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Cross border Classical Swine Fever control: Improving Dutch and German crisis management systems by an integrated public-private approach

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Abstract: The objective of this research approach is to analyse in which ways crisis management measures against Classical Swine Fever (CSF) can be improved by a public private cross border model. A core activity contains the analysis of information and communication systems: In a case study it has been empirically analysed if a sufficient supply of public and private information enables crisis managers at both sides of the Dutch-German border area to take decisions about CSF control more efficient. At the end of this approach a new crisis management model had been developed. One of the most important aspects thereby is the assessment of data: (1) within private quality management systems in normal times according to the benefit for public management tasks in times of crisis and (2) within public crisis management systems according to the benefit for cross-border CSF-control activities. To this effect two different methodological approaches have been combined within the model: (1) a method to identify and illustrate public actors and their options in crisis management decision making and (2) a system of communication and information exchange between public and private as well as Dutch and German actors (engage & exchange model) which permit to collect and to evaluate data in addition for a predefined time period are activated.

1. Introduction

Classical swine fever is a highly contagious disease of pigs and wild boar with a widespread worldwide distribution (Moennig, 2000; Klinkenberg, 2005) and a particularly impact on high pig density areas like the border area between the Netherlands and Germany (Fritzemeier et al., 2000; Stegeman et al., 2000; de Vos et al., 2003). The outbreak of CSF in North Rhine Westphalia in March 2006 has underlined the perception, that the control of CSF outbreaks within Europe is still an unfinished task. Hence a certain potential of improvement at the level of control measures within a state and between states is detected. The events in 2006 conveyed the impression that a lack of harmonization in public European contingency planning and an insufficient further development of public and private information systems took valuable time in controlling the outbreak. Losing time has a direct impact on the High Risk Period (HRP): the longer it is the more money is spend and the more losses in trade and animals are not avoided. Particularly the use of different data formats in documentation or in passing on of information as well as the fact that personnel resources were even more added for bureaucratic activities than for concrete control measures made the German crisis management less effective (Uhlenberg, 2006; Zwingmann, 2006; Blaha et al., 2006). Another crucial point for the low efficiency of some preventive and control measures was the degree of cooperation between the authorities of Germany, North Rhine Westphalia and the Netherlands. In 2006 both countries recognized that their information and communication structure concerning CSF-control needed specific updates to run more efficient in future crises. Relating to these empirical experiences it is the focus of this study, whether organizational and technical innovations should gain more importance according to the expansion of existing control systems on public and private levels – particularly in regions with a high animal density, like in the so-called North-West-German-Belt (Schulze Althoff et al., 2007; Theuvsen et al., 2007).

Thus the objective of this interdisciplinary project is to analyse, in which ways a cross border crisis management model can enhance the cooperation between (1) public and private actors and (2) Dutch and German authorities in order to improve the quality and efficiency of CSF-control measures in the border area during the Post-HRP. In a first step empirical work has been done to identify different areas for cross border cooperation. Afterwards the model is conceptualised out of two different methods: It is focussed on the hypothesis that a sufficient and punctual supply of information enables different protagonists in crisis management to be faster and more efficient in decision making. By testing the model in interdisciplinary research projects a contribution to the enhancement of Dutch and German crisis management in CSF control will be given.

2. Empirical Work

Empirical work was necessary to identify the areas for cross border improvement of CSF control. During the phases of analysis the following steps had to be taken:

- Identification of Dutch and German public and private actors and their responsibilities in CSF control,
- Illustration of analogies and differences between public CSF control systems,
- Understanding the priorities of relevant public and private actors for cross border cooperation,
- Construction of ambition levels for different degrees of cooperation.

2.1 Overview public CSF control

In Fig. 1 a schematic view on the course and control of CSF has been given in order to understand the different periods CSF is cycling through. The HRP is subdivided into phases: During the Pre-HRP is no virus present. The HRP1 starts with the introduction of the virus in an area that was previously CSF free and ends with the suspicion of the first case. In HRP 1 there is a suspicion of a CSF outbreak while in HRP 2 the suspicion has been officially confirmed. The Post-HRP begins with the notification of the first case and ends when all control measures are considered effective (Horst et al., 1998). The events that are necessary to achieve an advanced CSF-period are illustrated in the second line of Fig. 1 containing four different arrows. After eradication of a CSF outbreak is completed the first period is in force again. Furthermore Fig. 1 contains the course of action that is based on EU-regulation and core examples for the cross border need of information which is fully based on the results coming out of expert interviews and a cross border survey that will be presented later in this chapter (2.4).

The new crisis management model that has been developed within this research approach is focussed on the Post-HRP. As one can draw from Fig. 1 the control strategy begins after the notification of CSF has been accomplished. From the moment of notification on crisis management operation begins. Afterwards the need of information transfer and efficient crisis management is rather crucial and overwhelming. During the Post-HRP one can reduce the damage to animal health and economy by stopping the spread of virus as fast as possible. Therefore a clear management approach for a cross border crisis management model is inevitable.

2.2 Identification of public and private actors and their responsibilities

All relevant actors of animal health crisis management can be divided into different categories. Besides the concerned public and research institutions all levels of the private production chain have been taken into account (see also Fig. 2).

The identification of actors led to a code chart containing all public players and their crisis management tasks within the four phases of HRP (see Tab. 1). First of all the collected data has been filed into three columns: Due to the federal organisation of Germany animal disease control management is divided into national and federal-state tasks. In the Netherlands the entire system is organized under national responsibility which explains why there is only one column.

Established on the European basic strategy deriving from the European Council directive 2001/89/EC of 23 October 2001 on Community measures for the control of CSF the left ordinate contains all relevant measures during the HRP in order to compare responsibilities at each side of the border.

This code chart enables to identify differences and analogies between the organisation of CSF control systems in the Netherlands and Germany. Having the function of a basic tool it allows identifying all actors concerned on both sides of the border. Regarding the high amount of data only the Post-HRP is presented in this paper (Tab. 2). The following aspects belong to the most striking differences in tasks that have been found during the analysis:

- Common tasks are differently arranged: the veterinary system in the Netherlands is completely centralized while the chain of command in Germany is federal.
- Different level of strategy above the EU-regulation: The Netherlands e.g. are so far not using carcass data for Early Warning Systems; in Germany they miss a 72 hour standstill regulation in case of a first confirmed animal disease outbreak.

Having all public actors and their national responsibilities identified and listed completes the first step in analysing crisis management systems of both countries in order to find areas for cross border improvement.

2.3 Analogies and differences between crisis management processes

To be able to analyse the differences between both systems a little more in detail one can use flow charts to illustrate how information and communication transfer is embodied in the Netherlands and in Germany during the Post-HRP.

In Fig. 3 the contingency plans of both countries are translated into flow charts in order to underline major differences within the national information transfer. These two flow charts have been used to identify the strategy most likely

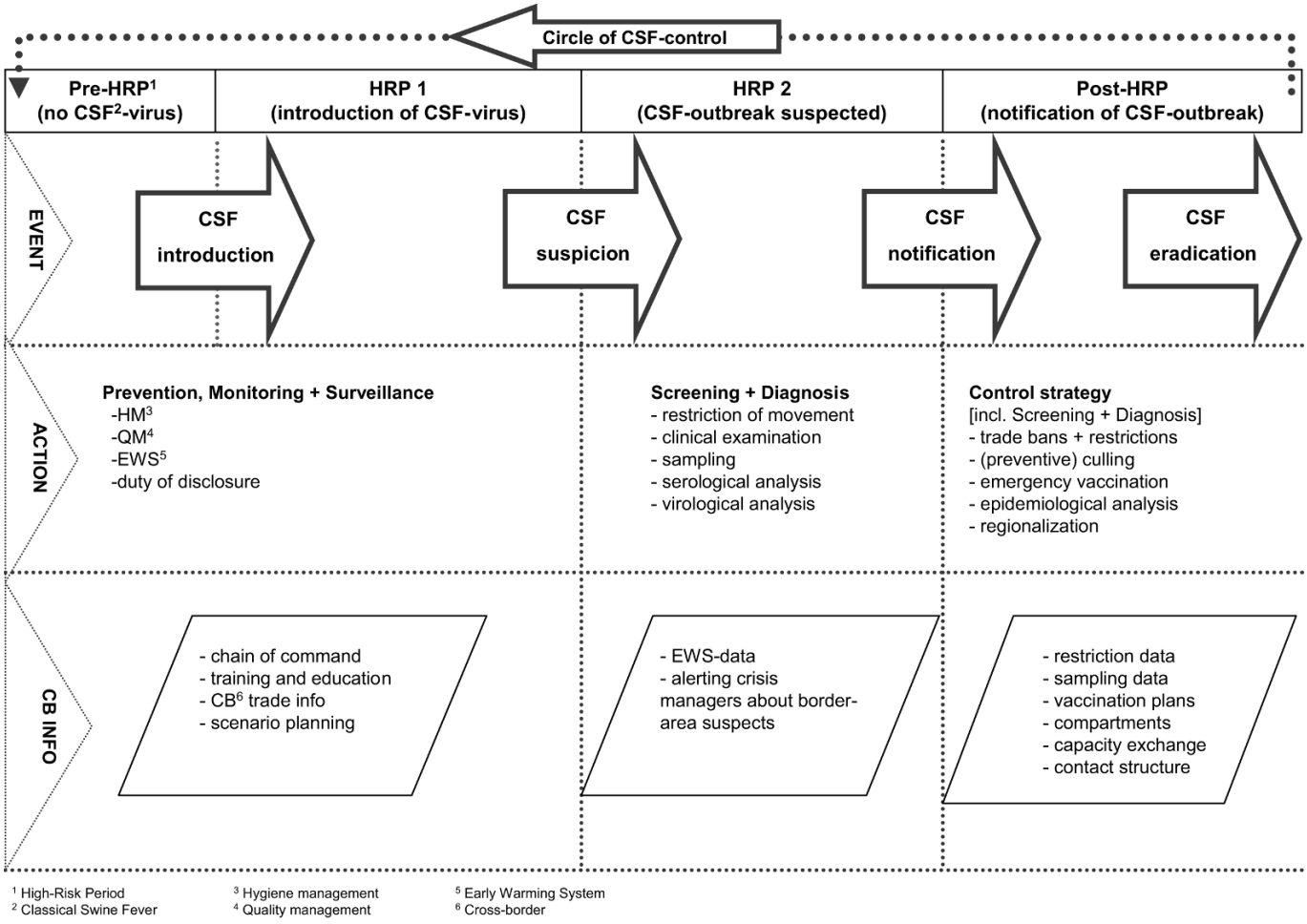

Fig. 1 Schematic view on CSF control.

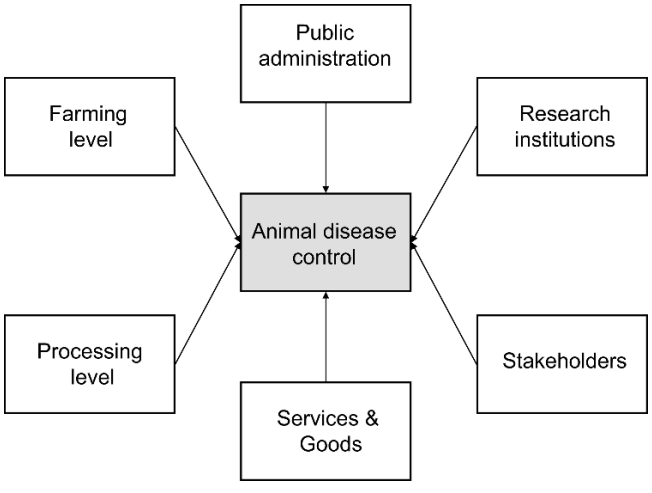

Fig. 2 Identified crisis management actors in different categories.

to reach the ending of a CSF-outbreak. Differences between the two models are pointed out by broad black edgings. Stating that differences between systems that need to cooperate are a handicap that has to be removed the following aspects are most relevant for further analysis. Fig. 3 shows that the main difference in transfer of information during a crisis is settled right in the beginning of the contingency process (boxes nr. 1): While the Dutch system claims a direct notification to a central institution (CMD – Centraal Meldpunt Dierziekten) the German system decrees that notifications about disease suspense are first given to the local (KOB – Kreisordnungsbehörde) and then passed on to the federal and national authorities. Speaking about harmonisation of information and communication transfer means that on the German side even more existing data bases have to be considered for designing interfaces. Furthermore Fig. 3 illustrates that publishing relevant information like decisions about total standstills and restriction measures and schedules (boxes nr. 4) is organised differently as well. Therefore a technical integration into harmonized information and communication system or at least a development of interfaces between different systems in order to save time and communicate properly could be rather helpful. This aspect is of particularly importance for our research activities as it contains both the combination of public and private information systems (e.g. transfer of schedules) as well the cooperation between Dutch and German entities (e.g. transfer of restrictions).

Tab. 1 Overview outline public actor crisis management code chart.

responsibilities of actors / Measures = directive 2001/89/EC		Germany		Netherlands
		National level	Federal state level	National level
Pre-High Risk Period (no CSF-virus)				
Legis-lation	Directives + regulation	BMELV (P)	MUNLV	MinLNV
[…]	[…]	[…]	[…]	[…]
High Risk Period 1 (no suspicion of CSF-outbreak)				
High Risk Period 2 (suspicion of CSF-outbreak)				
Art. 3	Duty of disclosure	TH + pTÄ	TH + pTÄ	TH + pTÄ
[…]	[…]	[…]	[…]	[…]
Post-High Risk Period (notification of CSF-outbreak) [*for full section see tab. 2*]				
	Decree of Standstill	*- in progress -*	*- in progress -*	MinLNV-VD
[…]	[…]	[…]	[…]	[…]

BMELV= Bundesministerium für Ernährung, Landwirtschaft und Verbraucherschutz; KOB = Kreisordnungsbehörde; LANUV = Landesamt für Natur, Umwelt und Verbraucherschutz; MinLNV-VD = Ministerie van landbouw, natuur en voedselveiligheid – directie voedselkwaliteit en diergezondheid; MUNLV = Ministerium für Umwelt und Natur, Landwirtschaft und Verbraucherschutz des Landes NRW; P = Preparation, pTÄ = praktizierende Tierärzte; TH = Tierhalter

2.4 Priorities for cross border communication

Based on the comparative data collection analysis interviews have been led out with experts of the veterinary administration in the Netherlands and in Germany in order to analyse the initial situation and to be able to estimate the future development of CSF control. The assessment of the collected information has been carried out *via* an opinion poll in both public and private expert circles (Mayring, 2002; Flick, 2005).

During the guided interviews with 54 actors [35 public actors: 21 German, 14 Dutch; 19 private actors: 9 German, 10 Dutch] questions have been asked to accomplish the understanding of animal health control systems – and here specifically of CSF control – in both countries, define differences and analogies and to get a first impression of the extent to which Dutch and German actors see a benefit in cross border cooperation concerning CSF control.

In a second step a cross border opinion poll has been launched. The actors were confronted with three questions about the CSF crisis management system in order to prioritize the demand for further research activities: To start with an expert was presented to a code chart that contained major differences between the current CSF-control systems in the Netherlands and in the federal state of Nortrhine Westphalia. The rating of the single categories within the chart had to express the impact these differences might have on crisis management structures of the country he belongs to. In order to regulate the statements a 5 point Likert scale (Likert, 1931; Babbie, 2005) has been applied to this questionnaire. A Likert scale is a type of psychometric response scale often used in questionnaires, and is the most widely used scale in survey research.

Subsequently the expert has been asked to value the practicability of cross-border-cooperation-approaches within the different categories as there could be a mismatch between the demand for a change and the practicability of a political reform. Finally the expert had to ascertain his priorities for (more) cooperation between the Netherlands and North Rhine Westphalia on the range of CSF control.

After evaluation of the questionnaires several expert rated rankings for the Netherlands and for North Rhine Westphalia had been on hand: Finally the average top 5 categories (out of 24 categories) for the extension of cross border cooperation have been chosen for processing within this research approach. Based on the results of this empirical survey in Fig. 4 the most important categories for the intensification of Dutch-German cross border cooperation have been listed. With an average value of 4.2 out of maximum 5 points the Dutch and German experts voted for a consultation about the feasibility of vaccination as a CSF-control measure as their highest priority for cross border cooperation. On second place we find the category Restriction areas + Compartment building (4.1) followed by Exercises (4.0), Communication + information transfer (4.0) and Early warning (3.8). Three out of these top five categories (2;4;5) contain major organisational differences between the Netherlands and Germany. Finding the category communication and information transfer on fourth place underlines that the knowledge about each other is particularly scarce. For all five categories different decision scenarios will be modelled in order to find ways to integrate available data. In addition the figure shows the Dutch and the German votes for each of the top categories. Especially about vaccination and exercises the distribution of votes has been quite diverse.

Tab. 2 Section from public actors crisis management code chart: Post-HRP.

responsibilities of actors / Measures = directive 2001/89/EC		Germany		Netherlands
		National level	Federal state level	National level
Post-High Risk Period (notification of CSF-outbreak)				
	Decree of Standstill	*- in progress -*	*- in progress -*	MinLNV-VD
Art. 23	Disease control center	BMELV	MUNLV + LANUV + KOB	MinLNV (VD+DRZ)
	Compartment building	-	MUNLV + LANUV	MinLNV-VD + VWA
Art. 9	Protection + surveillance zones	-	MUNLV + LANUV	MinLNV-VD + VWA
Art. 5	Killing of confirmed holdings	-	KOB + LWK (O)	VWA
Art. 5	Taking samples	FLI (O)	KOB	VWA
Art. 5	Processing of carcasses	-	KOB + TKBA	Rendac
Art. 5	Destruction of contam. Products	-	KOB	VWA
Art. 12	Cleaning & desinfection	-	KOB	VWA
Art. 8	Epidemiological enquiry	FLI (O)	KOB	CIDC
Art. 10	Definition measures protection-zone	BMELV	MUNLV	MinLNV-VD
Art. 11	Definition measures surveillance-zone	BMELV	MUNLV	MinLNV-VD
Art. 18, 19	Planning + performing emergency vaccination	FLI (A) + BMELV	MUNLV + LANUV	MinLNV-VD + VWA + GD
Art. 13	Repopulation holdings	-	LANUV + KOB	MinLNV-VD
	Evaluation	BMELV	MUNLV + LANUV + KOB	MinLNV + VWA + CIDC
	Compensation	-	TSK	MinLNV-DR

A = Advisory tasks; BMELV = Bundesministerium für Ernährung, Landwirtschaft und Verbraucherschutz; CIDC = Centraal Instituut voor Dierziektecontrole; FLI = Friedrich Löffler Institut; GD = Gezondheidsdienst voor dieren; KOB = Kreisordnungsbehörde; LANUV = Landesamt für Natur, Umwelt und Verbraucherschutz; LWK = Landwirtschaftskammer; MinLNV-DRZ = Ministerie van landbouw, natuur en voedselveiligheid – directie regionale zaken; MinLNV-VD = Ministerie van landbouw, natuur en voedselveiligheid – directie voedselkwaliteit en diergezondheid; MUNLV = Ministerium für Umwelt und Natur, Landwirtschaft und Verbraucherschutz des Landes NRW; O = Optional; Rendac B.V. = *Dutch rendering company;* TKBA = Tierkörperbeseitigungsanstalt [e.g. SARIA]; VWA = Voedsel en warenautoriteit

2.5 Crisis scenario construction

For each elected category several ambition levels can be defined. In this paper the scenario construction concept is exemplified in illustrating different ambition levels for category 4 information and communication transfer as it suits both parts of the research objective: combination of public and private systems and the cooperation between Dutch and German actors.

Speaking about ambition levels we first of all have to define the concrete ambition. In this case the ambition of all players concerned is the willingness to cooperate with each other. Then it is necessary to settle a minimum and a maximum level of ambition. In between them a freely chosen amount of levels

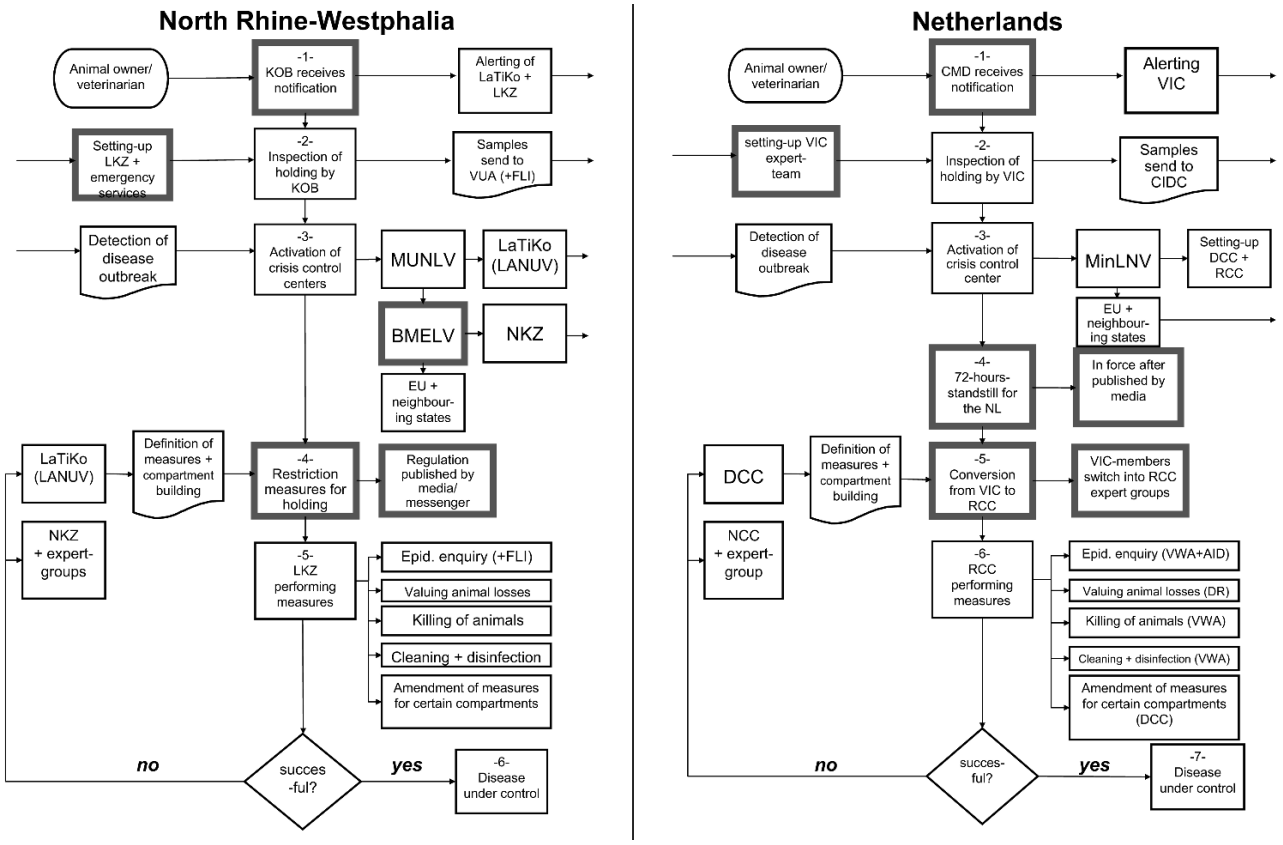

Fig. 3 Flow chart of animal disease contingency planning in GE [NRW] and the NL
(AID = Algemene Inspectiedienst; BMELV = Bundesministerium für Ernährung, Landwirtschaft und Verbraucherschutz; CIDC = Centraal Instituut voor Dierziektecontrole; CMD = Centraal Meldpunt Dierziekten; DCC = Departementaal Crisis Centrum; DR = Dienst Regelingen; EU = European Union; FLI = Friedrich-Löffler-Institut; KOB = Kreisordnungsbehörden; LANUV = Landesamt für Natur, Umwelt und Verbraucherschutz; LaTiKo = Landes-Tierseuchenkontrollzentrum; LKZ = Lokales Krisenzentrum; MinLNV = Ministerie van landbouw, natuur en voedselkwaliteit; MUNLV = Ministerium für Umwelt und Naturschutz, Landwirtschaft und Verbraucherschutz NRW; NCC = Nationaal Crisis Centrum; NKZ = Nationales Krisenzentrum; R&D = Reinigung und Desinfektion; RCC = Regionaal Crisis Centrum; TKB = Tierkörperbeseitigung; VIC = VWA Incident- en Crisiscentrum; VWA = Voedsel- en Warenautoriteit; VUA = Veterinäruntersuchungsamt).

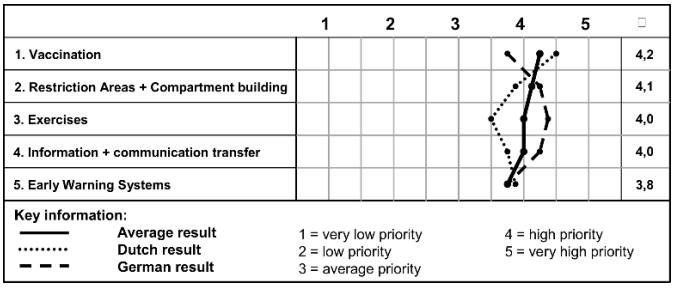

Fig. 4 Expert survey regarding prioritisation of demand for cross-border cooperation between the Netherlands and Germany [NRW] in CSF-control.

is possible. The minimum ambition level has already been defined within the expert survey: Clarification of communication channels between all relevant actors in times of crisis. In this case the maximum level of cooperation can be announced as a fully integrated cross border information and communication system. To illustrate only some medium examples of further strategies one can learn from Tab. 3.

Creating ambition level flow charts has several advantages. First off all the minimum level can be regarded as the lowest common denominator between all relevant actors. In this case all private and public players from the Netherlands and Germany can definitely support this approach. Assuming that the minimum ambition level is soon and easily translated into practice the flow chart can already offer following scenarios that have already been analysed. This bottom up approach can be in some ways compared with the political theory of Neofunctionalism, where the effect of regional integration is called spill over (Mitrany, 1976; Mc Cormick, 1999). Subsequently for each ambition level a scenario can be constructed. This initially requires the development of a Closed loop model (see chapter 3.1) in order to illustrate the starting situation of the scenarios that have to be constructed.

During the construction of a crisis management scenario for the minimum ambition level the concerned players can altogether make their decision with full information at hand. For reasons of better understanding crisis scenarios an example is given out of the recent scenario building process (see Fig. 5). In chapter 3.2 the Scenario bundle method is ex-

Tab. 3 Ambition level category 4: information transfer and communication.

Max. ambition level	Integrated cross border information + communication system
Level 5	Harmonization of certain data bases in times of crisis
Level 4	Harmonization of data format to allow cross border assessment
Level 3	Defining interfaces for certain data exchange
Level 2	Exchange of *liaison officers* to support crisis communication
Level 1	Organisation of Dutch-German hotlines in times of crisis
Min. ambition level	Clarification of communication channels in times of crisis

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plained as a part of the newly defined crisis management model.

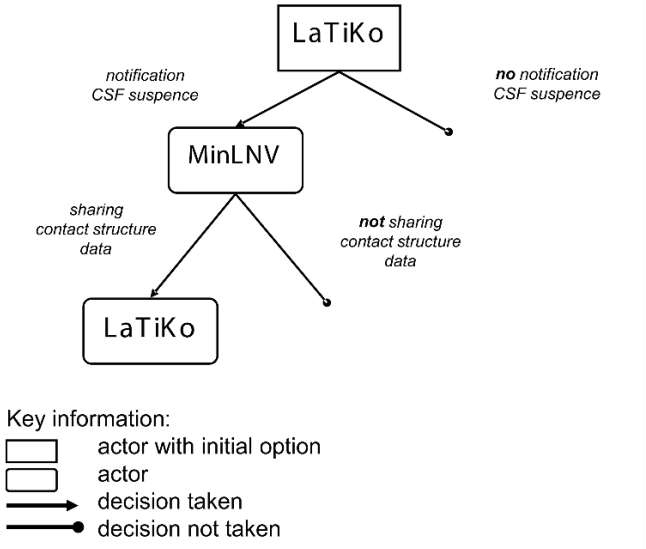

Fig. 5 Abstract of a Scenario bundle.

3. New Model for Cross Border Crisis Management

One of the most important aspects in crisis management decision making is the assessment of the optimal use of data and communication channels (Rosenthal et al., 2001; Boin et al., 2005; Rodriguez et. al., 2007; McConnell and Drennan, 2007; Kouzmin and Rosenthal, 1997). As we already stated this is of crucial relevance for the crisis management actors responsible for private quality management systems in pork production chains (Petersen et al., 2002 and 2003; Petersen et. al., 2005) and public authorities responsible for CSF control. Both sides are currently developing data warehouses according to their scope of duty on both sides of the border.

In order to be able to share more important information in times of crisis it was necessary to find out more about the priorities for cross border cooperation in CSF control. At the same time one has to be aware of the respective courses of action each actor has (EC, 2007). Therefore the concept for a cross border crisis management model has to contain two different aspects: (1) a model of actors and their options in crisis management decision making and (2) a model of communication and information exchange between actors.

3.1 Closed loop model

In order to understand the concerned actors and their tasks in crisis management they are represented as regulators in a socio-technological Closed loop model (see Fig 6). The ambition of regulation processes is to stabilize a system against the impact of unforeseen disorder. Regulators need four information categories for decision making in this model defined by Petersen (1985): Information can be descriptive, diagnostic, predictive and prescriptive (Harsh et al., 1981). Petersen (1985) describes a Closed loop model as the role of actors as controlling units in complex systems. In this paper the model has been adapted to parts of the crisis management systems in the Netherlands and Germany. As already stated veterinarians, farmers as well as public crisis managers have to take their decisions fast and efficient. Every necessary decision process contains the production and edition of information. If decision makers or policy makers aim to regulate certain processes they need to have full information at their free disposal. Hence the following data assessment tools are irreplaceable for an efficient crisis management: substantial monitoring, regular outlines and systematic evaluation (Petersen, 1985). Diagnostic information is particularly important as it enables decision makers to identify and analyse certain problems (Berg, 1985). As soon as a problem is detected the actors concerned are in need of information about the causes of the disorder in order to draw necessary conclusions for optimal response measures. At this time they are depending on the different categories of information. Descriptive information means regulations, contingency plans or any kind of data coming from the husbandries. Predictive information is an answer to the question: What, if...? It contains prospective scenarios that can come from a general trend or a risk assessment or a simulation. Finally prescriptive information is given to be the right course of action in decision making. It is directed towards answering the question: what should be done (Harsh et al., 1981).

To assign this basic model to decision making in crisis management a certain amount of aspects has to be considered:

1. Action alternatives described in a decision tree model;

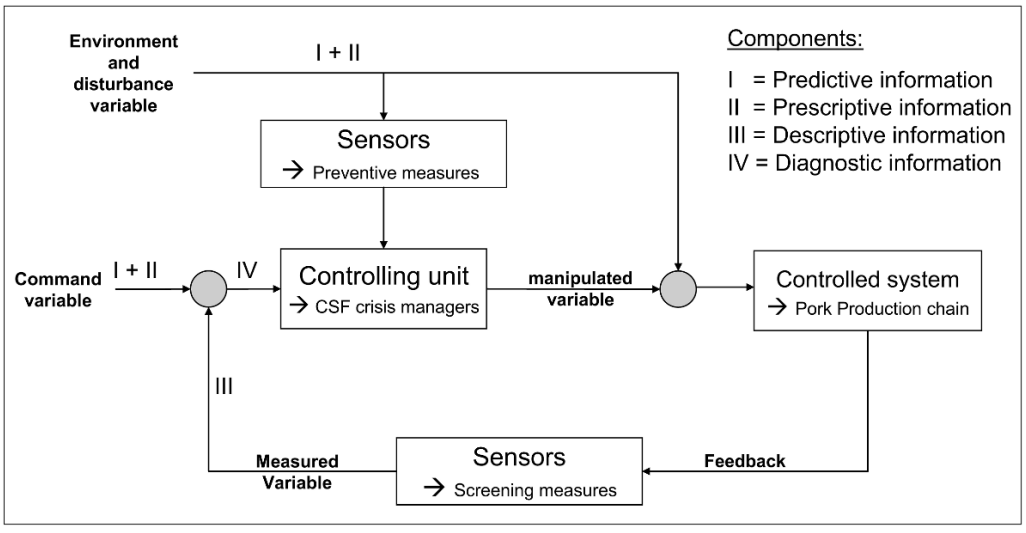

Fig. 6 Closed loop model.

2. Concrete decision problems that are going to be evaluated by the model;
3. Ambition levels of communication between farmer, veterinarian and public crisis managers.

3.2 Scenario bundle method

The Scenario bundle method is a component of the classical games theory (Selten, 1999; Reiter and Selten, 2003). It is a systematic method to the collection of expert verdicts from which simple game theoretical models can be drawn. In this case study information at hand is installed into prospective crisis management scenarios in order to find prescriptive courses of action for cross border CSF control. By use of the Scenario bundle method the options for action each actor has within a crisis become represented and valuated.

This method enables researchers to illustrate the different alternatives decision makers have in concrete crisis situations. The construction of scenarios is based upon expert information that contains answers to the following questions:

- Who are the relevant players?
- What are the motivating factors which determine the players' preferences?
- What are tactical possibilities of the players?
- What are the consequences of various combinations of tactical choices?

Scenario bundles indicate possible future developments (prospective information). Selten (1999) compares the benefit of information coming from scenario bundles with decisions taking in a chess game: Predictive reliability can not be promised. Human decision making in chess seems to be analogous to the construction and evaluation of scenario bundles. Generally, a chess player who tries to plan ahead cannot really predict the future course of a game. Nevertheless, he will approach his decision problem in a predictive spirit. It will be his aim to explore the likely consequences of a selection of plausible moves. Finally they will provide decision makers with the answers to the following questions:

- Which initial options are likely to be taken?
- Which initial options are not likely to be taken?
- What are the likely consequences of internal events?

Implementing the preliminary findings into scenario bundles is an optimal way to evaluate their possible benefit for CSF-control in forms of concrete courses of action: According to the Closed loop model one can state that the Scenario bundle method helps gathering predictive information in order to define prescriptive information (Breuer et al., 2007).

3.3 Combination of methods

Combining the Closed loop model approach and the Scenario bundle method the organizational part of a concept for a new crisis management model is presented for the construction of crisis scenarios regarding the necessary information transfer. The complementarity of both methods is most striking and made it possible to develop one new model: According to the Closed loop model we need four types of information to take safe and sound decisions: While the diagnostic information comes from monitoring and surveillance activities of all kinds and the descriptive information can be gathered from analysing any available and relevant source the Scenario bundle method enables decision makers to gain predictive information in order to find prescriptive information. Thus we have the tools to find out when a certain information is relevant (Closed loop model) and how we achieve predictive information in order to realize what we have to do next in crisis management (Scenario bundle method).

The second part of the crisis management model is a technical one. The Engage and exchange model illustrates, how information can be technically gathered and shared in order to optimize crisis management.

3.4 Engage and Exchange model

The communication model is based upon two different communication channels (Fig. 7): (1) the communication takes place between the data warehouses of public crisis management actors and the concerned sector orientated production chain (e.g. pork production chain). (2) This channel organises the exchange of information between public crisis management actors of the Netherlands and of Germany.

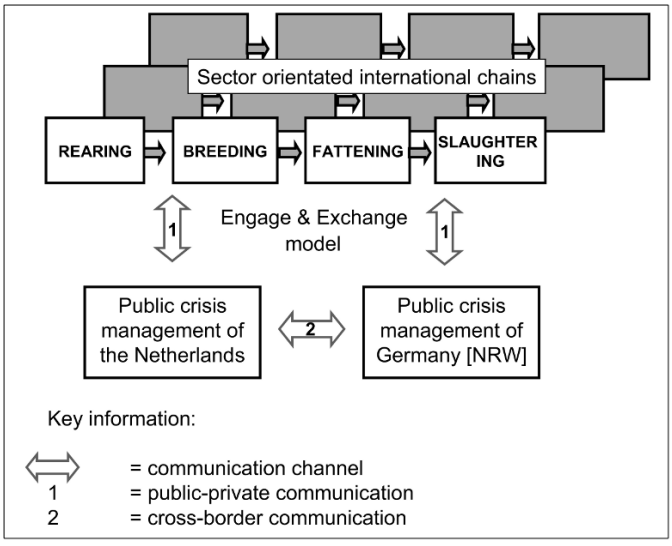

Fig. 7 Communication model.

private authorities in times of crisis is defined. The underlying idea of this concept – exemplified for pork production chains – is the definition of certain information that is part of public or private internet based data warehouse systems for an exchange in times of crisis. In Fig. 8 the systems set-up in normal times is illustrated. Basically the data assessment that is compulsive in every private quality management system is involved. Any relevant information coming from the data warehouses, e.g. about the animal health status, is edited by integrated software tools into certain parameter. Between every link in the chain information about transport is gathered.

So called network coordinators – like slaughterhouses or farming coordinators – are in their position as an information broker along the whole chain and towards the state authorities particularly suitable for the organisation of these databases. As soon as an official limiting value is exceeded (e.g. loss of animals is certain in observation period; prevalence for diseases) all animal husbandries and their supervising veterinarians will receive a warning message through the system. At the same time the official information management system is in a phase of reorganization. The German federal state North Rhine Westphalia is presently busy implementing a countrywide server that is said to be a central data base for all veterinary authorities in national, regional and local entities (Mätzschker, 2004). With this integrated approach the harmonization of several different applications (Hamlet, Traces, Balvi, etc.) that are currently running in NRW is intended. Any data concerning feed and food surveillance, animal health and animal disease prevention coming from animal husbandries is going

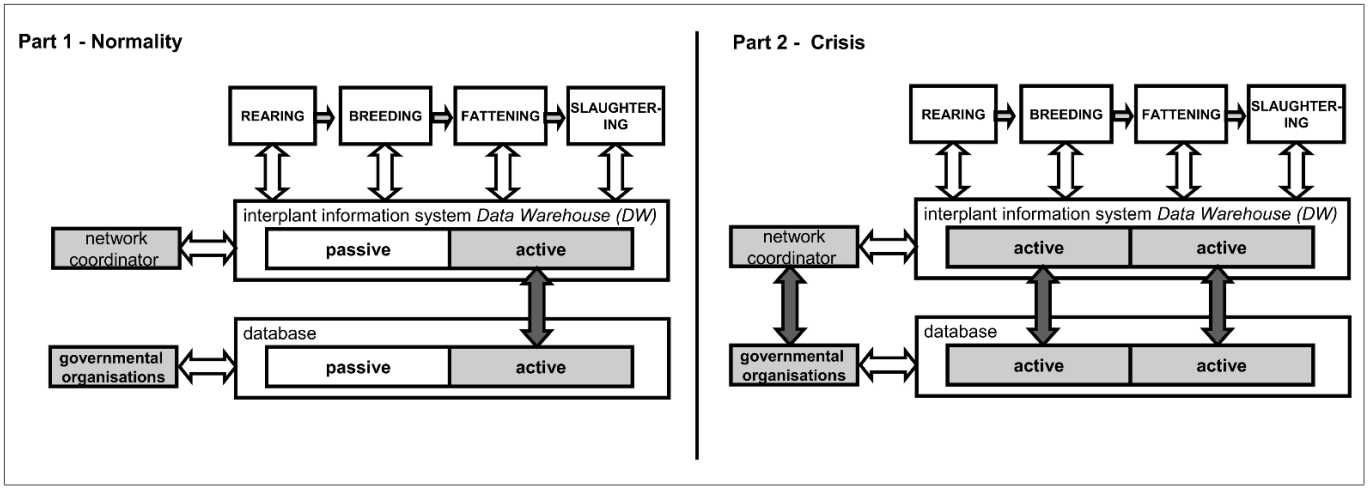

Fig. 8 Engage and Exchange model.

The model presented in Fig. 8 (Schütz and Petersen, 2007; Hoffmann et al., 2008) is developed to simplify the information and communication transfer between public authorities and farmers *via* certain network-coordinators in times of crisis. It is chiefly based on a two-step-approach: The first step contains the amplification of information transfer in normal times within inter-enterprise systems of private authorities. In a second step the exchange of certain information between public and to be collected unitarily in the near future. Specific software solutions are made for food control measures like food traceability in farms. Furthermore the structure of this central data server gives way to the use of control applications in times of crisis *via* a website. Ongoing an animal disease outbreak this involves a continuous data assessment of public and private authorities as well as a risk based assessment of specific data for certain and well defined time periods. It includes that e.g.

transport permission documents will be provided on the common website. Hence the passive segments of the database are activated in a second step. This means that the edited data coming from husbandries, farming cooperation and slaughterhouses on the one hand and from public authorities on the other hand is ready for public and private exchange in order to optimize the national crisis management. The network coordinators are dealing with the proper course of action concerning the engage of the system and the exchange of data.

4. Conclusions

Concepts for both organisational and technical innovations in cross border CSF crisis management are presented in this paper. They have been integrated to a new cross border crisis management model that contains possible approaches to solutions for cooperation between

a) public and private authorities and
b) public authorities in the Netherlands and in Germany.

Using methods from game theory and quality management in order to structure the experiences that experts already have made about crisis management before predictive information is gathered from scenario bundles has turned out to be a solid approach in supporting critical decision making during a crisis.

Illustrating first experiences with scenario bundle construction by analysing further cooperation within the category information and communication transfer showed that gaining relevant information at the right moment is a crucial task for an efficient crisis management. As all top 5 minimum strategies underline, are Dutch and German experts sharing the opinion that starting cooperation means gathering more information about each other. This statement takes private and public actors into account.

By connecting the Closed loop model to the Scenario bundle method a model is generated that can contribute to the improvement process of CSF crisis management in the Netherlands and Germany. While the organisational part of the model enables public and private crisis managers to understand the cross border need of information in times of crisis and to gain and spread the relevant information at the right moment, the technical part is focussed on the ideal distribution of the cumulated knowledge. It has been illustrated how the implementation of this model can help to reduce the Post-HRP. A higher degree of efficiency in information and communication transfer between public and private actors in the Netherlands and Germany can save the lives of pigs, the pork production economy of the border area and not least ready money that is spend on CSF control in every day of a crisis.

Regarding the technical innovation a final concept for the customization of the information systems chiefly consists of two columns:

a) Continuous elevation and safeguarding of data in normality,
b) Risk oriented connection of data collection modules in crisis.

In normality data are processed into Data Warehouse systems according to the uniform criteria of quality management (Petersen et al., 2007). In times of crisis auxiliary modules of databases which permit to collect and to evaluate data in addition for a predefined time period are activated. At the same time interfaces, data and information that have been agreed on before are exchanged between private and official Data Warehouse systems for a restricted time period. The inclusion of network coordinators (Schütz and Petersen, 2007) is particularly important.

The crisis management model has been developed and tested in the INTERREG IIIA project Managing Risks (http://www.giqs.org/projects/risiken/). The final report containing all results is available since July 2008. The degree of added value this model can achieve is mainly depending on the ambition of public and private actors to continue in cooperating about CSF control. Therefore further elaboration and implementation of this model in upcoming research projects is highly intended.

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