

# Managing the unmanageable: A case study of the management of an infectious animal disease in Corsica

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Health crises (avian flu, mad cow disease, etc.) have recurrently challenged government strategies for managing animal diseases that might become epidemic. Although many studies have focused on the gap between the supposed effectiveness of these strategies and the reality of conditions for implementing them in the field, very few studies have concentrated on the drafting of collective strategies involving a wide range of stakeholders (farmers, hunters, veterinarians, administrations, etc.) who often have incompatible interests. To help span this gap, a case study based on grounded research has been made of how Aujeszky's disease ("pseudorabies", a viral disease in swine) is being managed in the French region of Corsica. This disease has stymied animal health authorities for many decades because of the complexity of its biological, socioeconomic and organizational causes. Lessons are drawn from a participatory approach whereby researchers "co-constructed" a new strategy for managing this disease. Light is shed on the emergence of a local "middle management" and its characteristics. At a time when governance in the health field is undergoing change, this study brings to light approaches for locally working out public health programs while involving many stakeholders.

For several decades now, severe, potentially very communicable animal pathologies have emerged, re-emerged and persisted, disrupting the more or less rationalized production processes used in animal husbandry and the food industry and setting off health crises ("mad cow's disease", "bird flu", "bluetongue", etc.). Since the 1990s, these crises have repeatedly led to the failure of the programs designed and implemented by public authorities for managing animal pathologies. The idea of the state falling short owing to its inability to control the situation or its inappropriate management intersects with the radical instability of the pathogens and their circulation as discovered by scientists. Added to this situation are the difficult acceptance and implementation of health measures along the chain of the livestock farming system and, too, by the persons who manage the natural areas where infectious agents freely circulate.<sup>(1)</sup>

Though not having received much attention in France from the public, nor, sometimes, from researchers in managerial science, the crises of mad cow disease (in the 1990s) and then of bluetongue in sheep (in 2006) — not to mention the recent episodes of bird flu in southwestern France (during 2015 and 2016) or African swine fever (introduced via Belgium in 2018) — have successively opened a discussion of the question about how to reorganize the French animal health system. Currently, it is organized on the basis of what is usually called the "sanitary tripod" with reference to the threesome — public administration, veterinarians and farmers — around which health policy has taken shape in this field (CASSAGNE 2004). In 2010, a national meeting devoted to these health issues (the États-Généraux du Sanitaire) led to a "new health governance". This new policy orientation signaled

de Corse for its backing of the NovPath program. This article, including quotations from French, has been translated by Noal Mellott (Omaha Beach, France). All websites were consulted in August 2021; and a few bibliographical references have, with the editor's approval, been completed.

<sup>(1)</sup> The authors cordially acknowledge the participation of various persons in the surveys and workshops conducted during this research, and would like to thank the Collectivité Territoriale

the shift from a centralized, vertical and hierarchical, management toward forms of management better adapted to local areas and involving more local players (GUÉRIAUX *et al.* 2012). Its implementation has given rise to issues in public management. How to set up local arrangements involving a wide variety of stakeholders from the local area? How to design the means for this new management and shore up the roles and functions of all stakeholders? This rather “silent” reversal of the Colbertist approach in France to animal health and the management of health risks has been reinforced following successive outbreaks.

As in research on environmental management strategies — when the state has to construct, with a multitude of actors who often have contradictory objectives, a joint framework for managing an “environmental” problem with characteristics that are not well defined at the outset (MERMET *et al.* 2006) — this article focuses on the co-construction of a framework for a program to fight against Aujeszky’s disease. This pathology, which has affected pig farms in Corsica since the 1970s, has been declared “unmanageable” by health authorities there following various failed strategies for fighting against it (AFSSA 2009). Through participatory workshops, our research sought to formulate a shared statement of the reasons why these policy have failed and to explore the conditions for setting up new arrangements that would take into account the complex combination of biological, socioeconomic and organizational factors underlying this animal health problem.

This article starts by describing our theoretical framework that, derived from the literature on management and “translation theory” (respectively GIRIN 1990, CALLON 1986), we used to analyze the processes whereby common references (frameworks and objects) emerge that are to be managed collectively. A post-mortem analysis of our engineering approach is then proposed that borrows from research in the managerial sciences (CHANAL *et al.* 1997) and from research-intervention (DAVID 2002). Our findings, presented in the third section of this article, explain how stakeholders “constructed” a form of “middle management” when they gradually “enrolled” in this process as the problems and the managerial actions for solving them were “reinvented” on a local scale instead of on the scale used for reporting epidemiological findings (about the prevalence of the pathology) or for administrative purposes (specific to public authorities). The fourth and last section discusses the importance of the geographical dimension of management, in particular for the new health governance policy.

## The situation to be managed and the theory of translation

The concept of a “situation to be managed” provides a pertinent, general framework for analyzing changes in the various elements in the situation under study. However we had to borrow from the theory of translation in order to understand how the “manageable” was

“reinvented” and, in particular, to connect this reinvention with the formation of a group of stakeholders.

## The situation changes along with arrangements for coping with it

Girin’s viewpoint about “situations to be managed” is quite relevant for studying a phenomenon in management with fast-moving bounds in an organization undergoing a transition, as is the case in managing the health of livestock. Such a situation arises whenever “participants are gathered and have to accomplish in a given time a collective action that leads to a result to be submitted to outside judgement” (GIRIN 1990, p. 2). This definition, which not only has a broad scope in space and time but also includes “participants” (along with their interpretations, tools, etc.), provides an integrative framework for tackling the problematics of decision-making and cooperation (JOURNÉ & RAULET-CROSET 2008). The idea of a situation to be managed has been intensely discussed in studies on strategy. Attention has been drawn to the limits of situations imposed on actors from the outside (AGGERI 2008) and to the potentially too comprehensive scope of this idea, which so many empirical or theoretical references (DUMEZ 2008). Nonetheless, this idea is empirically operational in situations with a variety of stakeholders and a usually high degree of uncertainty, as happens during health crises (scarcity of knowledge about infectious agents, the behaviors of farmers or other parties, and so forth).

The idea of a situation to be managed has been used to show that social actors take part in a survey to reduce uncertainty, improve their understanding of the situation and ultimately define the actions for coping (JOURNÉ & RAULET-CROSET 2008). In addition, Barbier (1998) has written about the “invention of the manageable” for studying how a situation, unmanageable *ex ante*, becomes manageable through agents’ “determination”,<sup>(2)</sup> the delimitation of a space and time, the definition of the criteria to be used for judging and, above all, the production of one or more arrangements for managing it. He has related the reinvention of the situation to be managed to changes in the arrangements for managing it. These changes express stakeholders’ willingness to exercise control over an emerging or reformulated problem.

The territorial dimension of the situation to be managed (RAULET-CROSET 2008) turned out to have special interest in our case study, since the “delimitation of a space of reference for actions is a managerial lever: It leads to defining participants, bringing them to engage in actions, and mobilizing forms of competence related to their geographical proximity” (RAULET-CROSET 2008, p. 137). This author has described how action is defined in relation to precise spatial units (a stair well in a building, a control room, a bus stop, a watershed...) that make it an effectual part of a set of arrangements. However few studies have focused on the process

<sup>(2)</sup> In the sense of “selection”, the verb “to determine” implies that there is no choice among possible options, but that the actors, through this process, take part in problem-solving.

of defining this space, since so many studies are concerned with spaces that existed prior to the study. For animal disease management, the spatial rationalization of managerial actions is, we found, fundamental, since it lies at the junction of understanding epidemiological phenomena (the animal in a herd, on a farm, in a given area...) and a “territorialization” of the instruments for public interventions (decisions by prefects, municipal authorities or veterinary services). It is, therefore, worthwhile inquiring into this process since the “new health governance” policy in France amounts to an attempt to better take into account the geographical, or territorial, aspects of animal husbandry.

### The theory of translation for analyzing the gradual “reinvention” of the situation

Often used to make granular descriptions of controversial innovations, the theory of translation (CALLON *et al.* 2013) has also turned out to be relevant for shedding light on the formation of groups of action (AMBLARD *et al.* 1996). It can be used to identify and analyze stages in the formation of a group under a “translator’s” leadership (CALLON 1986). Its key concepts are problematization, interests, incentives, enrollment, and the stabilization of the network of actors once it produces a spokesman (AKRICH *et al.* 1988a & 1988b).

At the start is an action by a *primum movens* who initiates the preliminaries of translation, in particular by appointing the translator. In our case study, the prime mover was SRAL (the regional service of the Agriculture and Food Department within the Ministry of Agriculture); and the translator, INRA (Institut National de la Recherche Agronomique). The translator initiates the phase of “problematization”, a looping sequence for defining the problem and the parties to be involved. This phase ends with the definition of a single common problem consonant with individuals’ different problems. This common problem responds to the controversies that might have arisen during the group’s work together.

The second phase describes the production of interests and alliances (whether explicit or not) around the problem defined during the preceding phase. “An interest, if successful, confirms (more or less completely) the validity of the problematization, which, in the opposite case, is refuted” (CALLON 1986, p. 188). This process plays out through iterations, negotiations and reformulations up until the parties involved change their positions and ways of seeing the situation. These actors evolve; they modify their view of the world and of the bounds between social groups.

The third phase has to do with designing coordination and making it operational. “Enrollment” is the “mechanism whereby a role is defined and assigned to an actor who accepts it” (CALLON 1986, p. 189). All these multi-lateral negotiations allow for interests to be formalized. The translator then works at convincing stakeholders that the solution to their common problem provides a response to their individual interests. The outcome of enrollment takes the form of participation and the co-construction of collective strategies.

In a final phase, the network of actors becomes stable when the thus produced arrangements are institutionalized. This “locks” local enrollments into more general conventions, for example through the recognition of spokesmen or intermediaries. At that point, the situation to be managed has been reinvented by the group that was gradually organized throughout this process.

### A postmortem analysis of the research-intervention in Corsica

Our research focused on the management of Aujeszky’s disease in Corsica, a health situation in which “classical” managerial procedures had failed. This article comes out of a postmortem analysis of a series of participatory workshops that, conducted by researchers from INRA, sought to propose another way to manage this “disease situation”.

### Conditions on pig farms and Aujeszky’s disease: A case study

Aujeszky’s disease (often called pseudorabies) is a virus infection of pigs and wild boars, besides other animals. The virus causes abortions and makes it longer to fatten pigs for pork. Since this disease is not transmissible to people, its effects are mainly economic. It not only causes production losses on pig farms, but also motivates restrictions on animal movements, since the sale of live animals is forbidden if pigs have to be moved from areas where the disease is rife toward areas free of the disease. So, Aujeszky’s disease has a major impact on sales. Administratively, it is a “regulated category I disease”. In other words, state health authorities are in charge of managing it. They choose the strategy (usually under the authority of the minister or prefect). A range of interdependent stakeholders are concerned with the management of this disease in Corsica (Table 1).

Managing Aujeszky’s disease has been a longstanding problem in Corsica (CASABIANCA *et al.* 1989). The virus has survived on the island even though the same vaccination strategy was applied there as on the continent from the 1990s till 2008. In the pastoral system prevailing on Corsica, there are various types of livestock with quite variable levels of “biosecurity” (protection of animals against infections from the outside); and this strongly affects epidemiology (RELUN *et al.* 2015). At the end of 2014, during a meeting that, devoted to Aujeszky’s disease, assembled persons active in animal health, INRA proposed and would undertake, in agreement with health authorities, a research-intervention program for adopting a new set of arrangements. By including new actors (farmers, hunters, private veterinarians, etc.) in this program, INRA took on the role of translator, while its researchers steered this research-intervention. This article focuses on the period from 2008 (when continental France was officially declared free of the disease) till the presentation of the findings of this research during the FRGDS general assembly in July 2017.

Table 1: The management of Aujeszky's disease in Corsica.

Stakeholders	General assignment and roles
AFSSA (Agence Française de Sécurité Sanitaire des Aliments, now named ANSES: Agence Nationale de Sécurité Sanitaire de l'Alimentation, de l'Environnement et du Travail)	The French Health and Food Security Agency is in charge of assessing health risks. It informs public decision-making and is frequently asked to evaluate health situations, public programs, etc.
AOP Charcuterie de Corse	This protected designation of origin (PDO: <i>AOP</i> ) protects the label <i>Charcuterie de Corsica</i> for pork products (87 in 2012).
ARGRPC (Association Régionale de Gestion de la Race Porcine Corse)	The Regional Association for Managing Corsican Swine groups breeders and users of the local breed of pigs. Because of Aujeszky's disease, live animals may not be exported from Corsica.
CRA/CDA (Chambres régionales et départementales d'agriculture)	Besides being authorized to perform some public services, the regional and departmental Chambers of Agriculture (CRA/CDA) offer technical assistance to farmers. They play a major role in organizing lines of production in local areas.
DDCSPP (directions départementales de la cohésion sociale et de la protection des populations)	The departmental services of social cohesion and the protection of the population are local-level state services with the assignment of implementing policies about food, nutrition, and plant and animal health. SRAL coordinates them.
DGAL (Direction Générale de l'Agriculture et de l'Alimentation) is represented in the regions by the SRALs ( <u>Services Régionaux de l'Alimentation</u> )	The Agriculture and Food Department (DGAL) within the Ministry of Agriculture oversees the safety and quality of the food supply all along the chain. It is in charge of the health and protection of plants and animals in coordination with the state's regional and departmental services and with various stakeholders. It implements policies for controlling the quality and safety of agricultural produce and food.
Farmers	In 2012, there were 330 with about 50,600 animals (statistics from AGRESTE).
FDC (Fédérations départementales des chasseurs)	These departmental hunters' federations can have a part in plans for monitoring and managing wildlife (such as hunts organized by the administration or the location and retrieval of dead animals).
GDS (Groupement de Défense Sanitaire) FRGDS (the regional federation of GDSes)	Set up in the 1950s to foster collective efforts in the fight against bovine TB, GDSes group farmers and provide technical services, funding and advice to their members.
GTV (Groupement Technique Vétérinaire)	This trade group of private veterinarians can be used to coordinate veterinarians' actions during state-sponsored campaigns.
LRDE (Laboratoire de Recherche sur le Développement de l'Élevage)	This laboratory for research on livestock works on the development of animal husbandry in Mediterranean areas. It is a unit of INRA (Institut National de la Recherche Agronomique).
ODARC (Office du Développement Agricole et Rural de la Corse)	The Office of Agricultural and Rural Development of Corsica (ODARC), a public establishment under the control of Corsican authorities (Collectivité de Corsica), is in charge of measures related to agricultural development (support for farmers, etc.).
PNRC (Parc Naturel Régional de Corse)	The Regional Natural Park of Corsica is a zone of environmental protection managed by the Office of the Environment of Corsica.
Prefect	This administrative authority makes decisions about the implementation of measures for fighting against animal diseases (mandatory vaccination, restrictions on moving animals, etc.).

### Methodology of this research-intervention on a problem in public management

According to Amblard et al. (2018, p. 240), research-intervention is an approach for detecting problems in developing a collective action in local areas, for “enabling the emergence and development of collective action, [...] ensuring the adherence of stakeholders and legitimating those who participate, [...] accompanying, foreseeing and pondering the effects of the action on local areas”. Research-intervention helps explain how a situation to be managed emerged; it traces the process of the “invention of the manageable”, which plays out in an interorganizational context (BARBIER 1998). In the case of managing a regulated pathology (thus in a heavily constrained situation), research-intervention turns out to be quite pertinent for a systemic analysis, which stakeholders themselves would probably have difficulty making given their partial view of the situation (AGGERI 2016). In the case of pig farming in Corsica, research-intervention seemed to offer an appropriate methodology for handling the question of the relations between, on the one hand, the overhaul of the procedures for managing a complicated public problem with uncertain bounds and a mix of human and nonhuman actors, and, on the other hand, the processes for reinventing the situation to be managed and the structural effects of this reinvention on stakeholders’ “logics of action”, interests and enrollment (CALLON 1986).

Our data have come out of the three phases of this research-intervention conducted between 2015 and 2017:

- PHASE 1: A series of semidirective interviews with various actors concerned with the “Aujeszky disease situation in Corsica”. One objective was to detect the themes to be discussed during workshops. Data was collected from 29 interviews with: 2 veterinarians, 21 farmers, 3 heads

of state services, 2 persons from GDSEs and 1 person from the departmental laboratory.

- PHASE 2: Three workshops were organized in 2015 as focus groups. These “workshops of deconstruction” took the form of open discussions about themes identified during the first phase: 1) a review of the failure of previous programs (e.g., Why did some pig farmers drop out of the previous plan?); 2) the coordination of vaccination operations on the island (e.g., Which animals were to be vaccinated?); 3) the protection of pigs from being infected by neighboring herds or wildlife (e.g., Should wild boars be vaccinated?). The objective of these workshops was to “deconstruct” the Aujeszky disease situation and bring the work group to agree on the difficulties to be overcome and to propose and discuss potential solutions for each problem defined.
- PHASE 3: Three so-called “co-construction workshops” were organized in 2016 on the basis of the researchers’ report. Participants were led to formalize the operations to be planned and to make them fit into a set of arrangements (each arrangement having been described: operators, tools, techniques, regulations, etc.).

At the start of each workshop, researchers presented the conclusions from the previous workshops (as a function of the themes to be discussed). These reports led to the production of “artefacts” (e.g., tree diagrams or mental maps) for discussing and validating the conclusions. This procedure, based on a heterogeneous group (Table 2), was designed and analyzed by an engineer in managerial sciences<sup>(3)</sup> and a researcher in zootechnics, who were facilitators during the meetings.

<sup>(3)</sup> Including one of the authors of this article, who made the project postmortem.

**Table 2: Type and number of participants in the co-construction of a new set of arrangements for fighting against Aujeszky’s disease (2015-2017).**

Type	Description	Number
State health services	Head of SRAL, directors and technicians from the DDCSPPs	5
Farmers	From various regions, and with different sorts of livestock	5
Veterinarians	Private veterinarians	1
GDS and FRGDS	A veterinarian and technicians	3
Breeders’ organizations	Syndicat d’AOP and ARGRPC	2
ANSES (formerly AFSSA)	A researcher specialized on Aujeszky’s disease	1
INRA	Researchers and a technician specialized in the pork industry	3
Hunters	Members of local hunter associations.	2
PNRC	A technician	1

The project postmortem used a qualitative methodology for placing the events that marked the research-intervention in a series and context, (BARBIER 1998). This method sheds light on agreements or disagreements, on arrangements as a set or as separate elements, on the relations or separations that were the driving force in the phenomenon under study. This retrospective analysis enabled us to formalize our findings in a report that listed the failures of previous strategies for managing the situation and described how the disease situation was being reinvented (problems, actors, places and times). It set in perspective the individual positioning of local actors and, at the end of this process, the formation of a group.

## Results: From stalemate to mobilization

The first discussions enabled the group to make a joint assessment of managerial failures in the past and formulate the general problems to be solved. These deconstruction workshops reinvented the situation to be managed, in particular as the group came to agree on the objective of disease management. The general problems thus identified were then honed. The objective aroused the participants' interest; and the rationalization of managerial actions on a new scale of operations (the "microregion" or local area) enabled stakeholders to position themselves in relation to each problem identified. Owing to this new scale, all operations could be made consistent; and a set of arrangements, formulated that would lead to the enrollment of all actors.

### The group's construction of the history of a semi-failure

The first workshop (June 2015) served to construct a shared narrative about the history of the management of Aujeszky's disease in Corsica.

Once continental France was declared to be free of the disease in 2008, AFSSA issued an opinion against the pursuit of a mass vaccination strategy on the island owing to the conditions on pig farming there. Pigs roamed freely in the woodlands. Few farms had fences for separating and penning animals. Most farms were inadequately equipped and did not have the narrow runway for channeling the pigs for vaccination. Furthermore, official databases were faulty, since several small farmers raised pork pigs without filing declarations.

While accepting AFSSA's opinion, the DGAL, along with the FRGDS and SRAL (its representative), conducted an experimental plan between 2011 and 2014. Its objective was to "assess the impact of medical (vaccination) and health (confinement of breeder pigs) measures on changes in the prevalence of infection and the clinical signs of the disease". This plan consisted disease control techniques (such as vaccination) and assessments of their effectiveness (screening tests) and "performance" (weight gains, reproduction).

Discussions on the design and rollout of this experimental plan led to an explanation of this plan's mixed results. The group in the first workshop admitted that vaccination was effective. Screening for the virus indicated a decrease in seroprevalence from 31.1% in 2011 to 8.6%. Furthermore, several pig farms had been rid of the disease. However the group also agreed on the ultimately negative impact of other measures (blood testing and weighing of pigs), which were burdensome. A third of the initial participants dropped out of the experiment; twenty farmers remained in the plan out of the thirty at the start. Given the criteria for selecting participants in the experiment, only farms with breeder activities had been chosen. In effect, the persons in charge of the plan had tried to find the best equipped farms, which were, of course, not representative of the diversity of pig farming in Corsica. Another consequence of this was that participants were geographically scattered, whence organizational difficulties. During this three-year plan, no meeting was held to discuss problems, adjust operations, etc. When problems cropped up on a farm, the GDS technician and farmer (or even the farmer alone) decided how to make adjustments. As a consequence, no data were collected about the results on farms; and the directors of this experimental plan were unable to demonstrate the benefits of vaccination to the whole pig industry.

This narrative brought to light that the experimental plan was intended to enroll both pig farmers (since it underscored the productivity benefits of vaccination) and health authorities (since it demonstrated that the vaccine worked and that professionals were mobilized). This twofold goal for enrollment was not reached however. As the DGAL observed, the plan did not have sufficient means for objectively demonstrating the benefits (this being evidence that pig farmers had lost interest in the experiment) and since many farmers dropped out (this being evidence that the profession in Corsica was not mobilized to fight against the disease). Discussions about the results of this experimental plan provided the first elements for formulating general problems: the major impediments were not technical (since vaccination had positive effects) but organizational.

This phase led to an agreement on the conclusions drawn from this workshop. Participants agreed to continue working in the group, even the farmers, who were not used to having a say in the drafting of arrangements.

### Reinventing the situation to be managed: Group agreement on the objective

The next two workshops (summer 2015) deconstructed the Aujeszky disease situation through open discussions about the problems identified during the first workshop and interviews. Participants were placed on the same level during these discussions, even though the highly technical nature of some discussions left some of them out. All the themes identified were brought under discussion, namely: vaccination, surveillance, exchanges of animals, the steering and

organization of operations, awareness campaigns, and the implication of farmers, hunters and veterinarians. A count of interventions per participant and a description of the contents of these interventions have shown that farmers weighed in on questions about strategy and the group's organization. Their degree of participation was even higher than health authorities'.

Each theme was gradually broken down into subthemes, too numerous to be listed here. By way of illustration, several subthemes of vaccination emerged that were related to organizational problems, such as:

- **AVAILABILITY OF THE VACCINE:** regulations on imports (a regulatory problem), responsibility for vaccinating (veterinarians or health authorities, the problem of coordination) and funding (a financial problem);
- **VACCINATION ON ALL PIG FARMS:** the need to "regularize" farmers who raised a few animals (a regulatory problem, the problem of collecting information for a database); an inadequate identification of farms; the insufficient geographical distribution of veterinarians (organizational problems); the lack of equipment (financial problem); the lack of technical control by certain operatives (problem of qualifications).

During these two workshops, solutions were formulated for each problem. This phase of working out problems with their solutions led to proposals about:

- problems that, seen as being peripheral to disease management, now became a center of attention, such as breeding practices. For example, sows in heat should not be left free to roam lest they attract boars or neighboring herds of swine that carry the virus.
- interconnected sets of problems that required coordinating the roles of several stakeholders (e.g., identifying persons who owned but a few pigs, organizing veterinarians or authorizing farmers to administer the vaccine).
- new forms of action, such as the proposals: to vaccinate all pigs at the start and then (once the infection rate due to the virus had lowered sufficiently) only breeding pigs; to allow GDS technicians help veterinarians; and to take blood samples at slaughterhouses instead of on the farm (a simplification of the blood test protocol for monitoring the virus). Since the experimental plan had not quantified the benefits for farmers, another proposal was to rely on testimonial accounts from farmers (instead of trying to undertake a standard technical assessment).

The researchers who headed these workshops realized that the formulation of problems and solutions by the group would vary as a function of the objective set. No objective had been defined at the start (in order to avoid eliminating certain options). Several objectives were possible: eradication of the disease on Corsica; control and surveillance (not to eradicate but to monitor for clinical signs of the disease); or laissez-

faire (each farmer managing the disease on his own). The nature of the problems changes as a function of the objective. If the goal is eradication, for example, the problems of geographical coverage and the organization of veterinarians become important, whereas they are peripheral in the case of laissez-faire.

Given the various problems to be discussed, the researchers oriented the third workshop toward the necessity of setting an objective. They suggested adopting a single common objective prior to any discussion. This would make it easier for the group to identify problems. Group discussions soon centered on the objective of eradication, and then focused on honing the problems and solutions related to it. Decisions were made; and options, eliminated. Besides making it easier to reach an agreement on the problems to be addressed, a common objective would enroll support as participants came to realize that the goal of eradication could take the form of other arrangements and another "way of doing things" than what had been done in the past.

### **From agreeing on the objective to agreeing on a modus operandi: The "microregion" as the scale for disease management**

Setting an objective deeply affected the interest shown by participants. State authorities came on board the new set of arrangements for coping with what was a "regulated category I disease" along with veterinarians and the GDS, each party with its own prerogatives (animal health and assistance to farmers) under this official classification.<sup>(4)</sup> Departmental laboratories, too, were interested (in having routine tests run in Corsica rather than on the continent), not to mention the participating farmers. While the cycle of workshops during the summer of 2015 led to defining problems and matching them with actions (vaccination and its followup, disease monitoring, herd protection, recruitment of farmers, steerage committees), how to see to it that these actions fit into a coherent set of arrangements involving quite different stakeholders?

During the fourth workshop, researchers drew participants' attention to a topic that had come up several times during previous discussions: conducting operations "region by region". It had even cropped up during the meeting in September 2014 that marked the closure of the experimental plan. It meant rationalizing actions on a geographical scale that would be more feasible and effective for implementing them. This topic involved several points previously discussed during the workshops: the transmission of the disease (through contacts between animals, which led to the conclusion, as was stated in this workshop, that "if a farmer vaccinates, then his neighbors have to vaccinate too"); the difficulty of bringing farmers to attend meetings (organize meetings in villages, in a small committee, with farmers from the local area...); the diversity

<sup>(4)</sup> With regard to the goal of eradication of the disease, for example, a third party would have to certify vaccinations by an authorized veterinarian. This eliminated the option of allowing farmers to vaccinate.

Table 3: Examples of how participants positioned their actions in relation to the scale of operations.

Scale: Actions:	Corsica	Microregion (or zone)	Farm
<i>Vaccination</i>	— Estimate the budget	— Vaccinate on farms zone by zone with the goal of vaccinating 80% of animals in a zone	— Vaccinate breeder or pork pigs before they are a year old
<i>Monitor and control vaccination</i>	— Test breeders at the breeding station in Altiani		— Transmit information to the local office
<i>Manage contacts between herds, and between herds and wildlife</i>	— Target genetics labs (AR-GRPC and farmer education high schools) — Vaccinate animals on breeder farms — Certify herds that are free of the disease	— Technical support from the GDS and chambers of agriculture — Test and control animal movements in the zone — A local plan for equipping participating farms in the zone with pens for vaccination and breeding	— Run blood tests prior to exchanges of animals — Customize technical support
<i>Disease surveillance</i>	— Have hunter associations take blood samples from wild boars — Have slaughterhouses draw blood samples — Local laboratory accreditation	— Target the blood samples made by slaughterhouses on animals coming from the zone	— Regularly run blood tests using sampling techniques
<i>Enroll stakeholders</i>	— Awareness campaigns conducted by slaughterhouses and the GDS — Information circulated by professional associations — Communication via the local media	— Identify and count pig farmers as well as the owners of a few pigs — Awareness efforts during local meetings — Enrollment of farmers during local meetings	
<i>Steerage</i>	— Zoning Corsica — A regional steering committee	— The local steering committee (farmers, hunters, GDS, veterinarians, etc.)	

of the types of livestock raised in the same valley (the need for all types of farms to be represented, a difficult feat on the scale of the whole island), etc. During this workshop, researchers proposed an exercise whereby participants positioned each action on the geographical scale that they deemed the most “appropriate” in terms of feasibility and effectiveness. Not only could each participant thus voice his interest with regard to the actions he deemed to be a priority (e.g., the priority for SRAL was a budget for vaccination), but also several major actions could be planned on the microregional scale (Table 3).

During this workshop, the group adopted the principle of gradual geographical coverage, microregion par microregion (each zone with its local steering

committee). This marked a major difference with the previous strategies for conducting actions on the individual (in the experimental plan) or island (in the case of classical regulatory actions) scales.

### Enrollment by microregion

During the fifth and sixth workshops, the process of enrollment took place through the exercises proposed by researchers from INRA. During these exercises, participants positioned themselves in relation to the actions to be included in the future set of arrangements for fighting against Aujeszky’s disease. The positions thus staked out were sometimes classical (e.g., veterinarians proposed doing the work of vaccination) but, too, sometimes innovative.



In effect, farmers offered to take part in vaccination drives in their microregion (“We can lend a helping hand [to vets] at the neighbor’s place”), in making an inventory of pig farms, and in awareness campaigns (at local meetings). Enrollment no longer involved an “objectification” of the “worth” of vaccination in terms of productivity gains for farmers or constraints. It now meant that the farmers participating in the program would share experiences with other farmers in their local area. The Regional Association for Managing Corsican Swine (ARGRPC) proposed drafting an animal disease control plan with all breeder farmers (or at least those commercially active in the microregion). The agricultural high school offered farmers the possibility of visiting its herd of swine and proposed screening animals for sale in order to avoid spreading the disease. GDS technicians and hunters offered to draw blood samples from wild boars killed as game in order to monitor the disease in wildlife. Finally, all participants said they were ready to take an active part in the regional steering committee (on the scale of Corsica) or local steering committees (in the microregions of zones).

The interest shown by participants was, it is worth noting, sustained up to the final validation of the principles for the actions to be conducted. For instance, the principle of conditionality enabled the DGAL to reduce financial risks (since vaccine doses would be ordered only if enough farmers in a microregion had signed up for them). Another example: the organization of awareness meetings made it possible for the DDCSPP, veterinarians and GDS to win pig farmers back over on animal health issues that were broader than Aujeszky’s disease alone.<sup>(5)</sup>

A final point: the procedure used by INRA modified the status of actors. INRA itself was no longer an observer but a pivotal player. Although state services retrained the power to make the final decision, they were participants like the others; and this drew them closer to farmers, in particular. Farmers and veterinarians, instead of just applying decisions, became involved, along with others, in decision-making itself. Technicians from various organizations were implicated, as were elected officials. Participants in the INRA procedure gradually staked out positions in relation to what would be the new situation (Table 4), but without being sure that this process would play out in full. Nonetheless, participation was stable throughout this long process (and no participant dropped out) — despite the criticisms voiced and the controversies that broke out during workshops.<sup>(6)</sup>

<sup>(5)</sup> Other pathologies than Aujeszky’s disease afflict pig farms in Corsica, namely: trichinosis, bovine TB, swine influenza and African swine fever (which is present in Sardinia). The decision was made that awareness meetings should not discuss Aujeszky’s disease alone, lest farmers lose interest. Besides, pig farming is not closely monitored with regard to animal health. There are few qualified veterinarians; and farmers do not tend to call a vet in case of problems. Calba *et al.* (2015) have studied this situation with regard to the confidence that farmers have in the system for monitoring African swine fever in Corsica.

<sup>(6)</sup> An example from the second workshop: a farmer declared, “I prefer giving shots to my pigs. Veterinarians in Corsica don’t know how to do it.”

During the meeting for reporting the new set of arrangements to the FRGDS executive board in July 2017, the group advocated this new approach to managing Aujeszky’s disease: “*We have to try it.*” “*It’s a new approach.*” “*It might make the profession aware of health problems and organize to handle them.*” Such declarations reflect the enrollment of actors who wanted to pursue the fight against the disease and accepted the possibility of an approach that was not classical.

## Discussion: Reinventing the situation to be managed and changing its geographical scale

The rationalization of managerial actions on a geographical scale was meaningful to stakeholders. This key factor for enrolling them in the program can be helpful for thinking about how to apply the “new health governance” locally.

### The scale suitable for managerial actions

During this process, the situation to be managed evolved (GIRIN 1990). The participants (e.g., farmers concerned by the decisions) were different from those who took part in previous programs. The actions to be undertaken had new properties (methods for administering the vaccine, operations adapted by type of farm). The scope in terms of place (microregions) and time (advancing step by step) was altered. The task of assessment was now an activity distributed among state authorities, farmers, etc. In cases of uncertainty, a survey was carried out to gradually reduce the uncertainty by focusing on what was manageable. The situation to be managed was thus reinvented, in particular through intense activity for making sense (JOURNÉ & RAULET-CROSET 2008). In addition, our research-intervention produced knowledge about how to work out a compromise on the geographical scale of actions. The scale of the microregion of animal husbandry emerged in between farms and the whole island.

This compromise provided leverage for making the set of arrangements operational and enrolling participants. The changed scale in terms of space (actions in microregions) and time (microregion by micro region), thanks to what might be a “ratchet effect”, stimulated the enrollment of actors, in particular the “recipients” of state interventions (namely the farmers and veterinarians supporting the new arrangements). To the best of our knowledge, no study has shown the change of geographical scale to be so important for stimulating enrollment in a group of heterogeneous persons, nor for revealing the outcome of the process of translation.

By redefining the situation to be managed, this approach enabled the group to move from a stalemate, in which health authorities claimed that Aujeszky’s disease was unmanageable in Corsica (AFSSA 2009), to a situation where eradication became, once again, a possibility owing to this “reinvention” and reorganization of the situation to be managed, the main element therein being the zoning to define microregions. While attention

Table 4: Excerpts from the workshops

	Construction of the history of a semi-failure	Reinventing the situation to be managed: group agreement on the objective	The microregion as the scale for management	The enrollment of actors on the microregional scale
Workshop 1 (11/6/2015)	— “From the DGAL’s viewpoint [...] they see that half the farmers dropped out during the plan, and they’re going call it a failure” (DDCSPP).	— “There’s a problem with the farmers’ group and its representation” (a farmer).		
Workshop 2 (10/7/2015)		— “If the objective is eradication, then all animals have to be vaccinated from the start. If we try to control the disease, we can vaccinate breeders alone” (INRA technician).	— “If a farmer vaccinates, then his neighbors have to vaccinate too” (veterinarian). — “Me, I can vaccinate, but I know there’re pigs from owners who aren’t declared there where my pigs graze” (a farmer).	
Workshop 3 (10/8/2015)		— “The state will financially back this plan only if it aims at eradication” (SRAL). — “If the aim is not to eradicate the disease in Corsica, I don’t see why we’re here” (farmer).	— “We made the plan for farms to be geographically represented. As a result, we were scattered out. We were never able to organize a meeting with all farmers” (FRGDS). — “The disease is transmitted by contact, snout to snout or sexual. We showed that animals from different herds shared grazing land — with wild boars” (INRA engineer).	
Workshop 4 (27/4/2016)			— “We can go see our neighbors, or even farmers in other areas, to explain and maybe even lend them a hand during vaccination” (farmer).	
Workshop 5 (30/5/2016)			— “I think two out of my three neighbors are ready to take part if asked” (farmer). — “If we have the means to vaccinate by ourselves, if there’s no vet in the zone, we can make do” (farmer).	— “It’s a new approach” (SRAL). — “We can make the databases for the microregions in each department” (DDCSPP). — “I can take part in the local steering committee” (several farmers).
Workshop 6 (28/7/2016)			— “Since we didn’t manage to have reliable data on production gains during the plan, we can take as basis, during local meetings, the testimony from farmers who completed the plan. That might be more effective” (FRGDS).	— “We can propose visits to our herd, and we can do systematic screening” (agricultural high school).
Meeting for presenting the findings (10/8/2017)			— “Awareness meetings shouldn’t be held in Corte, Bastia or Ajaccio. You have to bring together a few farmers in the village reception hall [...] And there has to be a maximum of us, to show that it’s a program supported by a group of organizations and not the program of the state, INRA or FRGDS” (INRA engineer).	— “During microregional meetings, Aujeszky’s disease has to be connected with other pig health problems in order to really arouse farmers’ interests. And that might lead everyone in the pork industry to be attentive” (FRGDS).

has often been drawn to the relevance of small-scale operations for solving environmental or, more broadly, economic problems (respectively: WCED 1987, SCHUMACHER 1978), emphasis has also been laid on scale as a promising way to settle problems of governance and collective action through concepts such as “polycentric governance” (OSTROM 2010).

### Implications for the “new health governance”

Beyond our case study, these findings shed light on the reasons why the previous managerial plans launched by health authorities had failed or not been up to par (BARBIER 2006, BRONNER et al. 2014). They provide food for thought about the adoption of a new health governance (GUÉRIAUX et al. 2012), a policy that expresses the French state’s determination to “regionalize” decision-making and overhaul the health management system. In effect, this new governance provides for passing from a “health police logic”, steered with classical public policy instruments in the regions (prefectoral orders, veterinarian health mandates, etc.) to a managerial logic based on collectively reinventing what is to be managed and on new modalities of public action: instruments (prefectoral orders, databases, assessment criteria, etc.), geography (microregions vs. administrative bounds), the time scale (for monitoring), the role of public agents in various operations (awareness campaigns and steering committees), the organization (microregional steering committees), and too the legitimation of local actors. With regard to this last point, the pig farmers who “headed networks” were representatives neither of the farms with the AOC label, nor of the local association of pork farmers, who are the legitimate contacts of the state in this Corsican industry.

By inquiring into the forms of interactions between public managers and local stakeholders, our research has shown how the situation to be managed is constructed on the basis of not just knowledge in epidemiology but also contextualized sociotechnical know-how. Although the set of proposed arrangements is yet to be tested, this approach has opened the way toward moving beyond a stalemate without any acceptable solution for managers. A few methods stand out for this bottom-up construction of a set of arrangements for managing health situations. In this construction, interactions between participants hinged on: the deconstruction of the previous arrangements (open exchanges), the feedback to participants (tree diagrams for problem-solving, the solutions imagined, open options) and then the enrollment of stakeholders in a process of “closure” around the operational choices made (STIRLING 2007): the choice of objectives, the definition of actions in relation to the geographical bounds of operations, the self-assignment of roles, collective validation, and so forth.

A final point: “classical” managerial methods rely on coordination between the public administration, veterinarians (with a health mandate) and the GDS (in a support role), all this in a vertical organization where veterinarians are the channel (and even beneficiary) of the sectoral policy for managing regulated diseases (BONNAUD & FORTANE 2018). Making animal health management operational thus mainly depends on the geographical distribution and operation of veterinary offices in relation to farms and herds. The new setup is proposing a more complicated coordination (the number and diversity of roles, distributed responsibilities, etc.). This is possible owing to the rationalization of managerial actions on the smallest scale, which has taken the concrete form of the local steering committees that bring together a much broader range of actors in decision-making.

### Conclusion

In a stalemate where classical managerial instruments did not work, we experimented with a participatory approach that enabled us to deconstruct the presumably unmanageable nature of the Aujeszky’s disease situation in Corsica and to make new forms of management possible. Along with a group of diverse persons (who were often on opposite sides during animal health crises — farmers, hunters, veterinarians, public health services, etc.), we constructed a joint framework for, on the one hand, elucidating and sharing ideas about the failures of previous programs (in both their design and application) and, on the other hand, co-constructing an original strategy for a joint experiment. During this process, the reinvention of the situation to be managed (the Aujeszky’s disease situation) helped us formalize a series of complex problems, some of them having been “overlooked” in “classical” managerial arrangements. For an operational handling of these problems, our approach brought to light a key point that strongly affected enrollment: the change of the geographical scale for working out the actions to be conducted. This result opens further perspectives for research while pointing out the managerial implications of arrangements for handling diseases. This, in turn, opens perspectives for reinventing the situation to be managed during crises or in disrupted socio-environmental systems.

Our study thus points out how the plasticity of the concept of a “situation to be managed” is of interest for tackling complex problems with many stakeholders in geographical areas where public managerial instruments are intensively tried out before being trusted. In a context where forms of public management are changing, our study has shown the interest of using a territory like Corsica as a testing place for an original means of management.

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