution can be easily contested: that is, others do not have to reach very far to find information that directly contradicts these findings (Klijn and Koppenjan 2016: 42). Van Buuren and others (e.g. Feldman, Quick, Khademian, Ingram and Schneider 2006; Feldman, Khademian and Quick 2009) provide an explanatory lens for this when they refer to *ways of knowing*. As Feldman et al (2009) put it: knowing, and enacting knowledge occurs “in collective, emergent, pragmatic, situated, and historical ways”. *What* one knows cannot be separated from *how* one knows. Van Buuren (2009) also adds that these ways of knowing encompass frames, interpretations and normative perceptions of realities.

Ways of knowing

Feldman et al (2006) explore the close ties between interests and ways of knowing, and connect this to the necessary process of negotiation in policy creation. Actors from diverging backgrounds may share interests when they meet to discuss complex policy issues, but this means little if their views about how to realise these interests are opposing. These differences in ways of knowing may cause blockages in decision making processes if they present drastically dissimilar paths to achieving interests and these paths cannot be reconciled. The authors suggest the creation of *new* ways of knowing as a technique to deal with such blockages: allowing actors to appreciate one another’s way of knowing can result in a new, negotiated way of knowing that shrinks the distance in perspectives between actors and can create a path to the realisation of a common interest. This will be returned to further in the chapter, when network management practices are being discussed (Section 2.6)

Substantive complexity that is observed in governance networks can then be understood as a result of the ways of knowing that are brought to governance networks and the diverging perceptions around problems, their nature, and their solutions. In the context of decision making in a crisis situation, the problem representation may vary from actor to actor. So too might perceptions about who is responsible for what. It can be expected in

emergency networks that the range of interests is often quite small – the general focus of the network is to resolve a common crisis. What will differ is the ways in which actors believe this resolution should be carried out: this will influence the chosen strategies of each actor in a network. Substantive difference in perceptions between actors can increase decision making complexity in governance networks because it will influence their views on how a common interest can be realised, how other actors in the network should respond to an issue and also the strategic positions of actors in a network. An emergency situation might exacerbate this complexity because of the rate at which decisions must be made.

Currently, however, literature about perception differences in emergency networks is lacking. This research hopes to answer this deficit, and will test the relevance of governance network literature on perceptions to do so. We now look at the strategic behaviour of actors in a governance network.

2.2b Strategic decision making and the rounds model: Interdependence does not guarantee co-operation

As a result of many actors being involved, governance networks are also characterised by the multitude of interests and – sometimes conflicting – desired outcomes from the processes in a network. These can be referred to as ‘objectives’, defined by Klijn and Koppenjan (2016: 78) as ‘the targeted realisation of an actor’s perceptions that can be operationalised in a network’. Strategic behaviour is used by these interdependent actors to influence the actions of others in the network’s processes and secure their required resources (Klijn and Koppenjan 2016: 108). Much of this strategic behaviour is based on actors’ *perceptions* about behaviour of others in the network rather than actual knowledge, as communication between actors in a network is occurs in the fractured setting of ‘arenas’ (Ostrom 1986; Klijn and Koppenjan 2016: 70 and 90). Decision-making in networks takes place in arenas across ‘rounds’ of interactions (Teisman 2000; Klijn and Koppenjan 2016: 84). These processes can be chaotic and unpredictable due to the unexpected strategic moves often employed by actors, and also because it is not necessarily so that all actors are present in each round (Klijn and Koppenjan 2016: 84).

2.2c Phases and Streams

Teisman (2000) proposes the rounds model as a tool for reconstructing and analysing decision-making processes. It can be viewed as an alternative to a more phase-based approach, where analysis of decision-making takes a temporal view to the process: decisions – or policies - are formulated, adopted (agreed upon) and implemented (Teisman 2000: 940). This model is based on the assumption that decision move neatly through these phases, and consensus is reached at each stage before moving to the next. However the number of actors involved in these processes, each with their own perceptions and objectives makes this situation somewhat unlikely. It has been shown that in complex decision-making processes, official decisions can precede actions that cannot be classified as implementation (ibid). The rounds model too can be held in distinction from the so-called ‘stream model’, where problems, solutions and ‘politics’ are viewed as three distinct horizontal streams of activity (Teisman 2000: 942). These streams are largely independent of one another, and policy change occurs when a link appears between the three.

2.2d Rounds

In the rounds model, the phase model is combined with the stream model (Teisman 2000: 944). Decision making is made up of a series of rounds, with each informing the next in some way. Each round of decision making also produces at least one, but often more definitions of the problem and its solution (Teisman 2000: 939). Actors can be seen to ‘score points’ if the result of a round is their preferred problem and/or solution definition, and this also defines the beginning of the next round (Teisman 2000: 940). Each round holds the potential for the entry of new ‘players’, changing rules and shifting directions. The rounds model is hinged on the idea that problem and solution definitions are not permanent, due to the many perceptions and objectives of actors in the process. These features are dynamic in themselves and can change, overlap and contradict one another throughout the decision-making process (Teisman 2000: 945).

One of the key reasons that multiple definitions can exist simultaneously in the decision-making process according to the rounds model is that actors in the model are connected primarily through their possession of indispensable resources, and their dependence on the resources of others, rather than an alignment of interests, perceptions or objectives. For example, one actor’s suggested solution could be a problem according to

another actor's perceptions and objectives, but they are bound to the issue (whatever it is) because they require one another's resources. The evolution and outcomes of the processes within the rounds model are also largely determined by the types of strategies that actors bring with them to the decision-making processes (Klijn and Koppenjan 2016: 84). These mixes of strategies can lead to blockages, stagnation, impasses and breakthroughs, depending on their limiting or stimulating influence on interaction processes. Klijn and Koppenjan (2016: 84) refer to these as *game types*. For example, 'go-alone' type strategies will likely have a more limiting influence on the decision-making process than co-operative strategies (ibid). These strategy mixes are not fixed, and evolve throughout the course of time.

2.2e Complexity and rounds

The rounds model is therefore characterised by nonlinearity, unpredictability and dynamism (Klijn and Koppenjan 2016: 89). The demarcation of rounds can be conceptualised as the point at which various *crucial decisions* are made, the definition of which is at the discretion of the researcher (Teisman 2000: 946; Klijn and Koppenjan 2016: 86). The rounds model is a useful conceptualisation of the strategic nature of governance networks. Actors are working strategically to pursue their own objectives, bound to a network by their need for the resources other actors possess, and their own contribution of resources to the network.

In the context of emergency networks, again, there is a deficit in this type of research. Current literature focuses on networks of a more permanent, long-term nature. This research will apply the rounds concept to an emergency network, where decision making takes place in a context of urgency.

2.2f A note on institutional complexity

Scholars have also identified complexities arising from the institutional characteristics of a network – for example, the range of institutional logics that actors bring to governance networks from their respective backgrounds (Klijn and Koppenjan 2016: 107). The institutional features of the network are not explored in this thesis. The research is concerned primarily with the dynamics of the networks and the management of the processes *within* the network, rather than the structural features of the network itself.

2.3 Media logic and pressure to act

Alongside the complexities identified above, complex governance processes are increasingly monitored by media (Klijn and Eshuis 2012; Klijn 2016). This affects governance processes in a variety of ways. Hjarvard (2008) notes that media is permeating society's institutions to the point that they are no longer separate from them. This is the social and cultural process of mediatisation. Through mediatisation, then, and as a separate institution as Korthagen and van Meerkerk (2014) observe, media play an important role in legitimising processes. Media can legitimise processes through influencing sources of democratic legitimacy and acting as a vehicle for stakeholders. However, media also shape and select information themselves (Korthagen and van Meerkerk 2014: 706). This emerges as a result of the processes of news-making led by media's own rules, aims, constraints, and production routines – called media logic (Altheide and Snow 1979 in Korthagen and van Meerkerk 2014: 706).

The effect of media logic on decision-making processes in governance networks is increasingly an area of research interest, firstly because media as an institution of their own are likely to amplify aspects of governance processes according to their own logic, creating more complexity. Secondly, media attention on governance processes should be studied because according to mediatisation and its encroachment on society and culture, media are likely changing the decision-making behaviour of public managers (Hjarvard 2008). This call has been recently answered by some governance scholars (for example Klijn 2016; Klijn and Korthagen 2018; Korthagen and van Meerkerk 2014), but if the extent of media influence described by Hjarvard (2008) and others (eg Strömbäck and Esser 2014) is to be believed, it should form a substantial part of any examination of governance processes. Some relevant literature about media and governance processes is drawn upon below, but a stronger connection can be made between Comfort's (2007) framing of emergency networks as complex adaptive systems, Kapucu's (2006) observation of the activities within emergency networks and the highly disruptive role that media can play in emergency situations. This research will therefore dedicate considerable energy to examining the role of media attention in the events of the network.

2.3a Tensions in media logic

Several tensions have been detected between the logic of governance processes and media logic - so-called 'backstage logic' and 'front-stage logic' respectively. These two sets of logic are distinct from one another because the two groups of actors are pursuing different objectives and following their own institutional rules. The resulting tensions between the two create further complexity in governance networks (Klijn and Korthagen 2018: 103).

The backstage logic of governance is characterised by the multiplicity of actors involved in decision making, the complexity emerging from different perceptions about the nature of the issue and its solution, the interdependence between these actors and the negotiation and efforts to connect actors to find satisfactory solutions for the range of perceptions present in the network (Klijn and Korthagen 2018). Governance processes, in seeking common objectives, problem definitions and solution definitions to guide decision making aim to satisfy the greatest number of actors involved – or at least ensure that no actors are placed in a worse position to where they started. Unsurprisingly, these processes are a balancing act.

Backstage logic can be contrasted with the 'frontstage logic' of media, the rules of which have been categorised into three dimensions by Strömbäck and Esser (2014): Professionalism, commercialism, and media technology. Professionalism refers to the norms and values distinguishing journalism as a separate institution. Commercialism describes the nature of media as profit driven, requiring revenues and how this affects content selection and creation. Media technology refers to the platforms of communication used by media, and the effect of transmission on content production (Strömbäck and Esser 2014: 249). Much like the backstage logic of governance, these dimensions are dynamic, and do not often form a coherent set of rules (Klijn and Korthagen 2018: 104).

2.3b Biases in media logic

Bennett (2016: 36-39) identifies four information biases in media logic: the emphasis of drama, fragmentation of news and removal of context, emphasising personal aspects of news stories and a preoccupation with order, and whether authorities are able to maintain or regain control and order – called authority-disorder bias. Considering governance

processes are often characterised by conflict and negotiation efforts to find broad-based solutions that satisfy a range of perceptions, there are many opportunities for media to capitalise on these biases in news reports. Exposing drama and conflict within governance processes affects their successful negotiation because it highlights rifts between actors and prompts actors to contrast their positions with others in the network (Klijn and Korthagen 2018: 107). The complex character of issues can easily be lost in news reporting due to the commercial dimension of media logic and the need for short, soundbite-able stories (Klijn 2016: 119).

Further, media attention around governance processes can create pressure for actors to react, leading to additional external events and increasing the erraticism and unpredictability in governance networks (Klijn and Korthagen 2018: 107). This attention might also call for actors to 'profile' themselves more strongly against negative media reports, creating increasingly conflicting strategies (Klijn 2016: 119). Negotiation, compromise and joint exploration become less likely in these conditions. Media attention, via 'frontstage' media logic and its tension with 'backstage' governance logic can hinder the already fragile decision-making processes in governance networks. Emergency situations exacerbate the pressure and increase the prospects for rifts between actors and their interests to be made public by the media. Further, the time allowance for negotiated solutions is likely to be much less for crisis networks, so there is less time for actors to reconcile their differences in the way governance literature prescribes.

The combination of media interest in a good new story, and the conditions under which decision-making processes take place in crisis situations means that there are many opportunities for the role of media to complicate the activities of a crisis network. Media interest in food scares specifically will now be explored.

2.4 Media and food scares

2.4a The risk society

The media's rising preoccupation with food scares in the past two decades has been observed by scholars (Elliott and Greenberg 2016). It is in part due to the 'risk society' age

that we find ourselves in, where the public is increasingly concerned with its safety, and many observe a distance between measurable risk and the insecurities society faces (Beck 2002). As Elliott and Greenberg (2016: 252) put it: ‘the line between relatively minor health scares and warnings of catastrophic events is blurring’. For example, the EU has created a network from farm to fork that ensures the highest degree of traceability. This means that Europe’s ability to respond to food scares has never been higher, but it appears to be in juxtaposition with the public’s feelings towards the food supply chain (Bánáti 2014). This ‘risk society’ means that media coverage of environmental concerns, terrorist attacks or food safety scares is likely to ‘sell’.

However, it is important to note that the media has also played a part in its creation: social perceptions of risk are often as significant as the risks themselves, and as media logic favours drama, reporting on these events is likely to amplify risk (Elliott and Greenberg 2016; Klijn 2016). In the case of food safety risks, media attention is particularly important because of the urgency to communicate potential danger with the public as quickly as possible. The role of communication in food scares can affect public confidence more than the actual risk to public health safety (Elliott and Greenberg 2016). Although it has been noted that actors in a food safety network are likely to be constantly approached for comment during these periods, and there is pressure to be seen to be ‘doing something’ (Klijn and Korthagen 2018: 107), the full effects of media attention on the strategies of actors in an emergency networks can be further explored. This research will examine just that.

2.5 Stabilising factors of a complex network

In the face of such complexity, scholars have also pointed to a number of processes and elements of complex networks that prevent them from sinking into chaos. These processes are a large part of the reason that such networks exist, and do so on the edge of order and chaos. The ‘ordering’ elements of complex networks have been divided into three categories by Klijn (2007). These are rules, patterns and trust. They can be further divided into four ‘focal points’ (Klijn 2007: 264): resource dependency, interaction patterns, rules and regulations and trust relations. They will be expanded upon in the following sections.

2.5a Resource dependency between actors

Actors are bound by this dependency, particularly so when there are few substitutable resources they can turn to outside of the network. This stabilises the network because it prompts an understanding between actors that any differences in perceptions, strategies or objectives must be navigated to some extent, due to the reliance actors have on one another to access the resources they need. An emergency context will likely exacerbate this dependency because it is likely that few resources will be substitutable in a crisis situation, and the urgency of the situation demands swift action be taken, allowing less time for alternative courses of action (Klijn 2007: 265).

2.5b Interaction patterns between actors

Interactions between actors in a network often stabilise into a patterned order. These patterns make communication between actors easier because they are more predictable. Certain actors may begin to contact one another more than others, using particular channels, or on a particular time schedule (daily, weekly etc.). This reduces chaos in a network because it creates a form of order for actors. Emergency

2.5c Rules and regulations

Similarly, the establishment of rules in a complex network create order. These rules might be informal or formal, emerge out of patterns or be created consciously by actors. They can determine the 'setting' of the network (arena rules), or access to parts of a network (interaction rules). They can determine the nature of interactions that take place in a network, the language used, and even the distribution of power between actors. These rules and regulations reduce chaos because they become 'signposts' in the network that actors can rely on (Klijn 2007: 266). In an emergency situation, the context can be particularly chaotic. Therefore signposts in the form of rules and regulations can be crucial in creating some sort of order for actors to follow.

2.5d Trust relations

Trust reduces chaos by lowering the uncertainty between actors in a network. It encourages exchange of information and provides reassurance to actors about the behaviour they can expect from others in the network. It stabilises a network by facilitating cooperative action (Klijn 2007: 269). However, trust is created through sustained interactions between

actors and can be easily broken - if an actor does not fulfil a requirement that they promised another, for example. It is unlikely to emerge without a 'solidified history' of strong interactions and dependable actions (Klijn and Koppenjan 2016: 98). For emergency networks that remain latent until a crisis situation, these interactions might be missing.

This thesis will not operationalise these concepts in its empirical analysis. They are explained here because they are crucial aspects of governance networks and must be understood as such. These stabilising features partially explain the existence of complex networks: if the level of chaos in such networks became a dominant feature of the networks, they would cease to exist because they would not function at all. Therefore they can be thought of as the binding elements providing order in amongst the complexities of a governance network (Klijn 2007: 264).

However such features only give part of the explanation because complex networks have been shown to operate more effectively from direct and deliberate management (Klijn and Koppenjan 2016; Klijn, Edelenbos and Stijn 2010; Klijn 2007). This management can be performed by actors within the network or another external manager. Often, it is a public manager – that is, a public organisational actor, that performs this role. Governance networks involve a range of actors from many societal spheres – including the private one. Establishing a public manager in an oversight position can ensure the governance network is still operating to achieve the societal goals that it intended to (or at least ensure the interests of society are represented), as well as satisfying the interests of organisational (private) actors within the network (Sørensen 2006). The following section looks at the body of literature concerned with the management of governance networks.

2.6 Management of governance networks

This section details a range of literature about the management of complex networks. It will address each aspect of complexity that has been discussed above.

2.6a Inclusive management of knowledge

As discussed in Section 2.3, policy issues can be conceptualised as ways of knowing: that is, an actor's understanding of a situation is based on their perceptions and this will impact their perspectives and decision preferences. Feldman et al. (2006) propose the use of this conceptualisation as a means to further the practice of 'inclusive knowledge management'. This practice has two broad aims: firstly to enhance actors' appreciation of one another's perspectives on an issue to create and implement better policies, and the second is to create a collective space where actors with different ways of knowing can work together in a deliberative democratic forum to solve problems (Feldman et al. 2006: 93). The authors view this as a task that should be taken up by public managers in their quests to solve problems in an inclusive manner (ibid). Inclusive knowledge management can result in 'coproduced meaning' through the interaction of differing ways of knowing (Lejano and Ingram 2009: 653).

As networks and their processes are dynamic, they must be tended to in order to achieve desired outcomes. Because of this, intervention by public managers is possible, and through this intervention the introduction of new or altered ways of knowing. Feldman et al. (2006) posit this approach to collaborative decision making as an alternative to literature that examines the phenomenon of 'falling into' collaboration (e.g. Ansell and Gash 2006). The inclusive knowledge management approach is not born out of conflict, rather it emerges out of addressing the range of perceptions (or ways of knowing) that are brought to a policy network, and seizing this fact as an opportunity.

2.6b Management of processes

As scholarly attention to complex decision-making and networked governance has increased, so too has interest in how to manage these networks to produce the best outcomes. These management activities have been broadly labelled 'network management' (Klijn 1995, Klijn and Koppenjan 2016: 150; Klijn, Edelenbos and Stijn 2010). Network management can be defined as 'deliberate attempts to govern processes in networks' (Klijn et al 2010). They can be further categorized into either process management strategies, which focus on the interactions occurring within a network, and institutional design, which looks at the structure of the network (Klijn et al 2010). As process management strategies focus on the activities and interactions that occur within a network, many of the network management strategies relevant to the complexities identified above fall under this banner.

In managing complexity associated with the differing problem and solution perceptions of actors in a network, proposed process management strategies are centred around making parties aware of the existence of various problem perceptions, and thereby managing the variance in perceptions and proposed solutions, similar to inclusive knowledge management (Klijn et al 2010; Klijn and Koppenjan 2016: 126). Complexity emerging from the unpredictability of strategic behaviour can also be managed through process management activities: actors in governance networks are encouraged to 'discover opportunities for intertwining their objectives and tuning their strategies' in these activities (Klijn and Koppenjan 2016: 154). The principles that underlie process management are all aimed at facilitating interaction between a range of actors with different perceptions, interests and objectives. They call for patience, restraint and time. Process management activities could involve activities like creating rules about the management of information (to reduce the complexity associated with the many interpretations that can arise from one piece of information in a governance network that contains a range of perceptions and interests), organising participation, access and exit rules (by connecting or disconnecting actors, or opening new arenas in which actors can interact, for example) and decision-making rules (determining rules about veto power, for example). Although these activities do not guarantee they have been linked by scholars to more successful outcomes of networks (Klijn and Koppenjan 2016: 181).

Another important decision in process management, according to Klijn and Koppenjan (2016: 172) is locating the process manager. The manager must have the trust of parties involved and be acknowledged as an impartial actor, with sufficient resources to fulfil the role. This role is not necessarily allocated to one person only and different people or organisations might occupy the process manager role throughout decision-making processes in a governance network. To consider these activities in an emergency context, briefly, the issue of time might limit the extent to which these practices are followed. The management of media attention is considered next.

2.6c Managing media attention

Network management is also proposed by Klijn (2016: 117-120) as a strategy to mitigate media attention, as network management activities are said to bring more cohesion and connection to governance networks, thereby providing less drama and conflict for media to report on. Further, media attention is often sought by actors who feel excluded or unheard in a network (Korthagen 2015). Network management activities are said to address this issue by increasing the level of influence these underrepresented actors have in decision-making processes (Klijn 2016: 120). The two network management strategies identified by Klijn (2016) involve *exploring* solutions and information by paying attention to many points of view, bringing in ideas from external organisations and *connecting* actors to one another through searching for common ground and collective decision-making (Klijn 2016: 120). The study indicated 'exploring' activities that seek to include as wide a range of views as possible, and introduce news organisations and ideas to the process of finding solutions were associated with decreased negative media attention. This is potentially linked to the fact that exploring activities work to include the range of interests in a network, and if these activities are employed there is a lower likelihood of actors turning to the media to make their position heard (Klijn 2016; Korthagen 2015).

This literature is very much related to the activity of governance networks. We now turn to literature dealing explicitly with the management of emergency networks.

2.6d Managing emergency networks

There has been some examination of the effective operation of emergency networks: Resodihardjo et al (2018) observe collaborative networks that assemble to deal with crises can range from formal to informal, from 'a shared policy plan, some training, and an ad hoc nature as the network only springs into action when disasters strike' to a much more permanent situation of shared office space, frequent meetings in non-emergency periods and training and planning activities (Resodihardjo et al 2018: 164). It is noted that large and heterogenous networks create more difficulties when reaching agreements, and therefore integration and coordination are needed where networks cannot limit and select their numbers (Resodihardjo et al 2018: 168). Communication and information sharing are named as requirements for coordination and integration to take place – which is necessary in

networks that are frequently large and heterogeneous (Resodihardjo et al 2018: 167; Kapucu 2006).

The transformation of organisational structures from 'day-to-day' mode to crisis mode is also worth nothing again here (Kapucu 2006) – particularly the importance of 'flattening' those structures in crisis periods to prevent lower sections of a crisis network being isolated by actors further up in the chain of command if something fails. Comfort's (2007) reconceptualisation of emergency networks as complex adaptive systems refers back to the importance of a network's ability to *learn* from mistakes and correct the associated behaviour, as well as adapt to the constantly shifting environment it is operating in. However distinguishing between activities that *enable* effective emergency networks and activities *of* effective emergency networks is challenging. Little can be found in the way of literature for managers in these networks advising on strategies for enabling the effective operation of emergency networks. As mentioned earlier, this thesis will not cover the literature pertaining to individual organisations managing crises, as this body of literature tends not to cover the crucial element that is the range of perceptions, organisational backgrounds, and interests brought by actors to a network. There is a deficit in literature focusing on the *governance* of emergency networks (Christensen et al. 2016), but existing work hints at the usefulness of general network management strategies.

2.7 Evaluating outcomes of a network

Another important condition that needs to be established in this theoretical framework is the question of how the success of the network should be measured. This needs to be established in order for conclusions to be drawn as to what the network achieved, what could be improved and what can be learnt for similar, future circumstances. Various scholars have pointed out that this crucial step is more complicated than it may seem (Scriven 1979; Provan & Milward 2001; Koppejan & Klijn 2016). They have also noted that the logic underlying the idea that cooperation will produce more favourable outcomes than competition should be backed by a measuring technique (Provan & Milward 2001: 415).

In their seminal 2001 article, Provan & Kenis propose a three-level framework of analysis for evaluating the outcomes of a network. In this framework, the network's effectiveness is measured at three levels: community, the network itself and organisational participants. Communities receiving services through networked governance should provide greater value than efforts of individual organisations. Further, the network as a whole can be evaluated by its viability and the extent to which it can retain actors, and lastly the organisations that make up the network should see the value they accrue individually as members (Provan & Milward 2001: 416-420). This approach provides evaluators with a detailed, three-pronged framework to examine the extent to which networks achieve more favourable outcomes than the efforts of individual organisations. However this approach, while detailed, might still be too straightforward to evaluate the outcomes of a governance network, with its many actors, interests, and complexities.

Klijn and Koppenjan (2016: 242) argue that 'rational' evaluations can fall short when determining the success of complex decision-making processes. As suggested, such an evaluation can be considered too straightforward for many complex network processes (Klijn and Koppenjan 2016: 240). In complex decision-making processes, as has been explained earlier in Section 2.2a, a range of perceptions are being brought to a network. Trying to measure objectively whether that process was successful will be difficult because the multiple viewpoints that exist in the network will likely hold slightly different evaluations of the decision-making processes and outcome of the network.

Rather than a linear approach to evaluating network outcomes, then, Klijn and Koppenjan (2016: 246) suggest an alternative measurement: the extent to which learning has taken place in the network that has resulted in complexity being reduced. This learning is defined as 'the sustainable increase in shared knowledge, insights, and work methods between parties' (Koppenjan and Klijn 2016: 246). These developments can be further split into three categories: cognitive, strategic and institutional learning. These processes indicate learning how to navigate substantive, strategic and institutional learning respectively (ibid). This thesis will explore cognitive and strategic learning as a means to evaluate the outcomes of a network.

2.7a Cognitive learning

Cognitive learning can be observed in two ways: joint image building and goal intertwinement. Joint image building has occurred when there has been increased insight into the nature of the problem and its possible solutions (Klijn and Koppenjan 2016: 247). It is visible when there is consensus about the proposed solutions based on available information. Goal intertwinement refers to the outcomes of the network processes satisfying the range of objectives of actors in the network, reduce negative outcomes for other parties and/or finding solutions that realise the objectives of multiple parties. Essentially, it can be seen when the chosen solutions in a network benefit more than just one actor, and do not pass costs on to other actors (within or outside the network) (Klijn and Koppenjan 2016: 250).

2.7b Strategic learning

According to Klijn and Koppenjan (2016: 251), strategic learning can be observed when there is 'growing consciousness' of interdependence between actors, reflected in an increased capacity to manage conflict and successfully negotiate in a complex decision-making process where many perceptions, problem and solution formulations and objectives exist. Strategic learning can be measure in by the length of the negotiation process or the transaction costs of the process – although lengthy and costly negotiation processes don't necessarily equate to a failed decision-making process as some collaborative efforts take more time and effort than others. Strategic learning can also be observed in the *quality* of negotiations: that is, the extent to which collaborative efforts have replaced 'go-alone' strategies – that is, more cooperative and less conflictual approaches to decision-making processes in the network (Klijn and Koppenjan 2016: 252). The third determinant of strategic learning is the presence of inclusivity, accountability, and legitimacy in the decision-making processes. This measures the degree to which the processes were transparent and open to third parties (not included or muted in the network (ibid)). This element of strategic learning is evident then actors are held accountable for their behaviour, when due processes are followed to correct the flouting of established rules and when external support exists for the outcomes of the network.

These elements can be used to evaluate complex decision-making processes. They allow for a 'nuanced evaluation', where one can point to more and less successful aspects of

the processes and outcomes of the network (Klijn and Koppenjan 2016: 256). They will be used to assess the outcomes of the emergency network that assembled around the fipronil incident. They will also be used to measure the extent to which Comfort's (2007) reimagining of emergency networks as complex adaptive systems can be seen, recalling the 'fourth C' of cognition that she adds to the static model of communication, co-ordination and control.

2.7a Regulation and food scares

Before concluding this theoretical framework, it is worth pausing briefly to discuss voluntary private regulation. In responding to food scares, Fagotto (2013) has suggested that private standards and voluntary regulation often fill the gaps left by public regulation. The EU has encoded its position on self-regulation in legislating greater responsibility for food businesses (Albersmeier, Schulze, Jahn and Spiller 2009: 928). Some have pointed to voluntary private regulation as an answer to the difficulties faced by public regulators as private bodies can operate across national borders. Used in conjunction with public instruments, private regulation in food safety networks can serve the public interest and strengthen the overall governance of these complex networks. However, there has been acknowledgement of several 'quality scandals' in European states even after certification schemes have been set up, and of the fact that public governance tends to take over in times of failure in private regulation (Albersmeier, Schulze, Jahn and Spiller 2009: 927). So, private management can play a role in food safety networks and responding to food scare, but it cannot replace public regulation, and in times of a food scare plays a relatively minor role. Public managers take the lead in times of crisis in food safety networks. This is why the public manager of the emergency network that assembled around the fipronil incident will receive particular attention in the thesis.

This research will connect the gap in current research between crisis networks and network management. It will do this through its examination of the intervention strategies of a public manager in an emergency network and their effects on the strategies of other actors throughout the decision-making process and finally the outcomes of the emergency network's activities. Particular attention will also be paid to the impact of media attention on the perceptions of actors, strategies of actors and the decision-making process itself.

3. Conceptual model

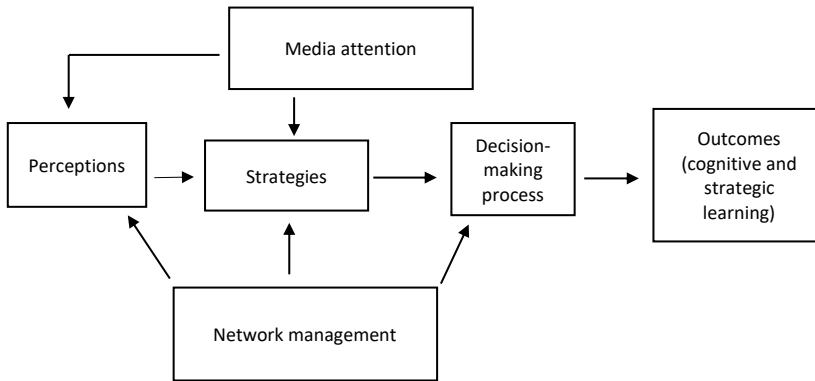


Figure 1. Conceptual model

Figure 1 presents the conceptual model for this research. Media attention in an emergency network impacts the strategies of actors and their perceptions of the problem, solutions, others in the network and their own position. Their perceptions also impact their strategies independently. The strategies of actors are brought to the decision-making process and through this process influence decisions and outcomes. Network management activities can impact the perceptions of actors, their strategies, and the decision-making process as a whole. The outcomes of this process can be examined by looking at the extent to which learning has taken place in the network, at which points, and whether the management practices employed by the public manager aided these developments.

4. Research method and Operationalisation

4.1 Methodology

This research looks at issues faced and strategies used in decision making/responses by public managers in emergency networks by way of a case study analysis. The case study approach is chosen here because the thesis seeks to understand the complexities of these processes and maintain 'a holistic, real-world perspective' (Yin 2014: 4). Case studies have been recommended as a useful approach to research when the goal is to develop an

explanation about a contemporary set of events over which a researcher has little or no control (Yin 2014: 14). As the boundary between phenomenon and context can be blurry, the 'case' should be studied in depth and within its real-world context, as this context is vital to better understanding the phenomenon itself. Document analysis forms the basis of most quality case studies (Yin 2014: 86). Interviews are one of the most important sources of case study information as a primary source and means to build a detailed picture of the case study (Yin 2014: 89). Focusing on the fipronil case, this research will examine a series of management decisions made by public managers in an emergency network regarding the management of that network, and the management of media attention in that network. The research will examine why these decisions were taken, how they were implemented and with what result (Schramm 1971 in Yin 2014: 15). Specific attention will be paid to the role of the NVWA as a public manager in the network, and the role of the media: the framing of actors and the effect this had on their strategic decisions.

4.2 Data Collection and analysis

Documents and network actor interviews formed the data for this research. Data collection and data analysis are described separately below but are interdependent and were carried out concurrently.

4.2a Data Collection

1. Official and media accounts of the case

Official and media documents were selected to form the basis of the reconstruction in Step 1 of analysis. The documents also informed the questions posed to interviewees in Stage 2 of data collection. This consisted of:

- Letters to parliament from Ministers van Dam & Schippers from the 3rd, 10th & 23rd August; October 20th; 6th & 21st December
- Press releases & official documents from the NVWA about fipronil (12 documents)
- Documents from the European commission about the fipronil incident (5 documents)
- Sections from Sorgdrager's commission inquiry into the fipronil incident (translated document from Tweede-Kamer website)

2. Interviews

In-depth, semi-structured interviews (Yin 2014: 89) have been conducted with 7 key actors in the fipronil network identified from the reconstruction of network and events. The actors sampled were chosen on the basis of their level of connection to the decision-making process - identified in the introduction. In Appendix A, an example of a transcribed interview can be found. This was also anonymised. The interviewees were sampled from a range of organisations in the network, both public and private. All interviewees were anonymized in the research and allocated letters. The following table indicates where interviewees came from in the network and gives further details of the type of interview.

Interviewee	Position in network	Type of interview
A	Public health authority representative	Phone interview 24/05
B	Quality management scheme representative	In-person interview 22/05
C	Wholesale association representative	Phone interview 24/06
D	Supermarket association representative	In-person interview 28/05
E	Poultry farmer association representative 1	Email interview 11/06
F	Poultry farmer association representative 2	Email interview 27/05
G	Poultry farmer	Email interview 25/05 & follow up 28/05

Specific focus was given to the actions of the NVWA and any changes to actor strategies prompted by the media's heightened presence. It should be noted here that at the time of the research, a court case between two key actors was ongoing. This affected the openness of the network for interviews. Due to this, and in some cases language barriers, some participants wished to give answers via text in an email to the questions rather than an in-person interview as planned. However email responses did allow respondents to give a more considered response and for follow-up questions to be answered (Hawkins 2018) Archival material made up a larger part of data collection than originally planned to correct this reduced accessibility to the network.

Interviews were structured using the reconstructed events from Step 1 and recorded perceptions about the problem at major stages of the case, solution, and the locus of responsibility, as well as the objectives of each actor at major stages of the case. Participants were asked about management strategies that were used in the food scare, and the impact of media on their activities throughout the fipronil incident.

An example of a question for a sector interviewee about the management strategies used in the fipronil incident is: *'How and when were you first alerted to the fipronil incident and what instructions were given to you?'*

An example of a question for an NVWA interviewee about the management strategies used in the fipronil incident is: *'What were the NVWA's initial instructions to the sector after the fipronil incident had been declared? What were some of the major changes in these instructions during the fipronil incident?'*

An example of a question for all actors (sector and public) about the media's role in the fipronil incident is: *'In your view, was the media's reporting of the fipronil incident reflective of the situation at hand? Did it amplify/diminish any details of the events?'*

These interviews enriched the reconstruction of the timeline by providing further detail and clarification of events. They also made up the basis of the rounds analysis (Chapter 6, Section 6.1).

3. Media output during the case

The following section provides a brief description of the data collection process for examining media output. A more detailed version can be found in Appendix B.

Media framing was examined through a content analysis of daily national newspaper coverage of the incident. LexisUni was used as the database for this collection. Initially, a search of the keyword 'fipronil' was performed according to the timeline created by the

rounds analysis. The number of Dutch news articles appearing across these rounds was used to highlight the spike in media attention at a key point in the incident. This can be seen in Figure 9 (Page 55).

The database was then used to focus on a specific time period, Round 3. This round of activity took place over six weeks, beginning July 31st and ending September 10th. Figure 10 (Page 56) shows the number of articles week by week in this time period.

A subsection of articles produced in this period from a range of daily national was collected. Twenty-two news stories from four national daily newspapers over the period beginning July 31st and ending September 10th were selected at random for content analysis.

Using this sample, five Dutch volunteers, referred to hereto forth as 'participants', were asked to read the articles (in Dutch) to assess whether the four information biases described in Chapter 2, Section 2.3 could be found: the emphasis of drama (dramatisation), fragmentation of news and removal of context (fragmentation), emphasising personal aspects of news stories (personalisation) and lastly a preoccupation with order - whether authorities are able to maintain or regain control and order (authority-disorder bias). The participants then answered a series of Yes/No questions.

Coding was then performed by the researcher converting the yes/no answers into a 0 – 1 numerical scale. A score of 1 indicated the bias was detected in the article and a score of 0 indicated the bias was not detected in the article. These scores were then added up to give a total numerical score per bias of how many articles the bias was detected in. The scores for each question were aggregated (so, for example, four 'yes' answers and one 'no' answer became a 'yes' answer in the final score of the question). These scores for each of the four biases were then turned into a percentage of the total number of articles.

4.2b Data analysis

1. The network around the fipronil case was reconstructed: actors, their positions and perceptions on the issue and general position on food safety, and activities in the network.

Specific attention was paid to the role of the NVWA in the network and its ability to intervene in the network.

2. The decision-making process was reconstructed based on concepts of the rounds model (Teisman 2000; Klijn and Koppenjan 2016), with critical occurrences, actions and reactions in the decision-making process being identified. This allowed the reconstruction of interactions, strategies and identification of crucial decisions in the network.

3. Media attention, specifically pressure applied by the media at different points in the decision-making process, positive and negative issues articulated, and the intervention points of the NVWA, was examined using the coding exercise described in 4.2a(3), and in the rounds model. The coded articles testing for Bennett's (2016) information biases produced percentage values indicating the portion of articles containing each bias. To analyse these figures, a comparison is useful. The results from this simple coding exercise were measured against a similar (much more extensive, in-depth) exercise carried out by Korthagen and van Meerkerk (2014: 716). In their research examining the presence of media logic in news reports regarding water management, a number of articles were examined for four information biases: dramatisation, personalisation, authority-disorder bias and *negativity*. While the fourth information bias differs from the one in this research (negativity versus fragmentation, respectively), the figures from Korthagen and van Meerkerk's (2014) findings will be used as a comparative measure.

4. The interventions of the NVWA were mapped out from the data collected through interviews and analysis of policy documents and media reports. They were located using the criteria of Klijn and Koppenjan (2016: 152) for network management strategies (as opposed to individual actor strategies) in the reconstructed timeline and the rounds analysis.

5. The effect of these network management strategies and interventions on the decisions and issues faced in the network was then analysed. This analysis was performed by examining the strategies of actors before and after the NVWA's intervention activity too look at the reaction of actors in the network and the activities of the network to management techniques of the NVWA.

6. The outcomes of the network as a whole were located in the reconstructed timeline and the rounds analysis of the fipronil incident. They were evaluated according to the learning criteria outlined in Section 2.7 to measure their success.

4.2c Operationalisation of core concepts

This section will briefly cover how core concepts were defined and measured in the research. Table 2, below, shows how core concepts were operationalised: Broad phenomena could be measured using the above definitions of core concepts. The following page contains Figure 2, a chronological timeline of the fipronil incident. A more detailed timeline can be found in Appendix C.

Concept	Definition	Operationalisation
Perceptions	Viewpoints of key actors on problem, nature & solution	As reported in interviews and extracted from content analyses of documents & media reports
Strategy	Deliberate actions by key actors to meet objectives	As reported in interviews and extracted from content analyses of documents & media reports
Media attention	Media reports on incident	As reported in interviews and from analysis of a sample of 22 Dutch news articles from 4 national newspapers
Intervention	Deliberate actions by NVWA to begin, adjust, or stop network activities	As reported in interviews and extracted from content analyses of documents and media reports
Decision-making	Key-changes by actors to the course of network activities	As reported in interviews and extracted from content analyses of documents and media reports
Outcomes	Extent to which goals of network have been achieved	According to cognitive and strategic learning processes detected in rounds analysis and timeline reconstruction

Table 2. Operationalisation of core concepts

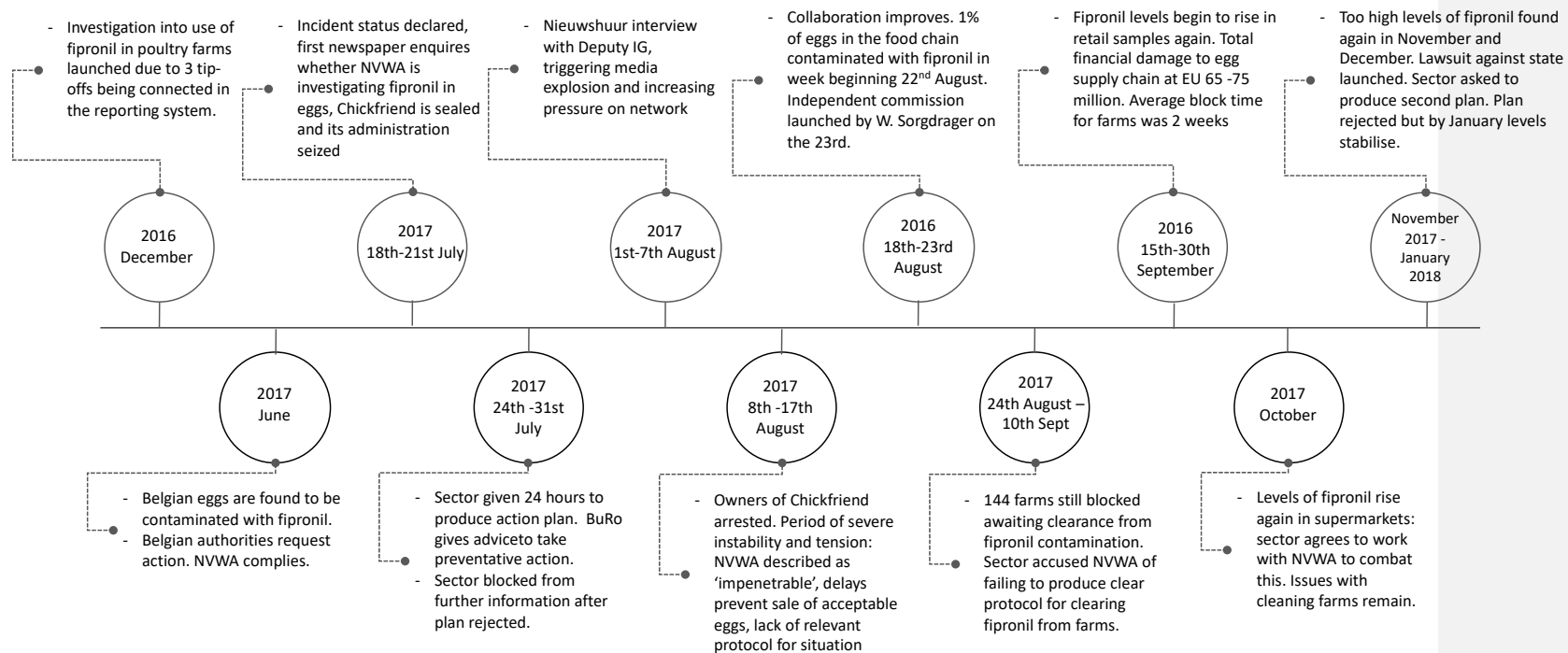


Figure 2. Chronological timeline of fipronil incident

5. The emergency network around the fipronil crisis

Actor	General role	Main interest	Role in fipronil incident
NVWA (including BuRO, IOD)	Public health authority	Protecting public health	Overseer of incident and creator of action plan, public manager
Sector associations (under AVINED supervision)	Represent companies along the egg supply chain	Protecting and voicing farmer interests	Implementer of action plan, main communicative link between NVWA and producers
CBL	Association representing interests of main supermarkets in the Netherlands	Protecting supermarket interests	Preventing sale of (dangerously) contaminated eggs
Ministers (EZ and VWS)	Oversee ministries of Economic Affairs and of Health, Welfare and Sport (respectively)	Economic policies and position of Netherlands, and public health, quality of life and sport (respectively)	Overseeing NVWA, protecting political reputation of government
FAVV and Belgian ministers	Belgian equivalent of NVWA and associated ministers	Ensure quality and safety of food chain in Belgium	Resolving contamination of Belgian farms, recovering damage to Belgian farmers

Table 3. Key actors, general role and their main interest/role in the case

5.1 Introduction

Table 3 gives a brief introduction to the main actors involved in the fipronil incident, their general societal roles and their specific roles in the fipronil incident. A more detailed account of the key actors in the network follow in Section 5.5, after the introduction and an explanation of the regulatory structure of the Dutch egg supply.

The measures that address food safety and food quality in the Netherlands are highly complex, spanning both public and private domains. The system comprises several iterations of rules where changes at various points in the process have replaced, or, in some cases, been introduced alongside earlier measures. This has resulted in multiple stakeholder inputs along the chain. In the case of eggs in the Netherlands, industries have organised representation at each link in the supply chain to ensure they are 'at the table' for any negotiations. Alongside

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this, recent changes have introduced private enforcement of national and EU level regulation. This is true for both the regular network of food safety and quality management.

This chapter will first provide an outline of the food safety and quality management measures in the Dutch egg supply chain. The outline will break the process down into three jurisdictional sections: national and EU regulations, private sector responsibilities and public enforcement. The chapter will then turn to the emergency network that assembled around the fipronil crisis.

This emergency network assembled gradually as the scale of the situation became clear. The network was dynamic, evolving throughout the fipronil incident, as objectives and strategies of actors changed. The chapter will provide an outline of the emergency network, the perceptions and objectives of the key actors in this network and the institutional dynamics at play within the networks. Finally, the chapter will include a section on the media's coverage of the fipronil events. The final section will first look at the rate of coverage over the timeline of the fipronil incident in major newspapers and examine the nature of coverage of the fipronil crisis from the perspective of four major national newspapers. The section will then detail the experience of the media's coverage of the fipronil incident from the perspective of four key actors in the emergency network before ending with short concluding discussion on the general impact of media attention on the fipronil incident.

5.2 National and EU Regulation

Legislation	Details	Responsibilities
Hazard Analysis and Critical Control Points (HACCP)	Rather than inspect finished products, production processes are monitored along the way to ensure food is safe from hazards of any kind. This is done through analysis of hazards, development of measures to prevent the hazard from entering the food supply, identification of 'critical control points' - where hazards can be	It is the responsibility of producers to analyse chemicals, feed or fertilisers to scan for hazardous additives that could enter the food supply. It is also the responsibility of the producers to keep abreast of new information and risks, and implement control systems accordingly. Should an operator in the sector have reason to believe a product

	detected and eliminated in the production process, establishing acceptable limits (over which the hazard becomes dangerous), establishing monitoring and corrective actions and finally a procedure to ensure the system itself is working.	does not meet the requirements and had been placed on the market, the public health authority should be notified immediately, and the operator should themselves withdraw the product from the market.
Maximum Residue Level (MRL)	Maximum level of pesticides that can exist in a food product. Below the MRL, the residue levels are considered safe for public health, not dangerous to the environment and not harmful to animal health. Danger to public health is determined by the 'Acceptable Daily Intake' (ADI) and the Acute Reference Dose (ARFD). The MRL is set according to the 'average and extremes' of population diets. It is set at the lowest possible level if the active ingredient in the pesticide is not authorised for use. On January 1st, 2017, the MRL was set at the lowest possible level for fipronil (0.005 milligram per kilogram) as its approved use in Europe ceased.	In the egg supply chain, the responsibility for preventing contamination from entering the food supply lies with the packing station. The producer must also be able to guarantee MRLs are being followed, and as such they are responsible for preventing contamination also.

Table 4. Table of relevant legislation to fipronil Incident and the associated responsibilities

Under EU requirements, regulation of the supply chain for domestic production of eggs is a joint private and public undertaking. However, legislation decrees that the brunt of responsibility for ensuring food safety lies with the sector (the term 'sector' refers to the companies and representative organisations that make up the Dutch poultry industry). The ministerial responsibility of food safety in this supply chain takes the form of policy and lies with two departments: before the egg is laid, the responsibility for food safety is with the Ministry of Agriculture, Nature and Food Quality (LNV). At the time of the fipronil incident, however, this was the responsibility of the Ministry of Economic Affairs (EZ), now called the Ministry of Economic Affairs and Climate (EZK). After the egg is laid, the Ministry of Health,

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Welfare and Sport (VWS) takes responsibility for public health – the parts of the supply chain where the egg is prepared or put on the market for sale.

Requirements for food safety measures are created at the European and national level and given to the sector to follow and implement. These require that producers to ensure their products are free from contamination.

5.3 Private sector responsibilities

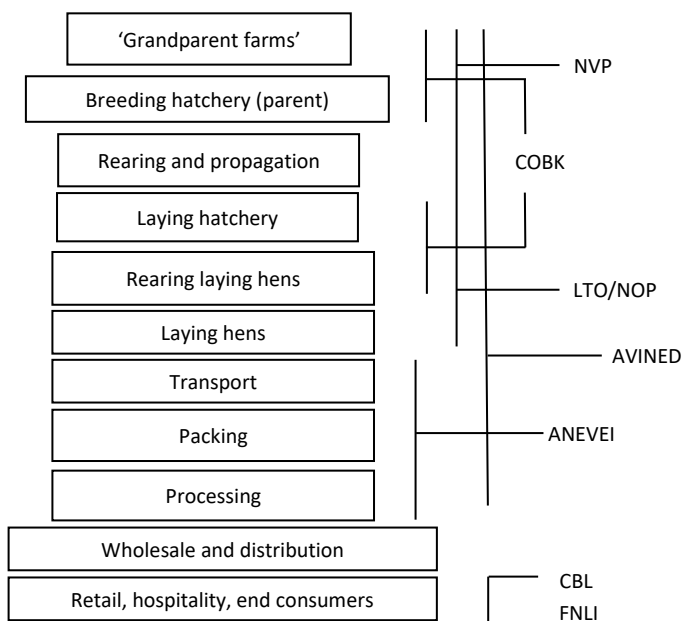


Figure 3. Visual representation of the egg supply chain and associated organisations

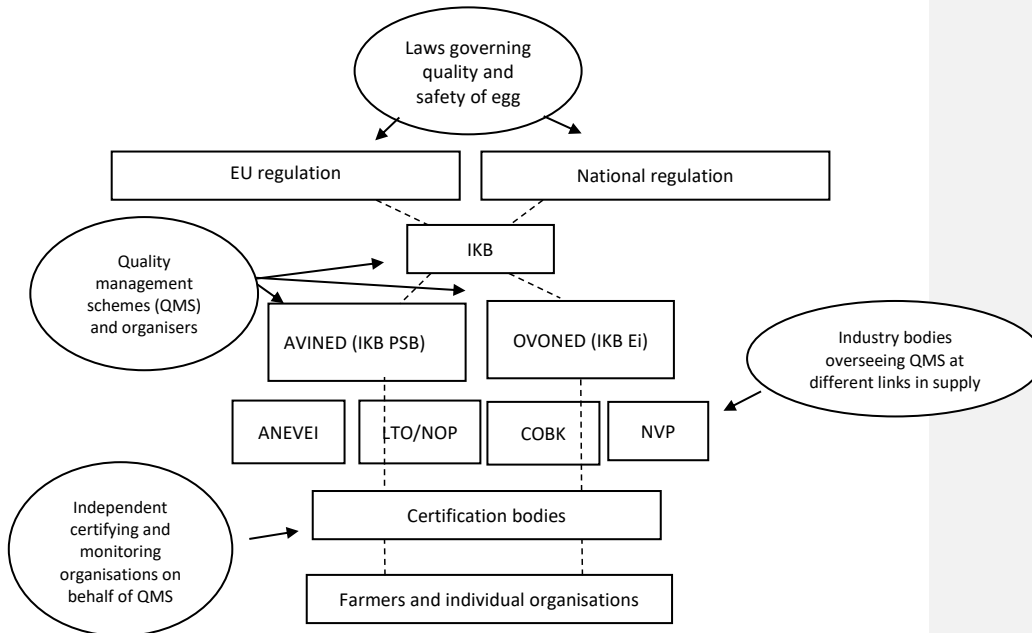


Figure 4. Visual representation of the quality management chain in the Dutch poultry sector. Please see glossary of abbreviations at Page 2 of the thesis for more details.

Figures 3 and 4 show the steps in the supply chain and their associated organisations, and the quality management chain for eggs in the Netherlands respectively. As can be seen from Figure 3, there is a high degree of specialisation in the egg supply chain. Each point in this supply chain has an organised association that represents their interests, from primary producers through to hatching and sorting, to companies that use egg products to retail points of egg sales.

Due to the specialisation of this sector, there is a high degree of interdependence between these associations. The entire chain is overseen by IKB, which is a system of ‘integrated chain management’ (see Figure 4). This system oversees food safety and quality

according to EU and national regulation. In 2015 the public bodies that oversaw the management of quality along this chain were replaced by a series of organisations founded by the sector: OVONED oversees IKB Ei, which protects the eggs supply chain from salmonella and dioxin. AVINED oversees IKB Poultry Service Provider (PSB), which works to bolster IKB Ei, and monitors disinfecting, pest control and other cleaning activities (Interviewee B).

To ensure that each link in the supply chain is maintaining the required standard of food safety and animal welfare, the two quality management systems set out specific rules for each link in the chain, enforced by the relevant industry association (e.g. COBK or NVP). The most relevant quality scheme to the fipronil events is IKB PSB, as IKB Ei does not deal with the removal of blood lice from hens, for which the Chickfriend products were used. As can be seen in Figure 3, this quality scheme traces the egg from the grandparent hen to the processing stage. It does not cover the wholesale and distribution stage, nor the retail (end sale point) stage. Quality systems are held to internationally recognised standards and approved by the RvA, which is an independent accreditation body accountable to the EZK. There are other private bodies that approve private quality schemes to make sure they are ensuring food safety and food integrity.

As Figure 4 shows, companies will first be approved by a certifying body on behalf of the private quality scheme, then 'regularly monitored' by the independent certifying bodies on behalf of the private quality scheme (Interviewee B). The industry associations oversee this process at each link. Certifying bodies compete with one another for the contracts of individual food companies, while companies enter these contracts, pay for certification and voluntarily participate in a private quality scheme.

According to its website, around 95% of businesses in the Dutch egg supply chain are participants of IKB Ei, and 70% of those participants have a contract with a certifying body for IKB PSB. Information about these systems and the companies that follow them are publicly available, so businesses can check whether their partner or trading organisations are knowledgeable of standards and the extent to which they are compliant. Noncompliance with the quality scheme can result in 'sanctions' – a warning, a recovery check, a fine, a temporary suspension or the withdrawal of the certificate.

From 2008 until 2018, companies that were monitored by IKB Ei were not checked annually by the public authority, the Dutch Egg Control Authority (NCAE) (Interviewee B). It was argued that IKB Ei and the NCAE overlapped in their activities so only one check every three years from the NCAE was needed. Further, public monitoring has in recent times taken a risk-based approach: rather than fixed inspections, public authorities prioritise high-risk companies for supervision (Interviewee A). Lower risk companies that are seen as having a high likelihood of compliance with regulations are not prioritised in this approach. The role of the NCAE is expanded upon in the ‘Public Enforcement’ section of this chapter.

5.4 Public enforcement

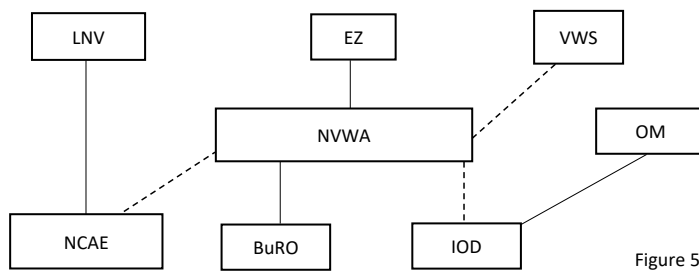


Figure 5. Map of NVWA and affiliated departments at the time of the fipronil incident

Figure 5 shows the responsible Ministries, affiliated organisations and Ministries and suborganisations of the NVWA. The Dutch Food Health and Safety Authority (NVWA) is the public authority that assesses risk to public health and enforces, among other things, compliance with food safety regulations. At the time of the fipronil incident, the NVWA had just gone through a major reorganisation (in July 2017). It was the responsibility of the EZ Ministry and also a ‘directive agency’ of the VWS Ministry¹. The NVWA has a range of instruments with which to enforce compliance with national and international laws and obligations.

Department	Relevant responsibilities
Risk Assessment and Research Programming Office (BuRO)	Identify & assess food & product safety dangers, provide warning about health risks

¹ At the time of writing, the NVWA is now the responsibility of the LNV Ministry

	to NVWA to distribute to general public & businesses
Intelligence and Investigation service (<i>IOD</i>)	Leads criminal investigations related to the laws that the NVWA is responsible for enforcing. Actually under authority of Public Prosecution Service (OM) but part of the organisational structure of the NVWA.
Dutch Egg Control Authority (NCAE)	Shares inspection duties of the egg chain with NVWA. NCAE undertakes supervision of egg supply chain under the oversight of NVWA. NVWA directs activities of NCAE & provides additional, 'second-line' supervision.

Table 5. Relevant responsibilities of suborganisations affiliated with NVWA in fipronil incident

Table 5 shows the suborganisations and their relevant responsibilities for public enforcement of food safety. In the decade prior to the fipronil incident, successive governments had legislated that more and more duties be absorbed by the NVWA in the interests of efficiency and cost saving (Interviewee A). The NVWA was operating each year with a decreased budget and staff presence, and increasing duties and responsibilities. When opportunities arise to bring private organisations in to perform public duties, the NVWA can take an oversight role and lessen the burden placed on the organisation’s resources by that particular responsibility (Sorgdrager 2018).

5.4 The emergency network

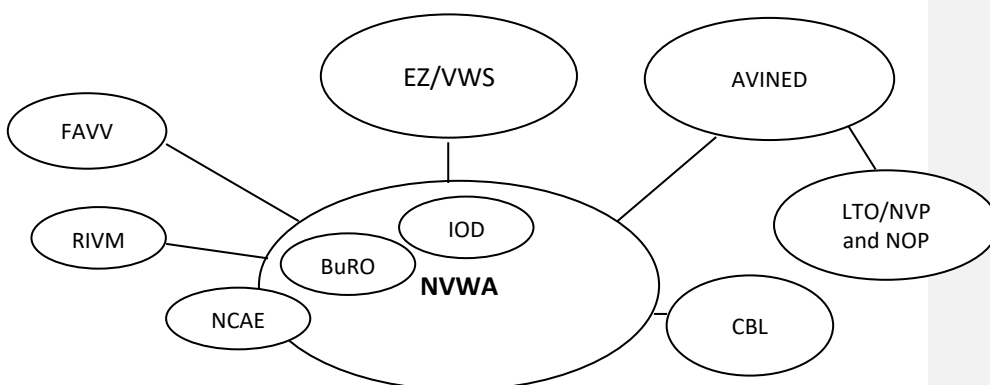


Figure 6. Visual representation of the emergency network around the fipronil incident

This section of the chapter will outline the *emergency* network that assembled around the fipronil incident. In this outline, actors have been distinguished according to their *perceptions, objectives* and *interests*. Figure 6 gives a visual representation of the emergency network. Table 6, below, gives an overview of the key actors in the network and their perceptions of risk, responsibility and urgency at various points in the fipronil incident. Farmers affected by the fipronil incident are not included in this network as a strategic group because they were bound by the instructions of the NVWA and relied on representation through the sector. According to the affected farmers themselves, cleaning the farms and ridding the hens of fipronil took up all of their time for most of the incident's timeline.

Actor	Perception of problem	Preferred solution	Perception of own role	Perception of other actors
NVWA	Sector failed to prevent contamination	Sector to create action plan and correct contamination reflecting potential risks to public health	Oversight position, minimal intervention	Sector responsible for clear up, FAVV aide in making arrests, ministers provide support where needed
LTO/NOP and NVP	Sector was a victim of food fraud	Action plan reflecting low risk to public health that protects reputations and livelihoods in sector	Victim to fraud, receiving minimal support in the clean up, entitled to financial support	Other actors not working to support sector
CBL	Food safety system did not prevent contamination	Swift action plan that doesn't cause financial damage to supermarkets	Last point of preventing public consumption of contaminated eggs	Initially wanted compensation from sector, then wanted swifter action from NVWA
Ministries	Sector did not prevent contamination	Action plan that protects reputation of ministers	Oversight, communication channel to parliament	Sector responsible, NVWA and FAVV should complete criminal investigation

FAVV and Belgian Ministers	Dutch cleaning company contaminated Belgian farms, response from Netherlands not enough	Swift action plan acknowledging potential risk and transparent communication from NVWA	Support in risk analyses and criminal investigation	Sector, NVWA and ministers should be collaboratively resolving issue, quickly
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Table 6. Key actor perceptions throughout fipronil incident

Table 6 shows the perceptions of key actors in the network over the timeline of the fipronil incident according to the dimensions of the issue, preferred solution, the actor's own role and the role of others. The following section will describe in further detail the network.

5.6 The emergency network – Problems, solutions and responsibility

Substantive complexity stems from the range of perceptions that exist in a network: different actors hold different problem definitions, and issue frames (Klijn & Koppenjan 2016: 41). This results in different interpretations of the same information, knowledge being contested and negotiations around solutions.

In the emergency network of the fipronil incident, much of the initial complexity stemmed from these diverging perceptions. Table 6 describes the diverging perceptions belonging to key actors in the network. One can see from Table 6 the effect of *ways of knowing* on the activities of a network. In this case, all actors in the network essentially had the same objectives and interests – that is, resolving the fipronil incident and ridding the egg supply of the contamination. What created the divergent strategies, however, were the range of perceptions about responsibility, risk and urgency in the situation. Interestingly, as the event wore on, these perceptions did not shift to a better alignment in many cases, particularly between the key actors.

The emergency network around the fipronil incident was characterised by loosely bound actors, most of whom did not have contact with one another regularly outside of this situation (Interviewee D). Due to the safety monitoring systems in the Netherlands, the public health authority rarely makes contact with producers. Inspections are performed by private, third party organisations and at the time of the fipronil incident, this had all but replaced any

inspections by public bodies (Interviewee B). As such, there were little to no established interaction patterns when the incident gained momentum and required collaborative action from the network. An exception to this is the relationship between the NVWA and the FAVV, where employees of each organisation communicated regularly with one another before the fipronil incident. In the initial phase of the incident, as can be seen from the table of the rounds analysis in Chapter 6, Section 6.1 information flowed easily between these two actors and their similar organisational backgrounds made communication easy. However, relations between other actors at the outset of the incident were patchy and not well-established.

5.6a Diverging perceptions

Perceptions in the network, as can be seen in Table 6's overview, remained divergent throughout the entire incident. Perhaps the key divergence, for example, existed between the NVWA and sectoral organisations as to whose responsibility the contamination was. According to the NVWA, and EU legislation, producers and members of the supply chain are responsible for keeping track of hazardous chemicals used in the production process (Interviewee A). According to the sector, producers were fulfilling their legal obligation and had been victims of food fraud (Interviewee E; Interviewee F). A second divergence was the different perceptions regarding the NVWA's handling of three anonymous tip-offs in November, that were connected and prompted the start of the public authority's investigation into fipronil and Dutch poultry farms. The NVWA did not share information about these tip-offs with the sector before an incident had been declared, nor the FAVV when they consulted the NVWA at the end of June when traces of fipronil were detected in Belgian farms (Letter to Parliament 2017b). The FAVV and Belgian ministers saw an issue with the fact that this information was not shared with them, as did the sector.

A range of allegiances between actors in the emergency network around the fipronil incident stemming from shared perceptions can be seen throughout the course of events. For example, the NVWA and FAVV worked closely together initially, until the owners of Chickfriend were arrested (Sorgdrager 2018). Relations between the two organisations became strained, particularly when it emerged that the NVWA had withheld information from the FAVV. At some points, CBL worked closely with the NVWA and called for damages to be paid by producers and their organised representatives. After the incident wore on, CBL's

supermarkets rescinded this claim and pointed to the NVWA's actions as problematic (Interviewee D).

Actors in this network brought to it a vast range of 'ways of knowing': the network shared many common goals and interests – primarily the removal of fipronil from farms and the egg supply - but these were informed by many different perceptions on how they could be realised, and who should be responsible for what. This is a feature of the networks that existed throughout its activities concerning the fipronil incident. The formal ties of accountability between actors held the network together and forced collaborative action to continue, despite outright hostility between key actors at some points.

Another element of divergence in perceptions between actors in the network was the contested knowledge existing about the risk posed by fipronil to public health, the correct removal of the chemical from farms, and the length of time it continued to exist after it had been used. Information was difficult to control as there were a range of views on the real danger fipronil posed to public health and these views informed different perceptions throughout the network. Sector actors argued that the risk to humans from consuming fipronil was very low (Interviewee E; Interviewee F; Interviewee G). BuRO based its risk analysis on the risk posed to the most vulnerable members of society by consuming fipronil (Interviewee C). Belgian authorities were using different standards of measurement to their Dutch counterparts for a time, before an agreement to standardise these values was established (Sorgdrager 2018). This contested knowledge informed the preferred solutions of the actors in the network. We now turn to the impact of media attention on the emergency network throughout the timeline of the incident.

5.7 Media attention

The following table, Table 7, gives an introduction to the timeline of the fipronil incident according to the rounds model (Teisman 2000; Klijn and Koppenjan 2016). Recalling Section 2.2e, rounds are triggered by an initiative or intention of one actor in the network that prompts strategic reactions from others. A round consists of interactions wherein actors deliberate about what is to be done about the issues that have been placed on the agenda. Each round will end with a crucial decision or event that provides resolution to the issues of

the round – anything from a joint solution to a redefinition of the problem (Klijn & Koppenjan 2016: 87). The rounds analysis was used to structure the analysis of media attention. It is returned to in more detail in Chapter 6.

Round	1: 28 th June – 20 th July 2017	2: 18 th July – 30 th July	3: 31 st July – 13 th September	4: 18 th September – December
Actors involved	NVWA (IOD, BuRO, ICB), FAVV, RIVM	ICB, NVWA, Ministries EZ and VWS, sector associations	NVWA, Ministries EZ and VWS, Tweede-Kamer, sector associations Commission, export markets	NVWA, Ministries EZ and VWS, Tweede-Kamer, sector associations
Crucial decision	FAVV alert NVWA to their discovery of fipronil on some poultry farms, request urgent response	Context redefined when upgraded to 'incident' status.	BuRO's sampled showed toxic levels of fipronil, public alert had to follow.	Discovery of fipronil levels in supermarket eggs rising again.
Intensity of interactions	Increasing towards the end of the round – mostly internal and informal within govt departments.	Increasing – high degree of uncertainty and inclusion of new actors who needed to be informed	High – Initially highly conflictual. Interactions continued regularly, became less conflictual.	Decreasing – less actors active in this round and most unknowns had been resolved
Agenda	Could fipronil contaminate eggs and what would happen if it did?	Investigating unknowns and formation of an action plan – and who will formulate action plan?	How to inform public and resolve the incident (heightened attention and many unknowns)? How to repair damaged relationship with sector?	How can the remaining cleaning issues be resolved, how to recover damage to the sector?
Key decisions made	Chickfriend's administration seized, samples taken.	Chickfriend sealed, first producers were blocked, sector's plan rejected, NVWA took	Decision to alert public made by NVWA. Sector made its position public.	Sector given more responsibility, NVWA largely returned to its oversight role.

		full control of incident.	Need to collaborate reaffirmed.	
Scope of interactions	Largely between government departments, with input from societal actor (RIVM) and international actor (FAVV)	Game unfolded into private sector, and the first media comment was requested.	Game unfolded to reach local, national and international levels, public and private spheres.	Mostly contained between sector and NVWA with some input from national political actors and international actors.

Table 7. Basic characteristics of each round in the fipronil incident

The following section examines media attention in the fipronil network. It first presents an empirical breakdown of the volume of newspaper reports at various points in the incident’s timeline. After detailing the responses of key actors in the network to media attention, the section ends with a discussion of media attention in the fipronil crisis, linking it back to theoretical observations of scholars.

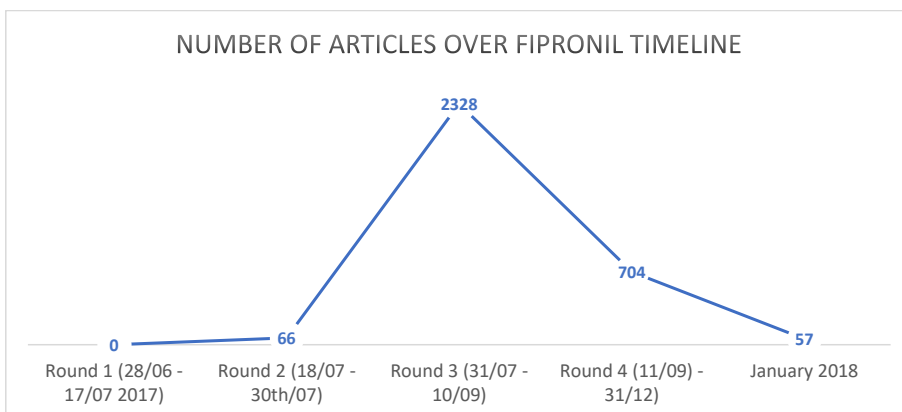


Figure 7. Number of newspaper articles on the fipronil incident throughout rounds of activity

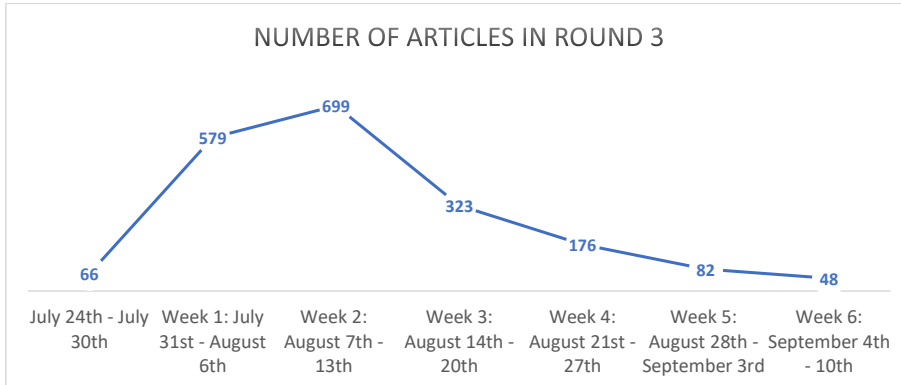


Figure 8. Breakdown of media attention in Round 3 by number of articles published per week

Figure 7 shows the sharp spike in media attention during Round 3. Figure 8 shows this spike in closer detail. The Nieuwsuur interview took place on Tuesday, August 2nd after which public confusion grew and the story gained momentum. By Week 6 of Round 3, media attention had drastically decreased, although it can be seen in Figure 7 that reports continued into Round 4.

Actor	Round 2	Round 3	Round 4
NVWA	De Stentor reported on the NVWA's investigation, NVWA had prior warning to report's release and were able to prepare	On August 2nd, NVWA lost control of the narrative. As it was determined that the risk to public health was low, focus of media coverage shifted to the lengthy waiting times that some farmers had to wait to be unblocked and the overstretched capacity of the NVWA.	The NVWA never regained control of the narrative in the media, and negative coverage of the organisation's handling continued.
LTO/NVP and NOP	The LTO/NVP and NOP were caught unawares at the outset of media attention to the fipronil incident.	After NVWA's initial press statement was released, sector released its own statement that it had been a victim of food fraud. Able to wrestle some control of the narrative in the media once initial concern about danger to public health had passed.	The LTO/NVP and NOP were able throughout this period to make their position more dominant in the media. Also the period when the LTO/NVP and NOP announced the lawsuit against the NVWA.

CBL	CBL did not have an independent role in this round.	CBL was quick to assert that it had repeatedly asked for the codes of producers with contaminated eggs so that its supermarkets could begin pulling them from shelves.	Once the narrative shifted to the issues faced by farmers CBL announced it did not wish to seek damages from the farm sector. CBL representatives criticised the NVWA's detection methods.
Ministers	Ministries did not have an independent role in this round.	Media attention initially favourable then turned when information about tip-offs came out. The ministries also received criticism about the NVWA's overstretched capacity and subsequent inability to address the incident properly.	Ministers announced an investigative enquiry into the cause and handling of the fipronil events.
FAVV and Belgian ministers	FAVV did not have an independent role in this round.	The FAVV used Dutch and Belgian media to convey its unhappiness that it had not been informed of the NVWA's investigation and with the NVWA's slow response to its initial request for action in June.	FAVV did not have an independent role in this round.

Table 8. Table of Actors and response to media attention in each round

5.7a Media attention and media logic in the fipronil incident – actor perspectives

Table 8 shows the response of key actors to media attention in each round. For the NVWA and its ministries, media attention became an issue in the events of the fipronil incident. The public alert prompted an appearance from the NVWA's deputy inspector general on the evening news. The outcome of this appearance was a loss of control over the incident's reported narrative. The media shone a light on the misstep by the NVWA. It forced a recalibration of strategy from the NVWA that increased divisions between the NVWA's key strategic partner in the network: the sector. The NVWA used considerable resources recovering from the media's response to the Nieuwsuur interview: its public contact system collapsed from the volume of enquiries the organisation received in the following weeks.

“...the NVWA did have to divert some resources after the Nieuwsuur interview with Deputy IG Freek van Zoeren to clarify the level of risk that the public was exposed to. The Ministry of Economic Affairs also provided communication experts after this to aid the NVWA with its public statements.”

- Interviewee A

The above quote is consistent with the ‘pressure to act’ effect that scholars have diagnosed in media attention and governance processes (Klijn 2016; Klijn and Korthagen 2018: 107). The NVWA was further debilitated when the story that the NVWA had withheld information from Belgian counterparts when they requested action was circulated (see timeline). The media framed the NVWA’s management in the second half of the incident as ineffective, consistent with Bennett’s authority-disorder dimension of media logic bias (Bennett 2016: 39).

The following quotes have been taken from interview answers to the question *‘In your view, was the media’s reporting of the fipronil reflective of the situation at hand? Did it amplify/diminish any details of the events?’*

“...the NVWA’s actions after the Nieuwsurr interview [were framed] as ‘backtracking’. This perhaps amplified the idea that the network was not organised or in control of the situation. Some media sources stopped including the fact that fipronil posed a low level of risk to the public, which might have amplified the idea that it was unsafe. In reality there were only two egg codes that were unsafe according to risk analyses...”

- Interviewee A

“As soon as the media picked up the story ... all the stakeholders started reacting overly exaggerated ... and making sure they were ‘not to blame’... [b]ecause of the summer period, with a lack of news, media were happy to make the story bigger and bigger, because of ‘the reward’ in terms of media attention.”

- Interviewee E

“The media has mainly looked from the consumer's point of view. As a result, newspaper headlines with terms such as "poison eggs" soon arrived.”

- Interviewee G

From the answers of interviewees, it can be concluded that actors in the network observed elements in the media's reporting of the events consistent with Bennett's information bias of dramatisation (Bennett 2016: 36). Risk and responsibility were the focal points of the media's reporting of the situation.

There is evidence of personalisation in some reports of the incident – it can be observed that stakeholders used this bias to ensure their position was being broadcast to the public at certain points. Some farmers contacted local media outlets when fipronil was leaving the national papers' headlines. As an interviewee who owns and operates a poultry farm explains:

“Sometime in October we realised the media was no longer interested in fipronil. Which was odd, because most farmers still had to deal with the effects of fipronil on a daily basis. That gave us the deciding factor to work on a report ... So that people know: even though you no longer hear and read anything about fipronil, for farmers it is still a daily reality.”

- Interviewee G

They wanted the public to know that although order had been restored in supermarkets, farms were still undergoing hardship trying to remove the chemical from their businesses and resume trading. This is conducive with Korthagen's (2014:706) observation that stakeholders can use media to transmit their interests. More than this, the stakeholders capitalised on the presence of personalisation bias to remind the public of their position.

Similarly, the media played an informative role for other actors: some sector interviewees were informed of the incident themselves through the media, rather than through authorities (Interviewee E). As the incident wore on, organisations gave frequent comments in response to the events and actions of the government as they unfolded. As the

NVWA lost its control over the narrative, the sector was able to establish its own perspective in the media's coverage of the fipronil incident.

This is consistent with the observation of scholars that media attention can expose and enhance rifts between actors in governance processes (Korthagen & Klijn 2014). It is also clear from interview responses that media attention did indeed create pressure for actors to react to one another, as scholars have commented on previously (Klijn & Korthagen 2018: 107). Not only were rifts between actors highlighted by the media in the fipronil incident, events like the Nieuwsuur interview prompted actors in the network to respond to the comments of the Deputy IG.

To conclude, the responses from interviewed actors in the emergency network that assembled around the fipronil incident indicate that media attention increased complexity in the network in a number of ways. The media amplified particular elements of the incident to generate and sustain interest from the public, in a period of the year that can be slow for stories of interest. It also highlighted tensions between actors in the network by increasing pressure on actors to make their position public, promoting other actors to follow suit. This led in some cases to tensions increasing between actors. The delicate 'backstage' logic of governance processes, in which intense interactions take place between many actors with a range of perceptions and interests can be disrupted by the 'frontstage' logic of media, where organisational pressures like economic goals and deadlines give rise to reporting that focuses on short, soundbite-able stories that frame situations in a highly binary way.

5.7b Media attention and media logic in the fipronil incident – public perspectives

Recalling the simple coding exercise described in Section 4.2a(3), participants were asked to answer a series of yes/no questions regarding Bennett's (2016) four media logic biases described in Chapter 2. The results are shown below, in Table 9². These results will be compared with the figures of Korthagen & van Meerkerk's exercise (2014: 716), seen in Figure 9.

² In two articles, public authorities were not explicitly mentioned and were thus not scored

	Personalisation	Dramatisation	Fragmentation	Authority/ disorder	More than 1 bias
TOTAL	8/22	12/22	8/22	9/19	14/22
%	36	54.5	36	47	63

Table 9. Table of results for coding reports according to media logic biases

Table 2. Information biases in the news

Biases	Media reports		
	IJsseldelta-Zuid (%)	Lent (%)	Noordwaard (%)
Dramatisation bias	23.0	46.4	26.9
Personalisation bias	16.0	13.4	19.3
Authority-disorder bias	42.0	68.0	36.6
Negativity bias	45.0	54.6	40.8
1 or more biases present in media report	64.0	78.4	62.4

Figure 9. Reprinted results from Korthagen & van Meerkerk's (2014: 716) study of information biases in the news

Table 9 shows the aggregated results for the coding exercise by five participants. Figure 9 shows the results for Korthagen and Meerkerk's (2014) exercise. As theirs was a comparative case study, we can observe a greater range of the proportion of biases. However, it can be seen that comparatively, the results in Figure 13 err on the higher side of bias presence. Relative to the results of Korthagen & van Meerkerk (2014), information biases had a strong presence in the media's reporting of the fipronil incident. Moreover, most news stories containing information biases displayed more than one of these biases. Before discussing the results of the exercise, it should be noted that there are a number of possible explanations for the difference in the rates of information biases in reports of the fipronil incident than water management schemes: the time periods are different, and the fipronil incident (as pointed out by interviewees in Section 5.7a) occurred over the summer months, when news can be particularly 'slow'. The nature of the stories also differs, which could also partially explain this difference. Nevertheless, some comparisons can be made.

5.7c The media's reporting of the incident – information biases?

In general, the media's narrative switched from speculation about the public health dangers of fipronil to a more sympathetic portrayal of farmers in the second half of the incident.

Personalisation can be observed in media reporting when larger social, economic or political elements of the picture are played down, and the 'human' element of a story is disproportionately focused on (Bennett 2016: 36). In the coding exercise, participants were asked the question '*Does the article focus on personal (emotive) aspects of this story more than objective reporting of facts?*' to ascertain whether personalisation was present in the reporting of the fipronil incident by Dutch media. Some reports contained stories about individual farmers or shoppers and their difficulties – for example in the case of farmers how they would go about cleaning up their farms from fipronil or the financial damage they had incurred from the incident. For consumers, one story recounted the experience of a woman who had made a cake and discovered she was using eggs with the codes that had been flagged by the NVWA. She was breastfeeding at the time and did not know if she had put her baby at risk by eating the cake.

Recalling that dramatisation can be described as the emphasis of crisis over continuity, placing personalities at the center of the story and downplaying the complexity of a story (Bennett 2016: 37). Certain reports of the fipronil incident fell into this by, say, focusing on one actor's perceptions of the events and discounting the views of others. For example, in the second half of the incident, reports began to focus more on the standpoint of the sector, asking why the NVWA did not alert them sooner to the contamination. Often missing in these reports was the viewpoint of the NVWA, which was that the sector was legally responsible for detecting such a contamination.

Fragmentation was one of the lowest scoring aspects of media logic bias. Fragmentation makes it difficult to follow a story over a longer period of time because details are missing from individual reports, or the wider context of a report is missing. This was not observed in the majority of the media report in the sample. Certainly, however, one can see a shift away from the frame of the NVWA in media reports, towards the sector's perspective. In events

where public health is at risk, media's reporting can play a significant role in the way the public experiences the event. Towards the end of the period that was sampled, ministerial actors became increasingly negatively framed. When reporting on the selection of another minister in the establishment of an investigative commission into the fipronil events, several reports argued that this would prevent the actions of ministers from being properly critiqued. Throughout the timeline of the incident, some news outlets would continually return to discussions about the actual risk to public health posed by fipronil – it is only dangerous in very high doses, but toxic substances can have a cumulative effect on health if consumed over a long time. Studies show that the effects of fipronil consumption in low doses are negligible, but what other substances have been deemed safe and later deemed dangerous?

The authority/disorder bias of media logic can be observed when a preoccupation with public authorities losing control over a situation exists in media reports. In this case, throughout the incident, the authority disorder bias could be observed when media stories focused on the long wait times farmers were experiencing to become unblocked, and the contradictory statements of the NVWA were the focus of the media's story.

As Elliot and Greenberg (2016) commented, the line between minor health scares and major catastrophic events often becomes blurred due to the media's reporting. The 'risk society' we find ourselves in is one that is increasingly preoccupied with public health risks at a time when such risks have never been lower (Elliot and Greenberg 2016). This brief snapshot of the media's reporting of the fipronil incident allows a simple reflection on these ideas. There was some consensus between actors that most of the public was not in danger after consuming fipronil. The risk analyses performed by public health bodies were to the degree that the most vulnerable members of society were also accounted for – young babies, and the elderly, for example. For the general public, risk to health was low. Media's reporting of the incident wasn't entirely reflective of this fact.

5.7d The media's reporting of the fipronil incident – conclusions

Scholars have noted that the backstage logic of complex governance processes is not necessarily conducive to the frontstage logic of media (Klijn and Korthagen 2018; Korthagen 2015). Further, media attention is often sought by actors who feel excluded or unheard in a

network (Korthagen 2015). Media can therefore highlight the positions of actors in a network, forcing others to make their own positions clear, driving division between actors in a network with opposing interests (Klijn and Korthagen 2018). This adds to complexity in a network because media attention often prompts fast, soundbite-able responses from actors that might not be accepted by other actors in the network. A very apt example of this is the Nieuwsuur interview given by Deputy Inspector General Freek van Zoeren on August 2nd, where when pressed by the interviewer he said it might be best to avoid eating eggs until more is known. This was a departure from the agreements made in the network about what would be discussed in the interview, and the position of most actors in the network – even the position of the organisation that van Zoeren was representing, the NVWA.

At the outset of the incident, sectoral actors were very much on the back foot, strategically. Media reports allowed them an avenue of communication to make their position better heard, particularly after the Nieuwsuur interview. This is in line with Korthagen's (2015) observation that media attention allows unheard or underrepresented actors to increase awareness of their positions.

The NVWA also fell into trouble when a memo was leaked in mid-August, noting that the public authority had been made aware of the possible presence of fipronil much earlier than it had stated publicly, and to the FAVV, its Belgian counterpart. This became one of the most commented upon 'mistakes' of the NVWA, and part of the reason that the sector launched a lawsuit against the government. Certainly the additional complexity caused by media attention in interactions in a governance network can be observed in the fipronil incident (Klijn and Koppenjan 2016: 80).

It can be concluded, then, that media attention added additional challenges to resolving the fipronil incident because disharmony between actors in the network was highlighted, and in some cases heightened. Additionally, the level of risk posed by the fipronil incident was at times amplified in the media's reporting. However, this amplification wasn't entirely due to the media's reporting. The risk analyses that informed the actions of the NVWA, in the eyes of some actors, also overstated the potential danger to public health. Similarly, although the

media did highlight and potentially heighten rifts between actors, much of this tension already existed in the network due to the continued differences between actors.

6. Rounds analysis of the fipronil events

This chapter will firstly give a brief introduction to the analysis of the fipronil incident through the rounds concept (Teisman 2000; Klijn and Koppenjan 2016). It will then re-present Table 7, with an overview of the rounds, their basic characteristics and key decision points. Following this is an in-depth analysis of the fipronil incident using the concept of rounds of decision-making. Each round concludes with an evaluation of its outcomes. Table 10 shows the range of arenas active in the fipronil incident and the rounds in which they were active. An analysis of strategic complexity in the network concludes the chapter.

The following analysis of the events of the fipronil incidents has been performed according to the rounds concept (Teisman 2000; Klijn and Koppenjan 2016: 83). Each round in the 'game' of strategic manoeuvring opens with a 'crucial decision' or an event that triggers a change in the dynamics of the game (Klijn and Koppenjan 2016: 83). For example, a crucial decision could alter the number of actors in the game, the interactions that take place between actors and the content around which interactions are taking place (Klijn and Koppenjan 2016: 84). Similarly, an event or change in the conditions under which interactions are taking place can trigger a change in the perceptions, objectives or strategies of actors. As a result, these crucial decision points, or events, require actors to consider their strategic stance and adjust it if necessary, to fit the new dynamics. Throughout the timeline of these events, a fluctuating number of actors were involved, employing a range of strategies in their interactions with one another. At some points, particularly at points of intense media scrutiny and a high level of dynamic activity, the mix of strategies were highly conflictual. Due to the urgent context in which the decision-making process was taking place, events and crucial decisions changed the interaction process quickly between actors. Crucial decisions that end one round immediately trigger the next round in the game by placing new challenges on the agenda, and problem/solution definitions.

Round	1: 28 th June – 20 th July 2017	2: 18 th July – 30 th July	3: 31 st July – 13 th September	4: 18 th September – December
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Actors involved	NVWA (IOD, BuRO, ICB), FAVV, RIVM	ICB, NVWA, Ministries EZ and VWS, sector associations	NVWA, Ministries EZ and VWS, Tweede-Kamer, sector associations Commission, export markets	NVWA, Ministries EZ and VWS, Tweede-Kamer, sector associations
Crucial decision	FAVV alert NVWA to their discovery of fipronil on some poultry farms, request urgent response	Context redefined when upgraded to 'incident' status.	BuRO's sampled showed toxic levels of fipronil, public alert had to follow.	Discovery of fipronil levels in supermarket eggs rising again.
Intensity of interactions	Increasing towards the end of the round – mostly internal and informal within govt departments.	Increasing – high degree of uncertainty and inclusion of new actors who needed to be informed	High – Initially highly conflictual. Interactions continued regularly, became less conflictual.	Decreasing – less actors active in this round and most unknowns had been resolved
Agenda	Could fipronil contaminate eggs and what would happen if it did?	Investigating unknowns and formation of an action plan – and who will formulate action plan?	How to inform public and resolve the incident (heightened attention and many unknowns)? How to repair damaged relationship with sector?	How can the remaining cleaning issues be resolved, how to recover damage to the sector?
Key decisions made	Chickfriend's administration seized, samples taken.	Chickfriend sealed, first producers were blocked, sector's plan rejected, NVWA took full control of incident.	Decision to alert public made by NVWA. Sector made its position public. Need to collaborate reaffirmed.	Sector given more responsibility, NVWA largely returned to its oversight role.
Scope of interactions	Largely between government departments, with input from societal actor (RIVM) and	Game unfolded into private sector, and the first media comment was requested.	Game unfolded to reach local, national and international levels, public and private spheres.	Mostly contained between sector and NVWA with some input from national political actors and

	international actor (FAVV)			international actors.
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Table 7 (repeated). Basic characteristics of each round

6.1 Background and rounds analysis

Figure 13 shows again the basic characteristics of each round in the decision-making process of the fipronil incident. A detailed account of the rounds in the fipronil incident follow. This reconstruction was created from data gathered through the 7 interviews with actors in the network, content analysis of NVWA & EU Commission documents, letters to the Tweede Kamer from ministers & Minister Sorgdrager's report of her 2018 inquiry into the incident.

6.1a Background to the fipronil incident

Upon connecting three anonymous tip-offs about a company using fipronil in its cleaning activities on poultry producers, an IOD case investigator opened an investigation on the 21st November 2016 (Van Dam & Schippers 2017c). The IOD began contacting colleagues in NVWA departments to establish legal and public health details. This meant investigating the activity of the company Chickfriend and contacting BuRO to look into fipronil – for example, whether it could enter the food supply. Throughout the final month of 2016 and first months of 2017 the question of whether fipronil could enter eggs was the focus of the investigation. BuRO carried out some investigations and reported there was some evidence that poultry would be susceptible to contamination by fipronil if it was in the cleaning product. The question of whether it could cause harm to health was then raised. By April, a more urgent criminal investigation began – nicknamed 'Aladdin' (Sorgdrager 2018). The first round in the incident was triggered by an information request from Belgian authorities.

6.1b Rounds analysis

Round 1: 28th June to 17th July 2017

Procedures, protocol and preliminary research

Belgian authorities detected fipronil in some Belgian poultry farms that had used Chickfriend and contacted the NVWA for information in mid-June. To protect the secrecy of the criminal investigation, Belgian authorities were told by the NVWA that they had no reason

to suspect Chickfriend (Van Dam & Schippers 2017c). This led to a request for more urgent actions on the 28th on June and by July 7th, an inspection at Chickfriend was carried out. It was still not communicated to Belgian authorities that a criminal investigation was already being carried out at this time. No fipronil was found on this occasion but an inspection on the 12th July found other illegal biocides that allowed the NVWA to seize the administration of Chickfriend and inspectors began to take samples from producers that had used the services of Chickfriend (Interviewee A). Based on the number of producers in Chickfriend's seized records, it was decided that the investigation 'Aladdin' should be scaled up on the 17th to include more inspectors and resources. The question of whether producers should be blocked was raised at this point but the samples from producers that had used Chickfriend were not yet ready, so on the grounds of insufficient evidence of contamination, the decision was made not to block producers (Van Dam & Schippers 2017a).

The NVWA had not alerted the sector to these findings, nor of its investigation. Belgian authorities were of the belief that their request on June 28th for urgent action triggered the events of July, unaware that investigation had been carried out since December 2016. The round to this point was contained within one institutional setting: government departments, with communication occurring through a series of emails and meetings between sub-departments of the NVWA and some input from research bodies and Belgian authorities. The decisions to keep information from Belgian authorities and not inform the sector both had ramifications for subsequent rounds. The NVWA did not have a pre-prepared crisis plan for this situation, and there were a great deal of unknowns remaining (Interviewee A).

Evaluation

The initial round was one with relatively low levels of strategic action, arenas of interaction and institutional settings. Although there were a deal of 'unknowns' in this period, the round was relatively low in complexity due to the firm problem definitions and issue frames, few active arenas and institutional similarities between actors. The number of actors in the round was low, and most were strategically aligned. Interactions were mostly between actors with a high degree of familiarity between them, meaning that despite the chaotic nature of the situation, decision-making and information searches took place in a relatively procedural setting. As the scale of the situation became evident, the decision was made to

scale up its status to 'incident level'. This decision effectively ended the round by initiating an increase in the number of actors in the game (ministries and the sector would have to be alerted), the course of interactions (increased urgency) and content of the game (new frames, issues and definitions).

Round 2: July 18th – 30th July

Increasing momentum

According to protocol, declaring a situation an 'incident' required the NVWA to inform the departments EZ and VWS. It was becoming clear that the situation would require action from many groups involved in the supply chain and a significant amount of resources would likely have to be mobilised. Due to the number of unknowns in the situation, providing a comprehensive risk assessment was difficult for BuRO (NVWA 2019b). So too was the formulation of a plan for the NVWA. The NVWA did not have a crisis plan for this particular situation and was in the process of a major reorganisation, so had to consider its strategic position. The next day, the first newspaper contacted the NVWA press office to confirm that an investigation into fipronil on poultry farms was underway. The NVWA press office confirmed, and alerted the Ministers of EZ and VWS, as well as the NVWA IG straight away. They were told that the story would be published on Saturday, July 22nd (Sorgdrager 2018).

On the 20th, the FAVV had notified Belgian neighbours through the EU Rapid Alert System for Food and Feed (RASFF) to possible fipronil in eggs (EU Commission 2017a). It also gave the NVWA a risk assessment because BuRO was unable to complete one due to the number of unknowns. This risk assessment gave some information about risks to health from fipronil but there were no studies on long-term effects, so information on which to form a plan was still sparse. On the 21st, results from samples of Chickfriend equipment confirmed that fipronil had been used as a cleaning agent and it was still highly detectable 58 days after use on farms (Sorgdrager 2018). The NVWA now knew that based on the administration found at Chickfriend, around 200 producers had used the service and more had bought products to use themselves. Chickfriend was sealed on the same day. The NVWA decided at this point to begin sampling *and* blocking producers, starting with seven producers the next day (22nd). In anticipation of the story from *De Stentor* that would name Chickfriend as the suspect company the following day, inspectors were told to call producers shortly before they arrived.

Inspectors were not given information about what would happen to the producers next – just to inspect and inform them that they were blocked from selling any products. Producers received letters in the following weeks giving them more information (Interviewee G). The ministries of EZ and VWS were informed of the events thus far, including the blocking of producers and the note that tip-offs had been received in November 2016 (Van Dam & Schippers 2017c).

The story from *De Stentor* prompted a second headline the same day from the online news agency *Algemeen Nederlands Persbureau (ANP)* that was much more alarmist. In response, the NVWA released its first press statement outlining the blocking and recalling of some eggs, and stating there was no immediate danger to public health. The NVWA then called for *ANP* to adjust its headline to better reflect the press release of the NVWA, which *ANP* did (Sorgdrager 2018; Interviewee A).

Based on the available information, the possibility of blocking all producers was raised at this point, and contact with the sector had to be made. On the 24th July, the NVWA organised a meeting with representatives from the sector organisations, and the same morning released 100 addresses of producers to be blocked to the incident team. At the meetings, the Director of the IOD requested an action plan to carry out the blocking and sampling from the sector within 24 hours. The reported outcome of the meeting was that the sector wanted to take charge of the situation (Sorgdrager 2018). The NVWA then began forming plans according to two scenarios: one if the sector's plan was sufficient, and one if the NVWA would have to take charge – in case that happened, the NVWA would have a plan ready to use. The following day, the NVWA consulted with ministries EZ and VWS and decided that in future consultations with the sector, ministry representatives would be present also (NVWA 2019a).

The next day, on the 25th, BuRO gave provisional advice to take preventative action in light of the unknown long-term health consequences of fipronil. This was also the day that the sector's action plan was due. According to representatives of other sector organisations, it was agreed that ANEVEI would take the lead in creating the plan, but there had not been proper consultation before ANEVEI had submitted the plan to the NVWA. That afternoon, around 14:00, the NVWA received an action plan from the sector organization ANEVEI. The

NVWA responded at 14:58 that the plan submitted by ANEVEI was not sufficient in its scope and would not address the incident adequately. ANEVEI was given an opportunity to resubmit the plan before 16:00 but did not succeed (Sorgdrager 2018; Interviewee A). The NVWA alerted Ministers from EZ and VWS that it had received a plan from one sector organisation, that this was insufficient and that the NVWA would take charge. According to ANEVEI representatives, the scope of the plan requested by the NVWA was beyond ANEVEI's organisational capacity. Due to its decision to take full control of the incident, the NVWA blocked the sector from viewing the list of affected companies, stating it would take control of directives and the sector would implement the directives. The sector was therefore unable to give input about the decisions being made.

On the 26th July, the NVWA published a Q&A on its website, and passed on egg codes with 'too-high' fipronil levels to CBL so that its supermarkets could begin recalling them (Interviewee D). Because of CBL's proximity to consumers in the supply chain, it had a separate role throughout the fipronil events. The NVWA also began blocking producers on this day: initially 181 producers were blocked. The NVWA also informed the EU Commission by letter of the situation so far. BuRO's initial sampling showed that about 26% of eggs in the food supply were contaminated with fipronil (NVWA 2019b). OVONED requested on the 27th that any producers or companies that had used the services or products of Chickfriend come forward voluntarily. In a meeting with the sector on the 29th, the NVWA and the ministries EZ and VWS sought to clarify facts, procedures and protocols based on what was known, and discuss issues faced by producers. The hope at this point was that hens could be rid of fipronil in a few weeks and go back to laying. The meeting ended with a conclusion that the public did not need to be alerted because it could damage consumer confidence and there was no acute risk to public health. While strategic cooperation between the NVWA and the sector was low, the conclusion of the meeting was an agreement that the incident could be handled without alerting the public, and potentially damaging consumer confidence (Van Dam & Schippers 2017a).

The decision to formally notify the sector of the incident and request an action plan with 24 hours' notice to the deadline was informed by the fact that the scale of the situation until that moment was not clear to authorities. The emergency context of many unknowns

and increasing urgency required fast decision-making. It has not been made clear in this research why the sector was not contacted earlier on in the investigation, particularly as the legal responsibility for preventing such contamination lies with the sector. As became clear in the round, the two key actors were operating according to their own separate institutional logics, with little overlap: the perspective of the NVWA was that it was the sector's responsibility to prevent and, failing that, deal with a contamination scare. The sector did not view the contamination scare as a product of its shortfalls and expected a more collaborative supportive approach from the NVWA. The decision ended the round by providing decisive problem and solution definitions to the issues posed in the round.

Evaluation

This round was characterised by an increasing amount of activity and complexity. Its beginning was triggered by the realisation of the scale of the incident and subsequent need for a range of actors to find solutions. The number of actors increased, and new actors brought with them diverging perceptions, objectives and strategies to the network. Decision-making occurred in a context of urgency, and the NVWA took control as director. By dominating the decision-making process, the NVWA selected a go-alone strategy – one that did not take into account the perceptions and objectives of other actors in the network. This was also a round where lots of new protocol had to be established: a situation of such intense uncertainty without a pre-prepared crisis plan resulted in a chaotic setting. The NVWA's problem definitions and issues frames dominated the round. Proposed solutions did not incorporate knowledge brought by new actors and did not address their concerns. This led to a low level of satisfaction for other actors in the round.

Round 3: July 31st – September 10th

Navigating complexity

This round was triggered by the seriousness of the incident again being scaled up when, on the 30th July, BuRO's samples indicated that ARfD levels, which were toxic levels, had been exceeded in two producers' eggs. This led to a decision by the NVWA, per protocol, to alert the public. This decision and event triggered a new round by increasing the number of actors in the game to include public watchdogs and heightened media attention, changing

the course of interactions by increasing tension between the sector and the government and changing the content of the game by redefining the problem as a public health risk.

The alert was scheduled for the next day, Monday July 31st and was a press release, largely informed by instructions from the EU (EU Commission 2017b). The NVWA and ministries EZ and VWS had previously arranged a meeting with sector representatives that morning to update them about BuRO's sample results, but the meeting would now be to alert the sector of the need to alert the public. The sector was very concerned about the public being alerted to the situation. It rejected a request from the NVWA in that meeting to create a list of companies that had not used Chickfriend, which the NVWA wanted to use as part of the public alert to quell panic. The sector was concerned about the reputation and livelihood of the producers had that used Chickfriend if the public was alerted to the incident.

On the 31st July the NVWA released a press statement outlining the incident: the risk to health was low, one producer's eggs should be thrown away because its fipronil levels exceeded the ARfD levels, and the codes of eggs exceeding ADI levels were published. In response to this press release, the sector organisations gave a press release of their own that the sector had been the victim of fraud.

On August 1st the NVWA decided that a representative needed to make a media appearance on that evening's Nieuwsuur to confirm the press statement. The NVWA requested the questions in advance and prepared Deputy IG van Zoeren on the organisation's position. In the interview, however, the presenter asked van Zoeren about the samples whose results were not yet known - van Zoeren replied that some results were still pending. When pressed, van Zoeren replied if someone could live without eating eggs until Sunday, that was recommended. According to representatives from the government and sector, this is when confusion about the incident began. A sector representative notes this event and the moment the NVWA 'lost control' of the incident. It triggered a new phase by changing the number of actors involved, the course of interactions and the content of the game. The number of actors increased because many 'latent actors' – that is, those aware of the situation but not participating in the processes – became active at this point: export markets began analysing their Dutch eggs to test for fipronil and discontinuing their sale if fipronil was found

(Interviewee c). Some governments of export markets banned imported eggs from the Netherlands outright (for example, Brazil banned the import of poultry from certain Dutch producers, Oman stopped importing eggs from the EU altogether, Ukraine stopped importing eggs from the Netherlands, Germany and Belgium). Ministers had to inform parliament of the incident, opening up another arena for the game. Supermarkets in Germany began pulling all Dutch eggs from their shelves in a 'precautionary measure'. On August 1st IKB Ei handed over a list of companies that voluntarily came forward after OVONED's call on the 27th, and this included extra companies that were not on the NVWA's original list.

The message was seen to contradict the press release of the NVWA of the previous day. The next day (August 2nd), representatives of the sector reported that the comment was fearmongering and public confusion grew – the NVWA's contact system could not process the number of requests for information it received (Sorgdrager 2018). The NVWA attempted to clarify its position in a press release that day, which was that there was no need to stop eating eggs as the risk to health posed by the incident was low. The NVWA then announced it would increase transparency by publishing a list of all of the egg codes that had fipronil levels above the MRL, not just above the ADI. The sector requested the NVWA not publish this list, because MRLs are not a health standard and it could do further damage to the sector's reputation. In the first week of August CBL and FNLI were given the corresponding names and addresses of producers with too high-fipronil levels. The rest of the sector was still blocked from this information: CBL was given the information because of its role in recalling. The rest of the sector was vocal in its displeasure at this development. A meeting between the Ministry EZ concluded that the incident did not need to be scaled up to a crisis status. The NVWA was to receive assistance from the Ministry's communication employees to prevent further confusion. It was also decided that communication between departments must be tightened (Interviewee A).

The next day, on August 3rd, the NVWA published egg codes of all of the producers with fipronil levels above the MRL on its website. As the codes were published the next day, the sector announced it would explore legal options in response. Ministers Schippers and van Dam from VWS and EZ respectively wrote to parliament for the first time to inform the lower house of the incident as it stood (Van Dam & Schippers 2017a). This initial letter did not

include mention of the tip-offs in late 2016 and the ongoing criminal investigation. The reaction to this detail is returned to shortly.

On the 4th, a meeting took place between the sector representatives and Minister van Dam, of EZ, to relieve the pressure from the NVWA. The NVWA requested the LTO/NOP and NVP make an urgent request that companies and producers come forward voluntarily if they had not yet been sampled and had used Chickfriend, as the list from IKB Ei on the 1st showed that the NVWA's original records were incomplete. The LTO/NOP and NVP complied with this request. From the list provided by IKB Ei and the call from LTO/NOP and NVP, an additional 50 producers were blocked and sampled (NVWA 2019a).

By the following week (beginning Monday August 7th), public confusion had somewhat subsided: RIVM had posted additional information clarifying the actual risk to public health was low and it was understood that the Deputy IG van Zoeren had misspoke in the Nieuwsuur interview. BuRO released a risk assessment that week clarifying the 'negligible risk' posed to consumers. After this clarification, the NVWA noted that most information requests were now from producers, and the public seemed less panicked (Sorgdrager 2018). The pressure was being primarily felt by the NVWA, the sector, the ministries EZ and VWS and of course affected producers. The NVWA's resources were overstretched, and the sector was struggling to receive answers for questions about removing fipronil from farms. The NVWA's contact system was still largely unreachable due to the volume of requests for information it was receiving in August. A hotline was set up by the LTO/NVP to answer farmer's questions because the NVWA's capacity was overstretched. Questions were bundled together by topic and sent in bulk to the NVWA to increase efficiency. The NVWA also established 'account holders' in this period who were given portfolios of blocked producers to manage.

On the 8th of August, a meeting was held with the sector, producers, representatives from the Ministry EZ and NVWA. In this meeting, the NVWA emphasised the common goal of the government and sector: repairing consumer confidence. The sector's hotline initiative was applauded by the NVWA and it was announced that AVINED would act as another contact point between the sector and the NVWA, and the two organisations would set up a flow chart for unblocking farms so that producers could have a clearer idea of the process and where

they stood - this appeared a week later. The NVWA was able to answer some key questions of the sector in this meeting, and acknowledged that the handling of the situation had not been without mistakes.

On the 9th of August the Belgian Minister for Agriculture criticised the Netherlands' response to Belgium's requests for information at the end of June. He also stated that the NVWA had received information in late 2016 about a cleaning company illegally using fipronil. The memo confirming these tip-offs was circulated online, and the media took hold of the story. The lower house asked the ministers to clarify why this was not consistent with their letter to the parliament on August 3rd. The ministers responded in a letter the following day (10th August) that due to the ongoing criminal investigation this information had to be withheld. The letter incorrectly referred to this information as one anonymous tip, rather than a series of linked tips (Van Dam & Schippers 2017b). It also mentioned that initial investigation by BuRO included RIVM and Ctgb at the beginning of 2017, and the organisations concluded no acute danger to public health. This was refuted by the two organisations. A correction appeared around two weeks later in a third letter to parliament on the 23rd. The criticism from the Belgian Minister for Agriculture prompted a television appearance from Ministers Schippers and van Dam to refute to accusation that the Netherlands had been lax. The same day, Minister van Dam called a Belgian colleague to establish a daily information exchange and the relationship was restored with that initiative. The same arrangement was made with German authorities. Also on the 10th of August, the owners of Chickfriend were arrested by the IOD and FAVV in a joint investigation team.

Getting fipronil out of farms was logistically very complex. Farms could not 'flush' the stables clear because the fipronil could end up in the water supply, which was illegal. Manure containing fipronil over a level safe for wildlife could not be removed any way except by incineration. There were only several incinerators to perform this and waiting times to remove the manure were long and costly to producers. Ridding hens of fipronil posed problems of similar complexity: producers were often operating without incoming revenue for several weeks while maintaining their hens and not knowing whether they would be able to rid them of fipronil. Some chemicals proved quite successful, but many were not allowed by the NVWA in the interests of animal welfare. After it emerged that changing the hen's diet

would not rid them completely of fipronil, it became increasingly clear that the hens would need to be culled (Interviewee G). By the end of October it was still being reported that removing farms of fipronil was proving a challenge. Removing manure by protocol continued well into 2018, according to media. Producers were also kept blocked for longer than necessary due to the overstretched capacity of the sampling laboratories and logistics of processing cleared samples. Producers could only be cleared by official laboratories, which were dealing with a back-up of samples. Although other private laboratories could test samples and indicate farms were clear, producers were required to use these results to press the NVWA to 'officially' test them and pronounce them cleared. This led to further costly delays between ridding a farm of fipronil and being able to sell eggs again (NVWA 2019).

Throughout August, the LTO was able to arrange regular meetings similar to the one held on August 8th where questions about unblocking and logistical issues could be asked and answered. AVINED was also able to prompt a change to companies who were only partially contaminated so they could start selling their uncontaminated eggs again, where previously they were entirely blocked. The NVWA also agreed to share anonymised information with the sector from the 16th of August when requested, and to alert the sector of major changes before they took place (Interviewee A; NVWA 2019a).

This round ended with solutions being found through cooperative efforts from actors in the network, and greater feelings of certainty for the actors. The common goal of ending the blockade of farms was reaffirmed between the sector and the government. Issues related to confusion and miscommunication faced in the round were largely resolved through the establishment of procedures and communication channels, like the regular meetings between the sector, producers and NVWA, the hotline, and AVINED's regular consultations with the NVWA. The NVWA were able to outsource some duties, placing the NCAE in charge of monitoring packing stations from August 18th to ensure eggs were being checked for fipronil at that point. These changes also led to interactions changing course again, as well as the content of the interactions. Things could proceed with more certainty due to new information. By the end of August, the egg supply was 99% free of fipronil, and domestic consumption and prices had returned to previous levels. The average blocking period for farms was 2 weeks.

This is not to say the incident had been completely resolved: 144 producers remained blocked because of the overstretched resources of the NVWA for sampling and clearing, and the some parts of the sector were voicing their intentions to pursue legal action based on the comments made by Deputy IG van Zoeren in the Nieuwsuur interview and the discovery that the NVWA was aware of the situation for some months before alerting the sector. According to producers they were required by some organisations to provide written statements confirming they had not worked with Chickfriend or the cleaning chemical DEGA-16. However, despite the slowness of some procedures, control over the situation was slowly being regained. In the first week of September, fipronil levels in supermarket eggs had decreased to 1%. On the 13th September the NVWA pulled down the egg codes above the MRLs but below the ADI (as it initially displayed before the 3rd August) and announced that despite logistical issues, the measure were working (Interivewee A).

Evaluation:

Round 3 was characterised by a high degree of substantive & strategic (Klijn and Koppenjan 2016). There was a great deal of divergence in the perceptions of key actors in the game, which caused disagreement about the appropriateness of the NVWA's response. The round began with a decidedly go-alone type of strategy from the NVWA as it took control of the situation and blocked other actors from viewing information. This type of strategy typically heightens feeling of conflict in a game, as it is characterised by an actor forcing a substantive solution to a problem through in spite of protest from other actors, which was the case in Round 3 (Klijn and Koppenjan 2016: 80). As the month of August went on, collaborative strategies were employed by the NVWA and the sector to negotiate solutions to issues faced in resolving the issue. Common goals were reaffirmed to aid negotiations and overcome the substantive divergence in perceptions of the problem. Frames were aligned and negotiated consensus was found in many cases. In this round, the issue of differences in institutional backgrounds was also overcome by the establishment of new protocols and systems for the network. The emergency network established some institutional logic of its own in this round that aided efforts in resolving the incident. Negotiated solutions were often informed by the production of new rules and processes – for examples, the hotline set up by the sector allowed the NVWA to answer questions posed by producers more efficiently. This

idea of 'bundling' informed the NVWA's establishment of 'account holders' who were managing portfolios of affected farms. Although issues remained, Round 3 saw the resolution to a large degree of the issues faced by producers in resolving the fipronil contamination. Solutions found in this round were enriched by the utilisation of knowledge and information from the range of actors in the network. Satisfaction increased in this round as the search for solutions incorporated more problem definitions and issue frames than just the dominant one of the NVWA.

Round 4: Mid-September 2017 – December 2017

Round 4 was triggered in the third week of September by the sampling of supermarket eggs showing they had begun to increase in fipronil levels once more. The NCAE was asked to check that packing stations were checking eggs properly, and subsequently reported that receiving correct information from packing stations was proving difficult. Packing stations had not been reporting all batches of eggs that had fipronil levels above the limit. It was decided on the 28th September that the NVWA would inform producers by letter that fipronil had begun to show again in their eggs, and letters would also be sent to packing stations and retail companies reminding them of their legal duties. By the end of September, when the NVWA was taking down the egg codes from its website, it agreed to circulate the information with the sector for the first time so that the representative organisations could continue to monitor the situation.

On the 4th of October, sampling again showed an increase in fipronil levels in supermarkets. Sector representatives were alerted and agreed to collaborate to end this. It was also agreed that the NVWA would not communicate the re-increase to the public without consulting both the sector and the Ministry of EZ. On the 2nd of November, fipronil levels again were too high. This was to do with a 'measure of uncertainty' which gave a small amount of leeway to measurement levels when blocking and unblocking producers. The MRL was 0.005mg/kg, but farms were unblocked if they showed less than 0.010mg/kg. However the sector was being asked to test for eggs over 0.005mg/kg. It was reported by the NCAE that packing stations were not performing the required checks, relying on the fact that the suppliers had been unblocked and were therefore cleared. Because this second check was not being performed at packing stations, eggs with fipronil levels over the MRL had again

entered supermarkets. The NVWA subsequently issued a warning to packing stations that had not been correctly reporting fipronil levels (Sorgdrager 2018).

On November 20th and 29th, the same results appeared, and the NVWA again issued letters. The sector requested permission to use the measurement uncertainty that was being employed by the NVWA to unblock producers further down the supply chain, but this was denied. The NVWA and AVINED agreed to jointly review the supply chain to check for weaknesses. Throughout these months, the NVWA repeatedly stated that it was the responsibility of the sector to fix the issue. The prospect of blocking was raised again for the first time, and the sector agreed to come up with an action plan. Two proposals were presented to the NVWA by the sector in December 2017 and January 2018, both deemed insufficient by the NVWA. As discussions continued about enforcement through blocking or fines, fipronil levels began to drop and stabilised at a lower, acceptable level in the food supply.

A collaborative approach was taken this time between the NVWA and the sector in combatting fipronil levels. The round ended with the NVWA's decision to take a much less interventionist stance in this period, requesting the sector take charge again. Various protocols were established by the sector to continue the clean-up from the incident, and to resolve the issues presented in the round. The problem and solution definitions, as well as the issue frames established in this round continued throughout the remainder of the incident.

Evaluation

Collaborative and facilitative strategies were favoured in this round (Klijn and Koppenjan 2016: 80). The NVWA was keen to re-establish the regular protocol of the sector being responsible for dealing with contamination scares. The approach to this round incorporated knowledge gained from the past rounds, responded to criticism of previous decisions and utilised processes like reframing to overcome substantive differences. Due to these efforts, despite diverging perceptions between the actors remaining, mutual ground was established through collaborative strategies.

Arena	Actors	Network	Nature	Rounds active
NVWA department	NVWA (IOD, BuRO), ministers (EZ, VWS)	National government level	Procedural, institutional familiarity, high degree of communication	1,2,3,4
Sector-producer channels (hotline set up by sector)	Sectoral associations, producers and companies along the supply chain	Local level (regional private bodies)	Main communication channel for producers: individual queries to be bundled and sent to NVWA	3
Sector-NVWA-ministerial consultations	Sectoral associations, ministerial representatives, NVWA representatives	Local level (regional private bodies) and national government levels	Channel between farmers and government: uncertainty, unpredictability, question-raising forum, institutional unfamiliarity, high tensions/emotions, contested knowledge, multiple definitions	2,3,4
Regional meetings	Producers and companies, sectoral organisations, NVWA representatives, local government representatives	Local level private and political organisations	Forum held by local government bodies: uncertainty, unpredictability, high tensions/emotions, many unknowns	2,3
Parliament	Politicians, ministers, NVWA	National level government	Channel from NVWA through relevant ministers to elected government – for elected officials to clarify and stayed informed of incident and solutions	2,3,4

Table 10. Description of arenas in rounds

Table 10 shows the range of arenas in which interactions took place throughout the fipronil incident. As can be seen from the table, not all arenas were active at all times, and

not all actors were present in all arenas. We now turn to a discussion of strategic complexity in the network.

6.2 Strategic complexity

Strategic complexity arose from the range of strategies used by the many actors and the multiple arenas across which interactions took place throughout the incident. The network was also highly dynamic, so complexity was further increased due to the shifting strategies of actors as the fipronil incident developed.

As can be seen in the rounds analysis and from the range of arenas in which interactions took place in Table 10, information was not moving freely throughout the network. Actors were operating with very low levels of trust between them, meaning there was a high chance of opportunistic behaviour, and actors could not be certain of the next moves and strategies of others. This led to uncertainty and unpredictability reaching very high levels in the network at certain points. For example, relations between the NVWA and sector became strained when the NVWA released a public statement about the situation without first notifying the sector. The FAVV also expressed frustration when it emerged that they had not been made privy to the NVWA's investigation into Chickfriend when the FAVV requested information. Additionally, the context in which these interactions were taking place was itself highly uncertain and unpredictable. Little was known about the risks fipronil posed to public health in initial stages of the investigation, and even less was known about removing it from farms. Information that was known, as discussed in the analysis of substantive complexity, was highly contested and different viewpoints were being used to inform a range of strategic positions in the network, particularly in relation to risk.

The strategic positions of actors in the network as a result of these diverging perceptions and contested knowledge were 'go-alone' – that is, only in the actor's interests and ignoring the dependence they had with others (Klijn and Koppenjan 2016: 80). At times of particular hostility these strategies were also highly conflictual – for example, at points, the sector plainly refused to co-operate with requests of the NVWA to extract information from producers that would have aided the NVWA's operations. Similarly, the NVWA blocked the sector from information about producers and the public authority's intended next action.

These strategies were more than go alone, because they stalled the resolution of the issue by creating blockages to action (Klijn and Koppenjan 2016: 80).

The network was characterised by a group of essentially indispensable actors, each possessing resources that were mostly not substitutable, with a high level of interdependence existing between them. Interactions, as shown in the rounds analysis and Table 10, were taking place across a vast range of arenas and information was not being shared freely between all actors. Interactions were taking place in a context of uncertainty and unpredictability, and the lack of trust or established relations increased these elements in the network. This meant that the actors in the network were forced to collaborate to resolve the situation and were without alternatives. Strategies were particularly divergent in Rounds 2 and 3 when actors were pursuing options that only informed their interests, and ignored their mutual dependencies (Klijn and Koppenjan 2016: 80). Strategic complexity was rife as a result of these conditions, particularly in Rounds 2 and 3. The following chapter examines the interventions of the NVWA as the public managers involved in the case.

7. Interventions of the NVWA throughout the fipronil incident

Recalling the management strategies discussed in the theoretical chapter of this thesis, this can be defined as 'deliberate attempts to govern processes in networks' (Klijn et al 2010). Managing complex governance networks can take the form of a variety of activities. This chapter will look at the management interventions of the NVWA over the timeline of the fipronil incident. Before discussing the NVWA's interventions, it is worth noting that considering the emergency context of the situation, more guidance from the NVWA might have been expected. As can be seen from the rounds analysis, for a great deal of the network's activities, the NVWA was not acting in a public management position but rather as actors pursuing their own set of interests and objectives.

7.1 Complexity and management

The interventions of the NVWA had varying effects on the network and its operations. The establishment of an investigative commission does indicate doubt over the public authority's handling of the incident. Despite this, one can point to several management

decisions made by the NVWA that increased collaborative efforts in a somewhat hostile network and led to the resolution of the incident.

Before doing so, however, a distinction must be made between two types of strategies seen from the NVWA in the fipronil incident, both of which can be defined as intervention. The first will be referred to as top-down intervention and the second is network management. Top-down strategies refer to the interventions of the NVWA that can be considered ‘classical’ management strategies – that is, the blunt application of rules with little manoeuvring room for the recipient actors. As can be seen in the rounds analysis and Table 12, this led to disharmony in the network, especially between the two key actors. The effects of these top-down interventions created additional issues in the network that hindered its operations. The network management strategies that can be seen identified according to the definitions discussed in the theoretical framework of the thesis were introduced not only to navigate the original complexities of the network, but also to correct the issues raised by the top-down, classical interventions of the NVWA.

Network management, specifically process management, can be defined as interventions designed to initiate, facilitate and mediate network processes (Klijn and Koppenjan 2016: 36). These interventions will be discussed according to the types of complexity covered in Chapter 2’s theoretical framework: substantive and strategic complexity, and the complexity arising from media attention. Those addressing substantive complexity are aimed at enhancing the generation of new ideas and building consensus. The interventions directed at strategic complexity aim to manage interaction between actors (Klijn and Koppenjan 2016: 37). Figure 14 provides an overview of these interventions by identifying an issue that prompted an intervention, what the intervention entailed, whether it can be classified as top-down (TD) or network management (NM) and the reactions of actors to the intervention.

Problem	Action	Reaction	Result
(End of Round 2) Sector’s action plan deemed not sufficient by NVWA	Sector plan rejected, sector blocked from involvement in new	Sector becomes increasingly frustrated with the NVWA’s decision to not involve it in decision making	Relations between NVWA and sector becomes fraught, making cooperation difficult

	plan, only receives instructions (TD)		
July 31 st (Start of Round 3) Samples indicate toxic levels reached according to BuRO's analysis – NVWA must inform public	NVWA informs public of contamination without giving sector prior notice, culminating in the Nieuwsuur interview (TD)	Sector utilises media to establish its own position, allowing media to highlight rift between actors	Media capitalises on story, continues to request comment from actors, prompting actors to make public the issues being faced in the network
2 nd August (Round 3) Confusion after Nieuwsuur interview indicates eggs are unsafe to eat	NVWA acts to increase transparency, releases egg codes despite sector's protests (TD)	Sector announces it is investigating legal options for negligent behaviour by NVWA	NVWA accused of backtracking by media, relations between NVWA and sector deteriorate further
7 th August (Round 3) NVWA unable to manage influx of activity and information requests from public	LTO Nord sets up hotline for local farmers – this is extended at request of NVWA to serve all farmers facing issues (NM)	Flow of information improves between farmers & NVWA through sector	Communication between sector & NVWA takes on a more horizontal form
10 th August (Round 3) Leaked memo shows NVWA withheld information from Belgian authorities	Dutch minister calls Belgian minister to repair relationship and establish daily contact (NM)	Belgium accepts offer	Coordinated approach between actors resumes after brief time of tension
(Rounds 2, 3, 4) Continued strategic divergence between NVWA & sector obstructing collaborative activities	AVINED becomes key collaborative actor between NVWA and sector (NM)	Weekly in-person meetings with NVWA	Enabled efficient exchange of information between key actors in the network

Table 12. Interventions by the NVWA throughout the fipronil incident, divided into top-down (TD) and network management (NM) interventions

To quote Klijn and Koppenjan (2016: 279): “Network management strategies are aimed in principle at facilitating and promoting interactions between actors, exploring content, or arranging interactions ... network management strategies are aimed at the initiation and facilitation of interaction processes”. The following sections take a more detailed look at the interventions identified in Table 12 of the NVWA that fit this description and can be classified as network management strategies.

7.1a Managing substantive complexity

The NVWA and the sector were the two actors with the most divergent perceptions, and the two actors most key to resolving the incident. These divergent perceptions, the urgent context and the need for decisive action meant that conditions for building consensus were far from optimal. In terms of exploring content to reduce substantive complexity, few strategies can be identified. The provision of scientific knowledge by the independent research body RIVM might be the closest example, and this did aid the building of joint solutions. On the other hand, these analyses and the analyses of BuRO were provided to the NVWA which gave mandate for some key decisions that were made throughout the incidents. The effect of this was that groups from the sector argued that the analyses were overly cautious and based on arbitrary standards, rather than standards set to protect public health.

Network management strategies to reduce substantive complexity can be observed in the joint action that was taken as a result of communication between actors improving. This improved communication was in part due to the establishment of AVINED as a collaborative partner to the NVWA. Although perceptions remained divergent, enough common ground was found to enable collaboration to occur. Diverging perceptions meant that a number of problem formulations existed throughout the incident. In later rounds, actors put these to one side to focus on the common ground they shared.

7.1b Managing strategic complexity

The first two rounds of interaction, particularly Round 2, in the fipronil incident were characterised by top-down strategies from the public authority: the NVWA blocked information from actors and initiated an independent plan after rejecting the sector's submission. The sector responded in a similar fashion: for example, refusing to hand over some information to the NVWA like a list of producers that had not used Chickfriend. It should be noted here that the sector did comply very early on with the NVWA's request to ask producers to come forward voluntarily if they had used Chickfriend's services, so this is not to say that the sector refused to cooperate in any way. However in comparison with the second half of Round 3 and Round 4, Round 2 did not include much collaboration and strategic

complexity was a dominant issue. This was in part to the fixation of actors on the nature of the problem and specific solutions that came with that fixation.

As initial go-alone strategies gave way to a more collaborative approach based on common ground, process management activities associated with navigating strategic complexity can be seen (Klijn and Koppenjan 2016: 279). The NVWA's collaboration with AVINED, the umbrella organisation for the sector and use of the sector's hotline to channel information requests from farmers are two examples of this. Thus, despite continuing high tensions and divergent perceptions remaining in the network throughout the incident, the goals of the network could be worked towards more effectively. Actors were able to connect their objectives to enable some goal intertwinement (Klijn and Koppenjan 2016: 174).

7.1c Managing media attention

Media attention to the fipronil incident exposed a strategic misstep of the NVWA after the Nieuwsuur interview. The NVWA then spent considerable energy attempting to clarify its position and repair the damage this had done to its relationship with sector groups, key collaborative actors. Rifts between private and governmental groups of actors were exposed through the media's reporting on the incident. Media attention also exposed a tension between Dutch and Belgian authorities when a memo was leaked and circulated, revealing Dutch authorities had withheld information about their investigation into Chickfriend when the FAVV first enquired about the business. Actors made their positions public through media interviews and this highlighted divisions within the network. This continued throughout the fipronil incident.

Although significant efforts were made to connect actors, exploration of content to find new solutions did not occur in this network. The result was that some actors continued to feel unheard, and to use the media as a means of making their position and interests public.

The fipronil incident shows how necessary these activities can be – a significant portion of the backlash to the NVWA's handling of the incident came after the media narrative of the situation shifted from one of public health risk to one of mismanagement. It appears as though collaboration occurred between actors in the network in spite of negative media

attention and the associated increased complexity, rather than due to management tactics by the NVWA to navigate this.

Network management involves activities like creating rules about the management of information to reduce the complexity associated with the many interpretations that can arise from one piece of information in a governance network that contains a range of perceptions and interests. It also takes the form of arranging, promoting and facilitating interactions between actors to enable better communication. Recalling the management of emergency networks specifically, information sharing and ensuring horizontal organisational structures in crisis contexts are two crucial elements of effective operations (Kapucu 2006). Comfort (2007) adds that emergency networks are increasingly effective when they become dynamic systems that adapt to their changing environment and correct mistakes where needed. To enable this, emergency networks require design that allow a reaction to information. In the case of the fipronil incident, information sharing was poor for a significant stretch of the timeline. The go-alone strategies that characterised Round 2 and the beginning of Round 3 were accompanied by a static organisational structure that did not change structurally when the incident status was declared. Information was often blocked and did not move freely around the network. Management strategies, as outlined by Kapucu (2006) were not visible in this sense.

As the incident progressed, some changes were made to processes, and interactions became more open. This can be linked to the 'cognition' element of the emergency network, as Comfort (2007) labels it, because feedback loops were able to inform adjustments to improve the network's functioning. However these changes appear to be due only in part to the management strategies that were employed by the NVWA, because many issues were not addressed by these strategies. Learning is explored in the following chapter as a means to evaluate the outcomes of the network. It can be concluded that some process management techniques were employed to initiate, promote and facilitate interactions between actors, and through this, communication and the operation of the network improved. However intervention, particularly network management strategies, did not appear as much as one might expect of a public manager in an emergency situation.

8. Evaluating outcomes of the network

The following section evaluates the outcomes of the network as a whole. Klijn and Koppenjan (2016: 240) propose the evaluation of outcomes in governance network processes through a series of assessment criteria. The criteria determine whether *learning* has taken place to resolve complexity faced in network processes and arrive at joint outcomes and co-produced solutions (Klijn and Koppenjan 2016: 247). These learning processes can be separated into three distinct categories: cognitive, strategic and institutional. The focus of this thesis is determining whether cognitive and strategic learning have taken place. The remainder of the section will outline these learning processes and determine the extent to which they have taken place in the fipronil incident.

8.1 Cognitive learning

Cognitive learning determines the extent to which outcomes of network processes utilise the range of insight into problems and their solutions brought by the variety of actors in a network. When outcomes can be seen to take into account this diverse mixture of values, interests and objectives, it is likely that solutions are enriched by this process and shared knowledge will have increased (Klijn and Koppenjan 2016: 248). This is an important step to ensuring outcomes are satisfactory for all actors in a network.

Throughout the rounds of interaction in the fipronil event, instances of cognitive learning increased. Particularly from Round 2 to Round 3, proposed solutions increasingly took into account the range of perceptions and corresponding objectives in the network. The NVWA maintained its role as the dominant actor in the network but switched from a go-alone strategy that ignored the interests of the sector to a collaborative one that incorporated the sector's knowledge, capabilities and strategies. The result was that by Round 4, as new issues appeared, the approach of the network had transformed. The solutions that were proposed were innovative, incorporating insights from previous rounds and responding to criticism in previous rounds. A 'meta frame' of common principles was established that still managed the difference in perceptions (Klijn and Koppenjan 2016: 128).

8.2 Strategic learning

Strategic learning can be defined as actors' growing consciousness of mutual dependencies and involvement (Klijn and Koppenjan 2016: 251). This can be observed through an increased capacity to handle conflict, and ability to successfully negotiate problem formation and solutions to take into account the variety of objectives present in a network. Criteria for assessing the extent to which strategic learning took place include the perceived quality of the interactions (that is, the shifts from go-alone strategies to a collaborative approach), duration and transaction costs of processes and the extent to which the processes can be deemed legitimate, transparent and inclusive (ibid).

Strategic learning in the emergency network around the fipronil incident might be observed in the shift from a collection of conflicting, go-alone strategies in the first and second round to a more collaborative approach in the proceeding rounds. For example, the NVWA began to share more information with other actors in Round 3 and 4 after refusing this in Rounds 1 and 2. Similarly, actors from the sector increasingly worked with the NVWA to resolve issues after refusing several requests for co-operation in initial rounds. Increasingly throughout the rounds, there was an increased acknowledgement by actors that resolving the incident relied on a joint approach.

It is more difficult however to observe strategic learning in relation to the duration and transaction costs of processes. Due to the need for swift action in this situation, many decisions were taken without extensive negotiation, particularly in initial rounds. Transaction costs in initial rounds were low due to the speed at which decisions were being made (Klijn & Koppenjan 2016: 251). Strategic learning is also not easily observed in the level of accountability, inclusivity or transparency of the processes. A lack of transparency of the NVWA can be observed to some extent in most rounds, and due deliberation is missing in many processes due to the emergency context of the situation. The establishment of an investigatory commission to examine the causes and handling of the fipronil incident gives some indication that the process lacked external legitimacy.

Although evaluating outcomes of a network through analysis of learning processes gives a more nuanced picture of a governance network, many aspects of the network's

outcomes remain unexamined. Examining learning processes as a means of assessing the effectiveness of a network, then, might be more effective when used in conjunction with a more rational, 'linear' approach. In the case of the emergency network that assembled around the fipronil incident, despite the many perceptions and interests within the network, its aim was reasonably clear: the removal of fipronil from the food supply. It might be appropriate, then to briefly return to Provan & Milward's three-level framework to look at the effectiveness of the network in achieving its aim. It should be noted that this framework was designed to be used in assessing outcomes of stable networks of service delivery. Therefore not all criteria of the three levels will be used in the following section as some – like 'building social capital' are not immediately relevant to the emergency network context.

8.3 Effectiveness of the network at three levels of analysis

8.3a Community level

Evaluating effectiveness at the community level can be performed by looking at criteria like the cost to community, increased social capital, perceptions about the network's problem-solving abilities, the problem being changed in a positive way (for example lessened or disappearing) and general well-being indicators of a community (Provan & Milward 2001: 416). This research has focused on the network itself rather than public experience, so analysing effectiveness from a community perspective is for the most part beyond the scope of its findings. However, it is possible to comment on public perceptions of the network's handling of the incident using the analysis of media attention from Section 5.7. Recalling this, certainly the media's narrative of the network's handling of the incident was a critical one, focusing on missteps and eventually the lengthy clean-up period. One conclusion might be that from a community perspective, the network's handling of the incident was not without errors, and therefore could have been improved.

8.3b Network level

A network-level evaluation of network activity examines the viability of the entity itself. Indicators relevant to the fipronil incident case include relationship strength between network members, the commitment of members to the goals of the network, the cost of the network's maintenance and the extent to which its activities are co-ordinated (Provan & Milward 2001: 416 & 417). Other indicators include the maturation of a network and its

expansion, but this is not included because of the temporal nature of the emergency network that assembled around the fipronil incident. In the case of the emergency network around the fipronil incident, relationships between members were frequently strained, and as a result the cost of its maintenance high. Significant energy was spent on repairing damaged relations between various actors in the network and on correcting missteps. Commitment to the goals of the network was reasonably strong, but this was due more to the urgency of the situation and the lack of alternative approaches than the appeal of the network itself. Evaluation at the network level indicates that the emergency network that responded to the fipronil incident was not operating at its most effective.

8.3c Organisation/participant level

The participant level of evaluation in Provan & Milward's framework looks at the value of participation for individual members of a network. Criteria for effectiveness include enhanced legitimacy, outcomes for clients of organisations, and increased ability to attract resources. In the case of the fipronil incident, some network members suffered damage to their reputations as a result of the network's response – the sector and the NVWA, for example. It could be argued then that their legitimacy might have also suffered. Sector associations act on behalf of poultry farmers, and as such farmers can be considered clients of those organisations. Farmers were one of the most vocal critics of the response of the network, as evidenced in this research's analysis of media attention (Section 5.7) and interview with a poultry farmer (quotes in Section 5.7). It is reasonable to assume then that client outcomes were not enhanced as a result of that organisation being a member of the network. Nor was there evidence that being a member of the network enhanced the ability of individual organisations to attract resources. The NVWA's allocated budget increased after the incident, however this was more in response to its capacity to manage all of its responsibility.

Although the framework of Provan & Milward was designed to assess the effectiveness of more stable, long-term networks of service delivery, it does provide further insight into the outcomes of the emergency network that assembled around the fipronil incident. When examined in conjunction with the detection of cognitive and strategic learning processes in the network, some conclusions can be drawn about the operation of the network

as a whole. Initial problems were addressed in many cases, and the network as a whole began to operate more effectively in later stages of the incident. However the collaborative efforts of the network in resolving the fipronil incident could in many ways have been more effective. Cooperation between members of the network was frequently low, and the resolution of the incident took many months due to blockages and stagnations resulting from conflicting or go-alone strategies being pursued. Recurrently missing was the strategic management of the network to improve coordination.

9. Conclusions

9.1 The conceptual model

The emergency network that assembled to resolve the fipronil incident of 2017 was characterised by a group of actors who were largely unfamiliar with one another, and therefore loosely bound terms of perception, interests and strategies. They were tightly held together however by their intense reliance on one another for resources to resolve the incident. This resulted in a highly complex setting in which actors needed to find a solution to the contamination scare. The actors in the network held a wide range of strategies, informed by their vastly divergent perceptions on the incident in relation to risk, urgency and responsibility. The dynamic setting of the network, too, increased complexity because actors were not only reacting to one another's strategic moves but also new events that were taking place around them.

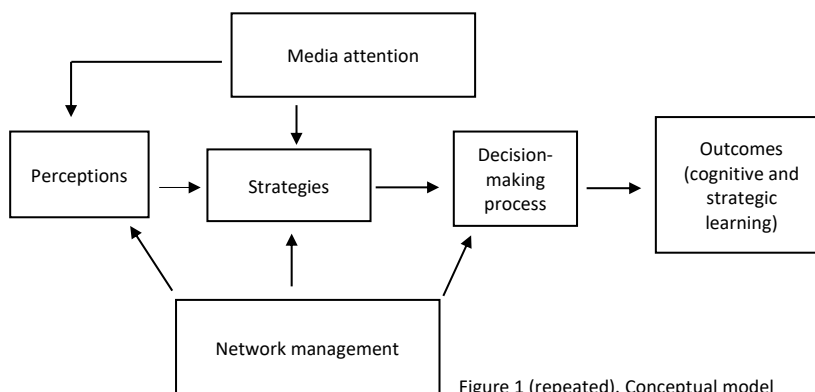


Figure 1 (repeated). Conceptual model

Recalling the conceptual model of the research, some conclusions can be made about the activities of the emergency network around the fipronil incident. Perceptions about the problem, its nature and its solution certainly influenced chosen strategies. So too did actor perceptions about others in the network. These strategies in turn had an impact on decision making in the network in a range of ways – whether a go-alone or collaborative approach was chosen at certain times, for example.

Media attention had a significant impact on the perceptions of actors in the network. Reports of risk, and the behaviour of other stakeholders informed actor perspectives on the issue, its nature and solution, and others in the network. Media attention also separately informed strategic behaviour in the network. In responding to questions from the media, actors made their positions public at various times, and media were able to point to rifts and tensions in the network. Tensions were also potentially created as well as increased by media attention as some public appearances prompted a more conflictual strategic response from other actors, particularly in early stages of the network's activities.

Perhaps the most surprising result of the research was the lack of network management strategies from the NVWA, which is returned to in Section 9.3. The public health authority was a reluctant leader, and upon rejecting the sector's plan and taking full control of the incident, assumed a decidedly classical approach to directing the network. This exacerbated tensions for the most part and created further issues for the network to navigate. The network management strategies that can be observed appear in the later stages of the network's operations, frequently as a response to hostile reactions to the initial 'top-down' managing style of the NVWA. Where they *can* be observed, however, positive effects also follow: a more collaborative approach of actors to resolving the situation coincides with the employment of network management strategies. Management strategies did not appear to reduce the complexity added by media attention. Many actors throughout the incident felt underrepresented and unheard, and used the media to ensure their interests were made public. These highlighted divisions were not really rectified, as evidenced by the launching of a lawsuit by a sector organisation and an investigative commission by ministers.

Outcomes are famously difficult to measure in governance networks (Klijn & Koppenjan 2016: 242). Objectives can change, negotiations can be lengthy and even costly to

certain actors. Using the observance of learning in a network to determine the extent to which its activities can be deemed successful allows a more nuanced approach to measuring outcomes than a goal-based evaluation. Although changes in the network can be linked to cognitive and strategic learning literature, it is likely that much of the network's outcomes are unaccounted for using the conceptual model of the research. For example, unintended positive and negative outcomes of the network are not examined. A more multifaceted approach to evaluation is recommended for future research into the outcomes of network activities. The brief discussion of the Provan & Milward (2001) framework gives argument to support the creation of a more tailored approach to evaluating emergency networks specifically.

The conceptual model was moderately effective in its analysis of the emergency network's management of the fipronil incident. Further examination into measuring outcomes is needed, as is more emphasis on the interventions of the network manager, and explanations as to why guidance from the public authority was so sparse. We now turn briefly to examine explanations of the network's improved operations other than the occurrence of learning or network management strategies.

9.2 Stabilising features of the network

As mentioned in the theoretical framework of Chapter 2, Klijn (2007) identifies four 'stabilising' features of complex decision-making processes. These are resource dependencies, interaction patterns between actors, rules and regulations creating certainty in a network and trust between actors in a network. One important conclusion of this research has been that, due to a distinct lack of management strategies from the NVWA, the network began to increase the effectiveness of its operations because some of these stabilising features took hold. The substantive and strategic complexity in the network, and the chaotic setting in which it was operating, were tempered to an extent by the four focal points of stability in the network (Klijn 2007: 264). The remainder of Section 9.2 will look at the stabilising qualities of resource dependencies, interaction patterns and rules and regulation in the emergency network around the fipronil incident. Trust is not included here as it requires specific data collection and analysis on actor perceptions of one another's intentions, and this was not performed in the research.

9.2a Resource dependencies

Mutual dependence is a key feature of governance networks. Actors are usually bound by their need for one another's resources. The emergency situation means there is extremely low substitutability for any resource in the network. One could observe that the extent of interdependence in this network ensured actors remained bound to one another despite strong conflicts and deadlocks. Throughout the fipronil events, there was a negligible amount of movement in the perceptions of the NVWA and the sector in terms of responsibility, urgency and frames of problems and solutions. The sector continually asked for more assistance from the NVWA, whether in the form of information, financial help for producers, or flexibility on sampling and unblocking procedures, and the NVWA almost consistently denied this assistance. Despite this inflexibility, and due to the acknowledgement of all actors that cooperative action was required using the resources of everyone in the network, these groups continued to engage with one another and negotiate solutions to issues.

9.2b Interactions patterns between actors

Initial communication in the emergency network around the fipronil incident was patchy and highly divisive. As the incident unfolded, various constellations of actors established stable, regular contact with one another: Dutch Ministers with their Belgian counterparts, AVINED with the NVWA, the sector with Dutch Ministers and the NVWA and various meetings at the regional level to raise questions with local government representatives. This regularity bred stability through the provision of consistent question-raising and decision-making forums. Although throughout the entirety of the incident there were multiple unknowns being dealt with by all actors, the regular contact that was established decreased the chaotic nature of the incident because it presented actors with opportunities to voice their concerns and receive information. The hotline set up by the sector through which producers could communicate with the NVWA is one such example of this. Prior to the hotline's establishment, producers were attempting to contact the NVWA individually and at random. This was ineffective and caused a complete breakdown of the NVWA's communication system. The subsequent establishment of a communication channel that sorted and bundled together questions of the same nature provided actors at both ends with certainty.

9.2c Rules and regulations as source of certainty

It was quickly discovered in the initial phases of the fipronil incident that a lack of clear rules and regulation was one of the key problems facing the emergency network in finding solutions to the issue. Established rules were not always known to actors – for example in the initial meeting between the NVWA and the sector it became apparent that parts of the sector were not aware of its legislated responsibilities (Sorgdrager 2018). The NVWA had also just undergone a reorganisation which meant the organisation itself was in a period of institutional ‘flux’. In circumstances where the network established negotiated protocols, uncertainty and confusion decreased. Similar to the establishment of regular interactions, these protocols, in particular those that were formed collaboratively, formed a framework through which the chaotic events of the incident could be navigated.

9.3 Findings and recommendations

An important finding from this research has been that the network as a whole improved its functioning through processes other than deliberate intervention by a public manager (or otherwise). Blockages in the network’s activities largely stemmed from communication issues, withholding of information and top-down directives from hierarchical structures, enhancing tensions between actors. A second important finding is that those processes that improved the network’s functioning occurred in spite of the tensions between actors and the frequent blockages that occurred due to conflicting perceptions and strategies. This network did not achieve its optimal operative capacity largely because these issues and the resulting complexities were not managed. Although some network management strategies were employed in later stages of the fipronil incident, reputational damage had already been caused. The lasting impression of the fipronil incident that was left with the public was one of poor management.

Conclusion 1

An important conclusion, then, is that in an emergency network, hindering the flow of information is likely to lead to disruptions, increased complexity and possibly even conflict between actors in the network. Hence, emergency networks will benefit from easy flows of information between nodes.

Conclusion 2

This flow of information is much more easily enabled through a horizontal network structure than a hierarchical, top-down one. A horizontal organisational structure is valuable in an emergency network not only to enable flows of information but also to facilitate interactions between actors. Through these interactions, actors can communicate about their respective perceptions, interests, objectives and their strategies to achieve these objectives. Collaborative efforts can increase when actors have a better idea of one another's strategic intent. The emergency network around the fipronil incident suffered greatly from the uncertainty between actors. This led to hostility and hindered collaborative efforts.

Conclusion 3

Recalling Comfort's (2007) comment that emergency networks benefit from *cognition*, that is, the ability to learn from and correct mistakes, this research can draw a third important conclusion about emergency networks that demonstrates this comment empirically. Emergency networks benefit from a fluid structure, where adjustments can be made to correct mistakes where possible, and learn for future scenarios. Repeating actions that block particular actors from information or directly oppose the interests of a certain group whose cooperation is needed will increase hostility and conflict in a network. Under these conditions, it is extremely difficult to collaborate to find solutions, or even force through unpopular solutions because actors that have been negatively affected can withdraw their resources. Therefore, a network will benefit from reflexivity, or cognition, where activities can be adjusted to correct errors. This, too, is helped by a horizontal structure rather than a top-down one.

Conclusion 4

The fipronil case study gives us one final (and perhaps the most important) conclusion: the features mentioned above of horizontal structures and free flows of information can benefit an emergency network if they are present. Further, their absence can hinder results. These features will not necessarily appear on their own. Conscious design and management is necessary to ensure such elements exist – for example a horizontal network structure might not initially exist in an emergency network because the assembling organisational structures

are likely to have a top-down form. For this reason, a conscious effort must be made to *enable* horizontal interactions, information flows and exchange of ideas. Although the managing role doesn't need to be carried out by a public manager, they are acting on behalf of a representative democratic government, and thus in the interests of citizens. The fipronil incident and the emergency network that assembled around it indicates that networks do not become effective in their operations entirely by themselves. Interventions in the form of network management strategies can ensure complexities are navigated, mistakes corrected and goals of the network achieved.

What is clear from this research is that despite the increased urgency of an emergency context, when time *was* made to employ network management strategies like the facilitation of interactions between actors, positive outcomes were detected. It provides a useful starting point to exploring the utility of network management strategies in emergency networks. Emergency network literature currently does not cover adequately the deliberate strategies than can be employed by managers in the network to enable better processes and outcomes in crisis situations. The two currently disparate bodies of literature of crisis management and governance networks stand to gain equally from further investigation into their potential overlaps.

9.4 Limitations

This research was limited in terms of access to the network, and general resource constraints. As a case study, the fipronil incident would benefit from a more in-depth analysis, particularly a more thorough investigation into the role of the NVWA. Language, too, played a role in the limitations of the research: apart from the media analysis where native Dutch speaking volunteers aided the process, documents had to be translated for the researcher to understand them and important subtext might have been lost. Interviews too were conducted in English, which, despite the fluency of most interviewees, may have affected responses. A more detailed examination of the outcomes of the network would have also provided further insight into the effects of the NVWA's interventions, which would have required more time to conduct the research, and better access to the network.

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Q. Did you note a change in the behaviour of other involved organisations when the media picked up the story? (E.g. NVWA, supermarket spokespeople, department ministers, EU Health, Food & Safety Directorate General, LTO/NOP, NVP)

A. LTO / NOP NVP were clear from the start in the media: it was never the intention of farmers to use illegal drugs. Fipronil came into the eggs by ChickFriend. It doesn't belong there, so we work really hard to get it out as quickly as possible.

Other business contacts demanded a written statement whether you had collaborated with ChickFriend and whether DEGA16 was used. It felt like no one trusted us. But what has hit us the hardest is the attitude of the bank. We were placed under supervision and had to meet additional conditions. This is still a delicate issue.

Q. In your view, was the media's reporting of the fipronil reflective of the situation at hand? Did it amplify/diminish any details of the events? (E.g. safety debates, actions of organisations involved)

A. The media has mainly looked from the consumer's point of view. As a result, newspaper headlines with terms such as "poison eggs" soon arrived. Because of this you have to defend yourself as a farmer.

Q. When did attention from the media settle down (if you feel that it has)?

A. Sometime in October we realised the media was no longer interested in fipronil. Which was odd, because most farmers still had to deal with the effects of fipronil on a daily basis. That gave us the deciding factor to work on a report from [REDACTED]. So that people know: even though you no longer hear and read anything about fipronil, for farmers it is still a daily reality.

Q. In your view, did the media's reporting of the fipronil case have an effect (positive or negative) on the relations between the organisations involved?

A. The fact that the NVWA DG pronounced on television that *it was better not to eat eggs* did not, in my view, benefit the relationship with farmers' representatives. It was absolutely not professional to make such a statement that is not actually substantiated.

In the political debate, the potential health risks for consumers were also strongly emphasized. It was not mentioned that extremely many infected eggs must be eaten per day (more than 7 eggs for an adult) before possible damage occurs. In my opinion, political parties wanted to score with the consumer.

Q. Have there been changes to the protocol of your farm in responding to such scares as a result of the events of the fipronil case in 2017?

A. In 2017 we hired an external company for the first time to disinfect our shed. Previously we always did that ourselves.

The fact that we have ended up in the fipronil crisis because of ChickClean has ensured that we never, but never again, have an external company disinfect the barn.

Q. Are there any additional comments you would like to make about the management of the fipronil case from your perspective?

A. Every organization (with NVWA in the lead) was afraid of making mistakes. As a result, strict rules and protocols were used.

As a farmer you are a food producer. It is a tough task to have to destroy food. Here a solution should have been sought in a human way.

What was allowed with the manure: mixing contaminated manure with clean manure until the levels are below the standard, that should also have happened with eggs.

No food waste.

This crisis could have become so great by reacting from panic, fear and the unknown of fipronil. If the contamination compared to the ADI had been looked at, the damage was less significant.

It is clear to me: the people who had to make decisions here are office people with little sympathy with practice.

Farmers come across a problem and solve it.

Officials come across a problem and triple it.

Appendix B

Explanation of coding exercise in methodology chapter (4)

3. Media output during the case

Media framing was examined through a content analysis of daily national newspaper coverage of the incident. LexisUni was used as the datasource for this data collection (Figure 1).

The screenshot shows a LexisUni search interface. On the left, there is a sidebar with filters: 'Nieuws' (2,433), 'Newspapers', 'Dutch', and a date range 'jul 31, 2017 tot sep 10, 2017'. Below the filters is a search bar with the text 'Geef zoektermen op' and a 'Tijdlijn' button. The main content area displays two search results:

- 1. Egg sector claims settlement**
 News | Netherlands, Kingdom of the | 544 words | 31 Jul 2017 | Editorial economics | Reformatorisch Dagblad
 ... fought with a substance to which the insecticide prohibited in animal husbandry **fipronil** was added. Eggs, chickens and manure are allowed on the blocked farms ...
 ... examination of samples by the NVWA has shown that none **fipronil** in it. An NVWA spokesperson was unable to state this morning ...
 ... to be able to do this within a few days. Because the investigation into **fipronil** research has the highest priority in eggs **fipronil** longer in manure samples. "...
 ... fought with a substance to which the insecticide prohibited in animal husbandry **fipronil** was added. Eggs, chickens and manure are allowed on the blocked farms ...
 ... examination of samples by the NVWA has shown that none **fipronil** in it. An NVWA spokesperson was unable to state this morning ...
 ... to be able to do this within a few days. Because the investigation into **fipronil** research has the highest priority in eggs **fipronil** longer in manure samples. "On social media, there is some concern among consumers. ...
- 2. Chicken farmer: 'I just don't pull this'**
 News | Netherlands, Kingdom of the | 254 words | 31 Jul 2017 | SJORS MOOLENAAR | AD/Amersfoortse Courant

Figure 1. LexisUni datasource results for Dutch newspaper articles including the term 'fipronil' in a specified period of the timeline (Round 3).

Initially, a search of the keyword 'fipronil' was performed according to the timeline created by the Rounds analysis. The number of Dutch news articles appearing across these rounds was used to highlight the spike in media attention at a key point in the incident. This can be seen in Figure 2.

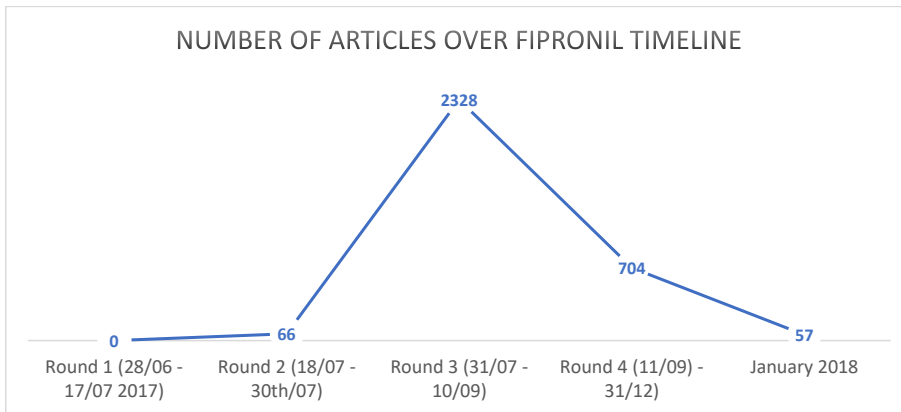


Figure 2. Number of articles across the fipronil timeline.

The LexisUni datasource was then used to focus on a specific time period, Round 3. This round of activity took place over six weeks, beginning July 31st and ending September 10th. Figure 3 shows the number of articles week by week in this time period.

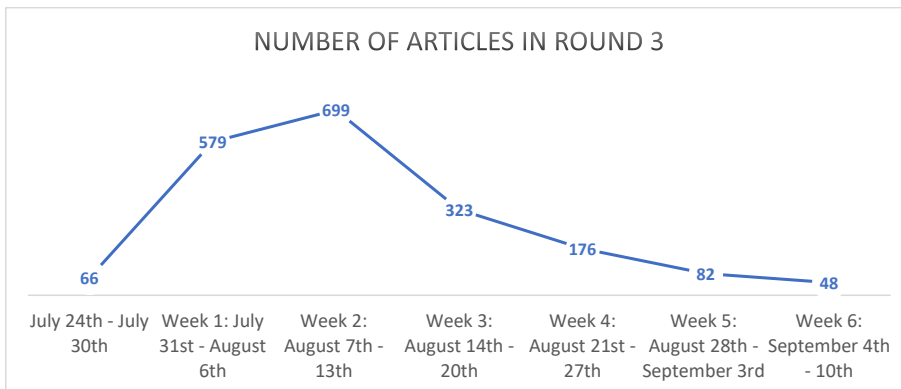


Figure 3. Breakdown of media attention in Round 3 by number of articles published per week

A subsection of articles produced in this period from a range of daily national newspapers (representing a variety of political positions) was used in this analysis to highlight frames used across a range of newspaper outlets. Twenty-two news stories from four national daily newspapers over the period beginning July 31st and ending September 10th were randomly selected for content analysis. This selection method is shown in Figure 4.

The screenshot shows a search results page on LexisUni. On the left, there is a sidebar with filters: 'Nieuws' (2,433), 'Newspapers', 'Dutch', and a date range 'jul 31, 2017 tot sep 10, 2017'. The main content area shows two search results. The first result is titled '1. Egg sector claims settlement' and includes a preview of the article text. The second result is titled '2. Chicken farmer: 'I just don't pull this'' and also includes a preview. The search results are sorted by 'Datum: oudste eerst'.

Figure 4. Search page on LexisUni for articles about fipronil from Dutch newspapers

The four daily national newspapers chosen were *Trouw* (a Protestant 'quality' newspaper), *De Telegraaf* (a right-wing sensationalist newspaper), *De Volkskrant* (a progressive left-wing newspaper) and *Reformatisch Dagblad* (a conservative Protestant newspaper). Figure 5 shows the column of the search engine where selections about the publications can be made.

The screenshot shows a search results page on LexisUni. On the left, there is a sidebar with a list of newspapers and their corresponding word counts: Dagblad De Limburger (PL) 150, Leeuwarder Courant 147, De Stentor 139, BN/DeStem 120, Dagblad De Limburger 112, Noordhollands Dagblad 100, De Gelderlander 99, AD/Amersfoortse Courant 84, Haarlems Dagblad 84, Eindhovens Dagblad 83, Brabants Dagblad 82, De Gooi- en Eemlander 82, Reformatisch Dagblad 82, Provinciale Zeeuwse Courant 80, Limburgs Dagblad 79, Trouw 76, AD/Groene Hart 74, De Telegraaf 74, Minder, and Meerdere selecteren. The main content area shows a search result titled '8. Companies get eggs from trade' and includes a preview of the article text. The search results are sorted by 'Datum: oudste eerst'.

Figure 5. Drop-down column on LexisUni search engine for newspaper selection

A search within these four newspapers was performed on LexisUni using the keyword ‘fipronil’ for each week of the period beginning July 31st and ending September 10th. Articles were selected from the results to compose 3 – 4 articles from the newspapers (no more than 1 per newspaper) per week of activity. The number of articles in each week varied from 3 to 4 because during some weeks one of the newspapers did not report on a story containing the word fipronil. As mentioned, a total of 22 articles were selected at random.

Using this sample, five Dutch participants were asked to read the articles (in Dutch) to assess whether the four information biases described in Chapter 2, Section 2.3 could be found: the emphasis of drama (dramatisation), emphasising personal aspects of news stories (personalisation), fragmentation of news and removal of context (fragmentation), and lastly a preoccupation with order - whether authorities are able to maintain or regain control and order (authority-disorder bias). They then answered a series of Yes/No questions. Examples of the text and questions given to participants is shown below in Figure 3.

Samples of news stories from fipronil incident

Week 1 July 31st – August 6th
Story 1

Body

APELDOORN. Ze komen van één boerderij en als je er veel van eet kun je ziek worden: eieren met de code X-NL-40155XX (waarbij op de plek van de X elk getal kan staan). Miriam Sluimer uit Ridderkerk bakte er een taart van. „Kan ik mijn dochtertje nog borstvoeding geven?”

Na een week van geruststellende berichten heeft de Nederlandse Voedsel- en Warenautoriteit (NVWA) gisteravond een publiekswaarschuwing doen uitgaan vanwege het gifschandaal in de pluimveehouderij. In eieren van een boerderij uit Eck en Wiel zit zo veel van het verboden insecticide **fipronil** dat de gezondheid van volwassenen die ervan eten, acuut gevaar loopt. Bij tien andere boerderijen, verspreid over het land, zijn de eieren minder besmet maar is het beter om ze niet door kinderen te laten eten. De eieren van deze bedrijven worden uit de winkel teruggehaald.

Vrije-uitloop

Miriam Sluimer bakte gisteren een verjaardagstaart. „Ik had nog een recept liggen voor een lemon pie. Daar had ik vijf eieren voor nodig”, vertelt ze. „In de supermarkt koos ik vrije-uitloopeieren. Die zijn goed voor het milieu, dus zullen ze ook wel goed zijn voor de mens. De hele avond ben ik bezig geweest met mijn lemon pie. Af en toe een hapje proeven of mijn taart goed op smaak was.”

Voordat ze ging slapen, las Sluimer bij de nieuwsberichten de waarschuwing van de NVWA. Ze liep snel naar de koelkast. Daar lag nog één ei. „En ja hoor: 1NL4015501. Een ei met het hoogste percentage **fipronil**. Gelijk sloeg de angst bij me toe. Ik heb een dochter van 4 maanden die ik borstvoeding geef. Heeft zij **fipronil** binnengekregen?”

Sluimer belde de huisartsenpost, maar die kon haar geen antwoord geven. Op Facebook had ze meer succes. „Op een pagina voor lactatiedeskundigen las ik dat **fipronil** niet riskant is voor de baby van voedende moeders. Gelukkig.”

Op haar website heeft de NVWA een lijst met eicodes geplaatst die de komende dagen voortdurend wordt geüpdatet. De voedselwaakhond heeft de afgelopen anderhalve week zo’n 180 boerderijen met legkippen geblokkeerd. De eieren daarvan worden onderzocht. Het kost enkele dagen voordat alle uitslagen bekend zijn.

Fipronil is een insecticide dat in vlooiensbanden van honden en katten zit. Maar in de veehouderij mag het niet gebruikt worden. Vorige maand werd in België ontdekt dat een leverancier **fipronil** had toegevoegd aan een legaal product dat kippenboeren gebruiken om bloedluis te bestrijden. Een servicebedrijf uit Barneveld, dat door veel pluimveehouders wordt ingehuurd, heeft dat Belgische product ook gebruikt.

Miljoenschade

Fipronil is een insecticide dat in vlooiensbanden van honden en katten zit. Maar in de veehouderij mag het niet gebruikt worden. Vorige maand werd in België ontdekt dat een leverancier **fipronil** had toegevoegd aan een legaal product dat kippenboeren gebruiken om bloedluis te bestrijden. Een servicebedrijf uit Barneveld, dat door veel pluimveehouders wordt ingehuurd, heeft dat Belgische product ook gebruikt.

Miljoenschade

De pluimveesector vreest een miljoenschade. Bedrijven die langere tijd geblokkeerd blijven, lopen de kans failliet te gaan. Er wordt al een vergelijking gemaakt met de vogelgriep. Bij die besmettelijke ziekte vergoedt de overheid de directe schade van het ruimen van bedrijven. Daarvan is in dit geval geen sprake.

De organisaties van pluimveeouders hebben gisteren gepleit voor de instelling van een calamiteitenfonds. Of die enige kans maakt, is onzeker. „We maken een analyse van de potentiële impact op de sector. Uitgangspunt is dat het gaat om een private aangelegenheid”, laat een woordvoester van het ministerie van Economische Zaken weten. Diverse kippenboeren hebben de Barneveldse onderneming aansprakelijk gesteld, zo bevestigt de pluimveehoudersvakbond NVP.

En de taart van Sluimer? „Die ligt in de prullenbak. Toch wel jammer van al mijn werk.”

Does the article focus on dramatic aspects of this story rather than objective reporting of facts?

Does the article focus on personal (emotive) aspects of this story rather than objective reporting of facts?

Does the article give sufficient context (background information) to the story?

Does the article fairly portray the activities of public bodies?

To assess dramatisation, participants were asked ‘Does the article focus on dramatic aspects of this story more than objective reporting of facts? Participants gave a yes/no answer. ‘Yes’ indicates dramatisation.

To assess personalisation, participants were asked ‘Does the article focus on personal (emotive) aspects of this story more than objective reporting of facts?’ Participants gave a yes/no answer. ‘Yes’ indicates personalisation.

To assess fragmentation, participants were asked ‘Does the article give sufficient context (background information) to the story?’ Participants gave a yes/no answer. ‘No’ indicates fragmentation.

To assess authority-disorder bias, participants were asked ‘Does the article fairly portray the activities of public bodies?’ Participants gave a yes/no answer. ‘No’ indicates authority-disorder bias.

The answers were then categorised into a table, showing the answers to the questions of bias per article. This is show below, in Figure 4.

News story	Dramatisation	Personalisation	Fragmentation	Authority/disorder
------------	---------------	-----------------	---------------	--------------------

1	Y	Y	N	N
2	N	N	N	N
3	Y	Y	Y	N
4	N	N	Y	Y
5	N	N	Y	Y
6	N	N	N	N
7	N	N	N	Y
8	N	N	N	N
9	N	N	Y	Y
10	Y	Y	N	
11	Y	Y	N	Y
12	Y	N	N	N
13	Y	N	Y	Y
14	Y	Y	N	N
15	N	N	N	
16	Y	N	N	Y
17	N	N	N	N
18	Y	N	Y	
19	Y	Y	Y	Y
20	Y	Y	Y	Y
21	N	N	N	N
22	Y	Y	N	N
TOTAL	12/22	8/22	8/22	9/19

Figure 4. Aggregated scores for each information bias per article

Coding was then performed by converting the yes/no answers into a 0 – 1 numerical scale. For personalisation and dramatisation, where the answer ‘yes’ indicated these biases were indeed present in the articles, the answers ‘yes’ were given a score of 1. The answer ‘no’ to these two questions about personalisation and dramatisation were given a score of 0. For fragmentation and authority/disorder bias, where the answer ‘no’ indicated the presence of these biases in the articles, the answer ‘no’ was given a score of 1 and the answer yes (indicating the bias was not detected in the article) was given a score of 0. These scores were then added up to give a total numerical score per bias of how many articles the bias was detected in. These scores for each of the four biases were then turned into a percentage of the total number of articles*. This is shown below, in Figure 5.

News story	Personalisation	Dramatisation	Fragmentation	Authority/disorder	More than 1 bias
1	1	1	1	1	1
2	0	0	1	1	1
3	1	1	0	1	1
4	0	0	0	0	0
5	0	0	0	0	0
6	0	0	1	1	1

7	0	0	1	0	0
8	0	0	1	0	0
9	0	0	0	1	0
10	1	1	1		1
11	1	1	1	0	1
12	0	1	1	1	1
13	0	1	0	0	0
14	1	1	1	1	1
15	0	0	1		0
16	0	1	1	0	1
17	0	0	1	1	1
18	0	1	0		0
19	1	1	0	0	1
20	1	1	0	0	1
21	0	0	1	1	1
22	1	1	1	1	1
TOTAL	8/22	12/22	8/22	9/19	14/22
%	36	54.5	36	47	63

Figure 5. Table of results for coding reports according to media logic biases

*In two articles, public authorities were not explicitly mentioned and were thus not score

Appendix C: Fipronil timeline

November 2016: Two anonymous tip-offs about use of fipronil in cleaning agent for poultry farmers to NVWA in quick succession. These are two in the 20,000 tip-offs the NVWA receives each year.

December: IOD case investigator registers sufficient grounds for criminal investigation, due to 3 tip-offs being connected in the reporting system.

Jan 2017: Unrelated to these events, fipronil maximum residue levels (MRLs) lowered by EU. Correspondence from BuRO to an RIVM enquiry about fipronil in eggs says that residue 'endangers food safety' and a closer look required to determine risk to consumers. According NVWA, BuRO concluded no acute risk to public health based on information at hand, as fipronil not believed to contaminate eggs and enter food chain.

April: IOD decides to launch investigation. Risk to humans considered low, so normal procedure followed. According to Sorgdrager's report (2018: 53), NVWA and BuRO say in meeting that it is unknown if fipronil can be hazardous to humans.

13th – 17th July: Inspectors requested on the 13th to take samples from eight farms treated by ChickFriend according to administration. Not told it's part of criminal investigation. NVWA share information with FAVV on 13th. Inspectors told by IOD on 17th that samples requested on 13th part of criminal investigation. Based on extent of Chickfriend's dealings with Dutch farms, it is decided that a larger investigation is needed and public health is at risk.

1st – 12th July: Reorganisation ('de kanteling') of NVWA begins on the 1st. NVWA initially inspect Chickfriend on the 7th & find two tonnes of non-permitted biocides (not fipronil). NVWA seizes administration of Chickfriend.

June: Belgian eggs are found to be contaminated with fipronil, and treated by ChickFriend. FAVV informs NVWA. Additional reports come through the alert system about illegal substances used to control mites. June 28th NVWA inspector tells Belgian colleague that there are no records of Chick Friend, and Belgian authorities insist on urgent action. NVWA complies.

May: IOD appointed research question regarding danger to human health of fipronil as part of criminal investigation

18th July: Meeting between ICB, NVWA to determine whether 'incident' status is necessary. NVWA have disaster control plan but not food crisis plan. NVWA did not know how many farms affected at this time, and what levels of fipronil. BuRo did not provide risk assessment because too many unknowns. FAVV had MRL for eggs but basis for this level unknown. Incident declared because of 'political risk, media attention, international component and extent of contamination'. Farms not yet blocked. Due to de kanteling, it is initially difficult to find necessary resources for incident team.

19th July: More samples taken from farms. Along with no food crisis plan, a number of uncertainties made formulating an action plan hard (how long does fipronil stay in the farm for? Which data protection laws apply?). First newspaper (*De Senter*) also asks for comment about whether NVWA is investigating fipronil in eggs. NVWA confirms but does not say which company. This information is not yet published.

20th July: NVWA inspector gives information to FAVV about affected Belgian farms. FAVV alerts its neighbouring countries to contamination and provides a risk assessment at request of Netherlands: FAVV refers to a French study warning of public health risks associated with fipronil.

24th July: NVWA invites representatives from all parts of the sector (ANEVEI, AVINED, CBL, FNLI, LTO/NOP, NEPLUVI and NVP) for a consultation – reportedly a chaotic event. Precautionary blocking raised again. Director of IOD asked that the sector come up with an action plan within 24 hours to block relevant farms and arrange sampling. NVWA also set up a plan with two scenarios: one that the sector complies and one that the NVWA will have to take responsibility. BuRo asks for 100 samples of eggs to test.

22nd – 23rd July: Van Dam & Schippers comprehensively informed. Included a note on first tip-off received in November 2016. Farms to be blocked and sampled. *De Senter* publishes NVWA comment on investigating fipronil. Inspectors call the farms to be blocked and sampled ahead of time to prevent them from finding out via the news in *De Senter*. Legal justification for this blocking was sent to poultry farmers by post.

21st July: Chick Friend is sealed. FAVV informs NVWA that traces of fipronil last for up to 58 days. Scale of situation also becoming clear: nearly 200 companies treated in past 6 months, and the company has been using another name (Chickclean) to carry out more cleaning. Also revealed that Chickfriend sold chemicals to customers. Evening of 21st Director General for Agriculture and Nature at EZ and Director General for VWS alerted by Inspector General.

Appendix C: Fipronil timeline

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25th July: BuRo gives first provisional advice: take preventative action. Long term risks unknown and sampling indicated that levels in eggs were above limit for children. Recalls begin at the sampled farms. ANEVEI gives NVWA action plan and it is considered not sufficient. NVWA sends response to ANEVEI at 2.58pm saying sector has until 4pm that day to revise plan, which it cannot. **NVWA then blocks the sector from viewing the list of affected companies and alerts Schippers & Van Dam that it only received plan from ANEVEI, not other organisations in the sector, the plan was not sufficient so it will be taking responsibility for the action plan, not the sector.** Also in the note to the ministers is that there is no acute danger to public health.

26th -28th July: NVWA publishes Q&A on its website. First phase of blocking begins and 181 farms are blocked. Other media begin to pick up on story and prompt NVWA to publish press statement. Framing of issue by some media outlets challenged by the NVWA and the headline is changed. 27th IOD takes on entire investigation (previously public prosecution had been involved). BuRo's results indicate 26% of eggs in the food chain are contaminated with fipronil (Sorgdrager 2018: 63). EU commission informed by letter.

29th July: Second meeting with sector. Van Dam & Schippers present this time too. Decision to not give public warning because of potential damage to consumer confidence and no acute health risk. Sector had questions about cleaning, ending blockade, protocols, MRL levels (some sector reps only now knew of their existence and their own legal obligation), lack of private labs for testing samples and methods for ridding hens of fipronil.

31st July: Sector alerted the same day NVWA releases public statement. According to NVWA representative it was again clear that sector could not act as unified body: for example, the sector did not want to prepare a list of firms that had not used Chickfriend. Message sent to public was largely in line with EU Commission's RASFF system. Press release also included the code of the farm that was above the acceptable daily intake (ADI), more results would be announced in the week, codes were published on website (and being updated) and advice to parents not to let their kids eat eggs with those codes. RIVM published further context on its website so consumers understood risks (which were low) better. According to Wageningen report in September (2017), by the end of July 190 farms are blocked. OVONED releases press statement emphasising the sector had fallen victim to fraudulent act.

30th July: More test results come back and some indicate acute toxicity limit reached. So public warning needed according to EU regulation act 178/2002 (reasonable grounds to suspect risk to human or animal health). Incident team decided to alert sector before public warning issued (though not legally required to do so).

1st August: Newshour interview with Deputy IG Freek van Zoeren of the NVWA (as IG away on holiday). According to Sorgdrager (2018: 72) van Zoeren had indicated he wanted to take interview and had consulted with incident team to interview on what he should say. Message would be that there is no danger to public health, but is fipronil forbidden, so it must be removed from food supply. Despite being told that the interview would be about the awareness of the poultry farmers to quality, the deputy IG was questioned about eating eggs from farms that have not been tested. Eventually he answers that if consumers can avoid eggs until more is known (which would be Sunday), they should. Consumers were confused, farmers labelled this comment 'farmmongering' and the media latches onto this quote.

2nd August: **The interview triggers a new phase of the incident.** NVWA releases press statement that it will publish codes of eggs above MRLs but below ADI (not just those above ADI). Sector objected but NVWA said it was in response to calls for greater transparency. Media reports frame NVWA's attempt to limit damage to sector was 'backtracking', and increased confusion. Communication employees come to assist NVWA. Meeting at Ministry of EZ about whether to scale up incident to crisis. Decision was to leave as incident but tighten ties between departments and NVWA.

7th August: Hotline established by LTO Noord to answer responses NVWA unable to handle. Initially meant to be local hotline but ended up supporting all farmers dealing with fipronil problem. EU commission circulates document to sector and NVWA saying that companies producing goods containing egg products after 1st January must be blocked until they are certified free of fipronil. This is after it was previously confirmed (31st July) that only whole eggs were under inspection.

4th – 6th August: Van Dam begins consultations with sector. Intended to relieve NVWA of issues not directly related to managing incident. NVWA asks LTO/NVP & NVP to request poultry farmers to report themselves if they have done business with Chickfriend but not yet been blocked. This is after companies are found to be missing from the original NVWA list. Chickfriend's administration had gaps.

3rd August: Codes published and parts of poultry sector say they are exploring legal options. Two German supermarkets pull all Dutch eggs from shelves and some supermarkets in the Netherlands follow. IG returns early from break to speak with sector, as does Schippers. Schippers and Van Dam send letter to House of Reps about the situation, which does not contain reference to anonymous tip-offs in November. States first alert was in June from Belgium.

Appendix C: Fipronil timeline

8th August: Meeting to provide information to farmers took place, more than 300 people showed up. NVWA and Dept Economic affairs representatives included. Also deputy director of IOD. Emphasised common goal of re-establishing consumer confidence. Indicated AVINED now contact point for NVWA. NVWA decides that NCAE should be in charge of the supervising the packing stations (the so-called Big 8).

9th August: Joint investigation team of IOD and FAVV formed. Joint searches in Netherlands and Belgium. Dutch owners of Chickfriend arrested. A third Dutch person, whose company (Pro-farma) delivered fipronil to Chickfriend, had his home raided. More administration also found. Media gets hold of note from NVWA that it was alerted in November 2016 of fipronil and did not act. Van Dam questioned and turns to NVWA for answers.

12th – 15th August: Logistic and policy issues faced. No procedure documents relating to cases such as this existed, so NVWA was using protocol for different situations. Sector complaints of delays to queries about procedure, timing etc. NVWA described by farmers as 'impenetrable', email inbox unable to cope with volume of questions initially. Delays in communicating sample results meant that farmers could not sell eggs that were acceptable.

11th August: NVWA issues first alert to NCAE about a packing station and NCAE is able to deal with it in the same day. NVWA and NCAE decide to conduct joint investigations to increase efficiency of information exchange. **Collaboration between sector and NVWA improve in this period.** AVINED creates flowchart for farmers to track unblocking. Some companies only partially blocked if fipronil only detected in some areas of their business, after being fully blocked previously. RIVM asked to prepare report to advise on fipronil levels in manure.

16th – 21st August: NVWA agrees to share anonymized information with farmers, and details of companies with too high fipronil levels to organisations involved with recalling. Also with Skal. On 18th August 7 more farms are blocked and sampled because of new information from IOD's investigations. On the 21st August it is reported that tracking companies at packing stations and processing plants are not able to receive the correct information.

30th August: 144 farms still blocked awaiting clearance from fipronil contamination. Although farmers could access private labs for sampling, only official results from NVWA approved labs could unblock the company. This added extra waiting time. European Commission changes date of products containing eggs to 1st August, rather than 1st January (see 7th August). **Egg consumption in NL is back to normal levels.** Exports still down.

10th August: Next letter to House of Repts from Van Dam and Schippers in response to criticism from Belgian ministers and media that NVWA knew about fipronil in November 2016. Stated NVWA did not know at the time that fipronil would end up in eggs. Also stated that BuRO, RIVM and Ctgb involved with BuRO assessment in January 2017, which both organisations denied. Van Dam called Belgian counterpart to restore relations and liaisons were appointed the next day to ensure daily factual exchange. **This triggered change in phase of incident**, as NVWA no longer acting on 'precautionary principle', because they have a much clearer picture of the situation. Consumers felt calmer as noted by representative of NVWA: Calls mostly from farmers after this point. Municipality of Barneveld asked for details of affected businesses in their municipality. Initially denied but then granted access on basis that the mayor keep information private and use it only for purpose they cited to gain access. BuRo circulates advice that risk to public health very low, although small children eating lots of eggs might be at risk. Nor was there high risk from products containing eggs, as only a 5th of farms were contaminated, so contaminated eggs were highly diluted. Also noted that situation was stable in that samples shows contamination levels weren't going up. EU Health & Food Safety Directorate General confirm that all 'non-compliant' meat and eggs have been recalled from markets.

22nd & 23rd August: 1% of eggs in the food chain are contaminated with fipronil in week beginning 22nd August. Letters sent to House of representatives from Schippers & van Dam report impact analysis: as of 23rd of August damage to poultry sector, according to Wageningen University, estimated to be 33 million euros. Priority reported to be ensuring poultry farms have funds to resume normal activity and hence collaboration with banks. However farmers report banks increasing supervision and conditions upon farms with fipronil contamination. Another non-permitted substance found at Chickfriend and fipronil found in Polish eggs imported by Dutch companies. Independent commission launched by W. Sorgdrager on the 23rd. Two main questions for the commission are: how did the incident occur and how was it dealt with? Is food safety being sufficiently addressed?

24th & 25th August: Media reports that supermarket chains have been 'silently' removing products containing contaminated egg. Farmers try 'moulting' their chickens (diets to break down fipronil) but BuRo explains that chickens can still have contamination even if their eggs are free. NVWA re-blocks farms.

Appendix C: Fipronil timeline

September 1st – 13th: First protocol on how to get rid of fipronil-contaminated manure from farms is released. Sector accused NVWA of failing to communicate clearly with companies that are blocked because of manure. Hydrogen peroxide is more successful in ridding hens of fipronil but is banned by NVWA because it can harm the chickens. According to farmers this led to more culls of the hens. NVWA and NCAE announce company visit of the 'Big-8' companies to get 'complete tracking data'. Inspections are carried out and it is found that compliance with legal provisions of food safety is not sufficient.

14th – 24th September: NVWA takes down list of codes from website. Lists handed over to NCAE. In the week beginning 18th September fipronil levels begin to rise in retail samples again. NVWA informs farm involved by letter but does not re-instate blocks. Report from Wageningen University puts total financial damage to egg supply chain as of 22nd September at 65 to 75 million euros. Average blockage time for affected farms was 2 weeks.

25th September: NVWA prepares report about packing plants: customers hadn't been informed about batches of eggs with too-high levels of fipronil and no reports were made to the NVWA. 'Last order' issued to two companies for lack of cooperation with investigation. Lack of co-operations was because Big-8 though they did not have to report if the levels of fipronil could be diluted and because of 'damage-control' with their customers. Priority was towards to customers and consumers, not the NVWA.

16th – 31st October: NVWA advises on the 23rd that 17 companies have been unblocked retroactively as a result of RIVM report on manure. Sector indicates that manure cannot be disposed of according to protocol because of capacity issues. Alternatives are very expensive, and it is becoming a problem for farmers. Bottleneck is the required standard and the lack of resources. Ministry of EZ sought to clarify with the RIVM.

1st – 15th October NVWA informs sector that too high levels again found in supermarkets, and number of eggs with too high levels increasing. Sector agreed to work with NVWA to combat this. Sector believes this is when the NVWA had regained control of situation (Sorgdrager 2018: 80). On the 15th, RIVM releases report requested by the NVWA in August stating that marine wildlife is in danger if manure has concentrations of fipronil, so the detection standard as MRL is recommended, as is the complete destruction of fipronil by burning.

26th – 30th September: EU Commission and Member States take part in a ministerial conference to follow up on the incident. Agree to facilitate better risk communication between member states, coordination at EU level to risk management and better capacity at national level. NVWA distributes lists of KIP codes to businesses – this information was previously withheld, despite requests from the sector to view it. Packing stations are put in control of checking all eggs for fipronil.

February – May 2018: In February, the court awards the Minister of LNV a one-off delay of 6 weeks in the summons that NVP & LTO/NOP submitted following the fipronil crisis. In May the court date for LTO/NOP & NVP is postponed.

January 2018: On the 15th, sector produces another action plan, again unsatisfactory. Topic of enforcement again raised, but not proceeded with. Fipronil levels drop down to 5% and stabilise at that level.

June 2018: Sorgdrager's commission releases findings, conclude the Dutch government and the egg sector did not give enough priority to food safety. Foodwatch releases a report about Skal, the inspector for organic eggs, concluding that 'supervision failed', and inspectors were not picking up on the use of prohibited substances in organic eggs.

November 2018: LTO/NOP & NVP announce date (15 April 2019) for case hearing in compensation claim against NVWA for poultry farmers. April 2019: 15th sees court hearing launch by LTO representing 124 farmers claiming damages from NVWA due to negligence in not acting on 2016 tip-offs and statement from senior minister van Zoeren of the NVWA advising consumers to avoid all eggs.

December: Proceedings against the State launched by LTO/NOP on the 14th. Meetings between sector and government departments continue. On the 20th NVWA receives second sector action plan and arranged meeting for next day. Plan did not meet requirements and NVWA stated it would look for other methods, for example publishing sample results on its website again. Another alternative discussed was the possibility for CBL to only accept eggs from fipronil free companies. December 22nd AVINED announces two protocols for removal of manure. Farmers say that protocols are unworkable because of cost. Mixing clean manure with contaminated manure is allowed if farmers have in-house clean manure. However, this bottleneck did not go away. Manure was still being processed at the end of 2018.

November: Too high levels of fipronil found again on the 6th. NVWA reminds others in the supply chain to apply pressure to poultry farmers to be vigilant about fipronil levels. Packing stations are alerted. Supermarkets Aldi, Jumbo & Albert Heijn announce they will not seek damages from the poultry sector. November 20th levels rise again. NVWA continues to inform farms by letter. November 29th agreed that NVWA incident manager and AVINED would together examine the egg supply and monitoring chain for weaknesses. November 30th NVWA mention of enforcement resurfaces. Sector agrees to come up with action plan. Sector again denied information about which companies involved.