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Governing by ignoring

The production and the function of the under-reporting of farm-workers' pesticide poisoning in French and Californian regulations

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Introduction

Large areas of uncertainty still surround the relationship between environmental exposure to toxic materials, on the one hand, and human health, on the other. Several historical accounts have recently shown that this state of ignorance is not only due to the complex *nature* of the interactions between toxic agents and human bodies. Most of these accounts cast light on the strategies set up by big corporations to hide the dangers of the toxic materials they use, sell or dispose of in the environment. The cases of tobacco smoke (Proctor 2012), global warming (Oreskes and Conway, 2010) and toxic chemicals (Markowitz and Rosner, 2003) provide evidence of these strategies contributing to the "social production of ignorance" over environmental health issues. Until now, these accounts have tended to focus on how industry draws on specific networks of scientists, politicians and experts in regulating agencies to produce doubts about the harmfulness of their products. These approaches tend to limit the role of governing bodies to that of organizations "captured" by private interests (McGarity and Wagner 2008). In so doing, they overlook the fact that for governing bodies, ignorance can have a value in and of itself. For instance, it helps the contemporary state to reduce complex issues (Scott 1998) so as to make them "governable" (Foucault 2004). Recent environmental health studies support this thesis. The cases of indoor air pollution (Murphy 2006), of pesticides' effects on bees (Kleinman and Suryanarayanan 2013), and of the consequences of human exposure to chemicals in the soils of post-Katrina New Orleans (Frickel and Vincent 2007), show that ignorance is a useful resource for the control of toxic chemicals in the environment.

The aim of this chapter is to push further this idea by examining the ways in which public authorities legitimize and maintain ignorance over long periods of time in the field of environmental health. From an organizational and a comparative international perspective, based on the

cases of France and California, this chapter highlights the usefulness of ignorance for the bodies which regulate pesticide occupational hazards. In those two agricultural regions, specific surveillance programs have been set up by regulatory agencies to monitor the impact of agricultural pesticides on the health of workers and/or residents. Yet, in spite of many suspicions expressed by scientists and advocacy groups, it is still difficult to know whether the daily use of pesticides causes serious illnesses among farm-workers or not. Part of this difficulty of "knowing" comes from the massive under-reporting encountered by these official surveillance programs. After justifying the need for international comparison to understand the mechanisms that produce ignorance (part I), we suggest that the under-reporting of occupational pesticide poisoning is partly produced by the organizational characteristics of the surveillance programs that are supposed to monitor them (part II). Thus, regulatory principles, risk assessment routines and the division of work between public agencies undermine the capacity of these programs to collect relevant data. Finally, we reflect on the function that this "organized" ignorance plays in the pesticide regulation systems, arguing that it is a means to solve some of the regulatory inconsistencies underpinning those systems (part III). This functionalist view leads us to interpret ignorance as a mean to preserve a given social order, an insight inspired by Douglas's perspective on taboos (1966).

France and California: a similar gap in official data on pesticide-related occupational illnesses

Organization and ignorance

Pesticide poisoning among farm-workers is recognized to be largely under-reported both in France[1] and in California (Das et al. 2001). In both cases, official surveillance programs do exist, but have registered an average of only one or two hundred cases of occupational poisoning per year over the last decade.[2] This is a very low figure considering that about one million farm-workers are exposed to pesticides in France and in California. Drawing on the Californian case, Harrison (2011) and Cunningham-Parmeter (2004) stress that this under-reporting is largely due to the characteristics of the people exposed to pesticides. Californian agriculture employs a large undocumented migrant workforce, and researchers generally link inadequate action on pesticides-related illnesses to the inability of this population deprived of many political rights to confront employers or make claims to the government. A comparison with the French situation encourages us, however, to widen the analysis beyond the focus on the dominated status of farm-workers. French agriculture relies much less on immigrant farm-workers than on farm owners themselves. French farms are organized as small businesses where farmers are their own employers and constitute the majority of the agricultural workforce. This workforce is highly heterogeneous, but it certainly cannot be reduced to a dominated population. It thus appears that the social characteristics of the workforce exposed to pesticides cannot suffice to explain the under-reporting of occupational pesticide poisoning.

International comparison between France and California encourages us to study the organizational design of the policy systems set up to regulate and monitor the use of pesticides. Rather than focusing on the differences between European and American "styles of regulation" (Vogel 1986) or "civic epistemologies" (Jasanoff 2004), we examine similarities in the risk regulation regimes in these two cases (Hood et al. 2001). Despite their regulatory differences, the French and Californian systems have very similar ways of assessing and controlling occupational pesticide poisoning. Considering that the two regulatory systems share many characteristics and face the same under-reporting issue, it is possible to

draw the assumption that the source of under-reporting is – at least partly – located in the institutional design of policy tools used to identify and control pesticide poisoning among farm-workers.

Risk assessment and official monitoring programs

To understand how monitoring programs contribute to maintaining ignorance, it is necessary to briefly consider the regulatory system's main principles and rules for controlling chemical hazards in agriculture. The French and Californian systems both rely on a pre-market authorization based on an *ex ante* risk assessment procedure and on post-market surveillance programs to identify potential harmful effects of authorized substances on workers' health.

Firms that manufacture chemicals used to control "pests"[3] need to obtain an authorization issued by public authorities. This authorization is given on the basis of a risk assessment procedure. In California, the Department of Pesticide Regulation (DPR), which is in charge of pesticide regulation, performs the "first registration process" according to standards set up by the federal Environmental Protection Agency (EPA). In France, the "Agency for Food, Environmental and Occupational Health and Safety" (ANSES) is in charge of pesticide risk assessment, while the Ministry of Agriculture delivers the pre-market authorization. Based on this assessment, officials establish guidelines for "the safe use" of authorized pesticides, which have to appear on the label of each product sold.

Once the pesticide is on the market, public authorities implement programs to monitor its possible negative outcomes on health and the environment. Regarding occupational safety issues, France and California have set up surveillance programs to monitor pesticide-related illnesses and injuries among farm-workers. Both of these programs are "passive" systems, insofar they rely on different sources (physicians, poisoning center) to gather information about cases of poisoning and the symptoms. The report of a poisoning triggers an official investigation into the precise circumstances of the poisoning. The French pesticide poisoning monitoring network, called "Phy'attitude", is governed by the "Mutualité sociale agricole" (MSA), the administrative body in charge of farmers' social security system. The monitoring system gives a key role to MSA occupational physicians. Those doctors are supposed to report any occupational pesticide poisoning they are aware of, with the victim's authorization, to a group of toxicologists. The toxicologists decide whether or not the reported symptoms can be attributed to an exposure to pesticides. In California, the state runs two surveillance programs. The main one, considering the number of cases reported, is the "Pesticide related illness surveillance program" (PISP). This program was set up by the DPR to ensure that all incidents related to pesticide exposure, either of farmers or of the population living nearby, are reported. The PISP data are collected through various sources (mainly physicians, hospitals and poisoning centers), and serve to launch an investigation process to determine the circumstances of the poisoning. This process is led by County Agricultural Commissioners (CAC), who are local officials appointed in each of the 58 counties of California by an elected supervisory board for 4 years, with the mission to ensure local agricultural law enforcement. The second surveillance program is the "Tracking pesticide related illnesses and injury" program set up by the occupational health branch of the California Department of Public Health. Its function is slightly different from that of the PISP, in the sense that it only looks for information on occupational health issues, with the goal of improving workers' health and safety provisions.

All these monitoring programs codify the pesticide-related incidents they record in databases, and are supposed to help public authorities to take measures to reinforce workers' safety and to make regulatory changes regarding the control of pesticides. For instance, observing a string of

intoxications related to a same product over a short period of time could encourage authorities to restrict the use of this product. This could entail light regulatory change such as the modification of the "safe use" guidelines on the product's labels (e.g. recommending the use of gloves when manipulating the product) or more substantial change, such as the banning of the use of a pesticide on some or on all crops. Yet such restrictive measures are rarely taken, due to the small number of cases these programs are able to identify each year.

The official production of ignorance: the reductionism of organizational data

In this section we focus on two specific mechanisms that undermine the capacity of pesticide surveillance programs to collect data on the harmful effects of these substances on farm-workers' health. First, we show that the design of regulatory schemes aimed at controlling pesticides actually induces an implicit framing of occupational poisonings as the result of mistakes committed by farm-workers, and the farmers' consequent unwillingness to report them. Second, we suggest that the division of work between official agencies in charge of pesticide regulation compounds the difficulties of pesticide poisoning reporting.

Errors and violations: how pesticide poisonings become invisible

Policy tools often incorporate implicit views and assumptions on the objects they are supposed to govern. Such is the case for the pre-market and post-market tools used in France and in California to control the dangers of pesticides. They promote an implicit view of occupational pesticide poisonings as consequences of the errors made by the farm-workers themselves. This framing makes it very difficult for those workers to report on the problems they may encounter when using these substances in the fields.

In the French regulatory regime, the *ex ante* risk assessment procedure entails the calculation of the "acceptable operator exposure level" (AOEL based on *in vivo* tests on rodents) for each product, and the calculation of the predictable level of exposure for the farm-workers who will use the product. This level is calculated from models which take into account several parameters, such as climatic conditions, quantity of product used per hectare, type of spraying, etc. If the predicted level of exposure is considered "unacceptable", the firm wishing to put the pesticide on the market can suggest protective gear (gloves, masks, coveralls) so as to reduce the level of exposure below an acceptable limit. The degree of protection of such gear is also pre-defined by the exposure assessment models. If the pesticide manufacturer convinces the risk assessment agency that exposure will not exceed the AOEL, the product may be authorized. It then has to be sold with a label describing all the conditions necessary for its "safe use", including protective gear.

This regulatory regime puts the onus of protection on the final user of the product, namely the farmer or agricultural worker, and implicitly promotes the view that "a product correctly used doesn't cause an accident".[4] Several recent epidemiological (Baldi et al., 2010) and ergonomic (Garrigou et al., 2008) studies have underlined the limits of this regulatory approach, demonstrating the flaws and inappropriateness of the gear available to protect the workers against pesticides. Despite these studies, the "safe use" logical expresses the bottom line of French policies to prevent occupational diseases linked to pesticide use. When a pesticide poisoning case is reported through the Phty'attitude program, agents of the Mutualité sociale agricole have to investigate so as to establish its causes. They mostly do so by trying to identify the errors the farmer made when using the

pesticide. In particular, they investigate whether the farmer was wearing protective gear or not. Phyt'attitude reports insist that most of these accidents could have been avoided had the farm-workers worn the appropriate gear and paid more attention to the caution on the pesticide labels: "Among the contaminated farmers, 62% were not wearing gloves. Three circumstances of frequent intoxication: incident on the material, the preparation of the slurry and the work on the plot after treatment."[5] Like most of the agents involved in pre-market and post-market control of occupational pesticide poisoning, they tend to overlook the limits of protective gear and adopt an "error paradigm" perspective. This makes it very difficult for the farm-workers, whose responsibility is brought to the fore, to consult the MSA doctor in order to report an "incident" due to pesticide exposure. Their difficulty is compounded by the fact that the MSA physician needs to have complete details on the causes of the incident if this report is to be validated by the chief toxicologists.

In California, the "safe use" paradigm is also a central tenet of the regulatory system. The Californian DPR agents in charge of the surveillance program often argue that the "label is the law", suggesting that regulatory guidelines are enough to ensure workers' safety if they are followed. The extensive use of casual farm laborers has prompted the authorities to delineate the responsibilities of the employer growers. For instance, the federal Worker Protection Standard (WPS) requires growers to provide their employees with safety training and information on pesticide hazards.[6] Any poisoning involving pesticides is therefore likely to be considered as the result of a violation for which the grower might be deemed responsible. In the agricultural counties this puts high pressure on the County Agriculture Commissioners on whom the investigation of the pesticide-related incident relies. Appointed by local elected boards that are careful to protect the growers' interests, they must reconcile their state law enforcement mission with local political concerns, and take into account the agricultural industry's reliance on pesticides.[7] Reporting and investigating on pesticide poisonings can consequently be a sensitive task.

To reconcile these different components, the CACs report and investigate mostly those poisoning cases that might draw "negative publicity" both for themselves and for the growers concerned. Such "sensitive" cases generally involve a large number of victims, whether they are people living near the fields or large crews of poisoned workers, and are often the result of "drift" phenomena from pesticide spray, mist, fumes or odors carried from the target site by air. PISP reports illustrate the tendency of the surveillance program to focus on "drift" events and to interpret those events as accidents resulting from careless pesticide use:

> In 2010, pesticide drift was associated with 115 (83%) of 139 fieldworker illnesses in twelve separate episodes (. . .) Severe intoxications typically result from careless and often illegal use of pesticides. Using pesticides in excess of the specified application rate, besides being a violation of state and federal laws, greatly increases hazards to health without comparable improvement in efficacy.

CACS have no choice but to report and investigate "sensitive cases", which can draw the attention of local media or other officials. They have to show that local authorities are dealing with the situation, and once the investigation has been launched they have to verify that the growers concerned complied with the regulations. It is therefore also in the growers' interests to report those "sensitive cases" quickly, as this is seen as a sign of good will and is likely to be taken into account in the decision concerning their fine.[8]

These "drift" cases are, moreover, often caused by exceptional weather conditions that are very difficult to foresee and avoid. This leaves room for the CAC to decide on the extent to

which a violation has been committed by the grower, as the following case from the 2010 PISP report illustrates:

> Five hours after an application began, 32 fieldworkers arrived at a field to harvest strawberries about 1200 feet away from an ongoing insecticide treatment to a nearby field. Thirty-one of the workers reported that an odor from the neighboring application bothered them. The crew was moved away from the odor and finished the harvest from the previous day. As the fieldworkers continued to work, two workers' symptoms persisted. The farm manager, who was aware of the application and odor, told the 10 workers they could seek care if their symptoms persisted. In all, 22 fieldworkers reported symptoms and only the two who reported persistent symptoms were taken for care.The growers were cited for failure to take their employees for medical management. The records did not include the use of the pesticide involved, fenpyroximate. On interviews of the applicator, mixer/loader and supervisors, they said the insecticide applied was new to them. Weather station data showed wind was blowing between 3–7.7 mph southwest, towards the direction of the harvest crew.[9]

By investigating cases caused by exceptional circumstances, the CAC makes sure that he is fulfilling his law enforcement mission without interfering too much in the farm's business. The CAC can conclude that there has been a violation of the law, but such cases are rare, considering the small number of fines issued, as the report "Field of poison" by Californian advocacy groups noted.[10] In short, the reporting of pesticide drifts is the only politically acceptable form of pesticide poisoning reporting in California. In contrast, pesticide poisonings involving only one or two farm-workers have very little chance of making their way through the CAC agenda. This "blind spot" is worsened by the particular law enforcement focus: by referring to compliance with the guidelines given by the federal Worker Protection Standard (WPS), the CAC makes sure that the law is abided by at a collective level (the weather conditions required for pesticide spraying or fumigation, specific information and training regarding pesticide use and so forth). As we will see below, the other surveillance program set up by the California Department of Public Health (CDPH) records incidents related to individual handlers. However, the number of these cases reported each year (approximately 150 per year during the 1998–2007 period)[11] through that program is even smaller than on the PISP. With such small numbers of cases, general trends regarding the individual poisoning of handlers cannot be identified.

A "structural" ignorance

The division of work is recognized as a source of "structural secrecy" (Vaughan 1996) within organizations, and has been put forward to explain mainly organizational failures. The specialization of tasks within organized systems, combined with organizational practices and social and geographical distances between agents, are clues to identify potential problems or warning signals. This can be applied to the under-reporting of pesticide-related poisoning both in France and in California.

In California, the specialization between two distinct agencies in charge of pesticide surveillance programs, the DPR and the CDPH, is an obstacle to adequate data collection. In spite of their similarities, the two programs differ in several respects. First, they rely on different sources of information. The CDPH's program relies mainly on the "doctor first reports", the medical files constituted for the workers' compensation system in case of an occupational injury. This source primarily concerns other kinds of accidents. The 1998–2004 CDPH surveillance program report established that of the 1,605 known pesticide accidents, the majority stemmed from routine work

(60.1 percent) and the application of pesticides (22 percent). The CDPH program also draws on the few post-accident investigations it is able to make after the reporting of an accident involving pesticides. Thus, whereas the DPR's PISP pays attention to cases involving numerous victims, the CDPH surveillance program spotlights individual workers handling pesticides.

A few years ago the CDPH and the DPR decided to share their data during monthly meetings so as to make their own analysis more accurate and robust. In fact, each department has access to specific information which could improve the surveillance activities of the other department. For instance, the DPR is keenly interested in the doctor first reports that the CDPH receives, which provide valuable information on the medical background of the victims. In turn, due to its limited human resources, the CDPH can investigate only superficially the cases of pesticide poisoning that it records, and may be interested in the *in situ* information contained in the CACs' investigation reports.

The different focus and target of the two agencies limit data sharing. As the CDPH targets individuals, it is unlikely to find the information it seeks, insofar as the CAC focuses on law enforcement at a collective level. For instance, the CDPH will want to know whether an injured handler was wearing his protective suit, whereas the DPR will verify whether the pesticide fumigation was authorized or whether the pesticide spray was used in the required weather conditions. In addition, the fear of losing control over a public policy field inhibits information sharing. According to CDPH agents, the DPR is sometimes not willing to provide information such as the name of the product involved in the poisoning. Likewise, the DPR does not let CDPH agents investigate on farms. As a CDPH physicians explains: "This is crazy, every time we try to investigate on a farm, we receive a phone call from DPR saying 'what the hell are you doing here?' I don't know, they must have spies all around."[12] Due to these challenges, information is shared with difficulty, and data gaps on pesticide poisonings remain numerous. These barriers explain why the PISP program remains the main source of information on pesticide-related illnesses. As a consequence and despite CDPH concerns, very little is known about the poisoning of the workers who handle pesticides on a day-to-day basis.

In France, the division of work between regulatory agencies worsens under-reporting in a different way, through a mechanism of responsibility fragmentation. Two agencies can officially be involved in post-market surveillance, the MSA and the ANSES. The MSA runs the Phyt'attitude program. Its officials are aware that their surveillance program largely under-reports pesticide poisoning of farmers. On many occasions they have stressed that this program cannot be the sole tool bearing the responsibility for ongoing post-market occupational health and safety surveillance. The ANSES, in charge of pre-market authorization, can also participate in improving surveillance by asking more systematically for complementary field studies of workers' exposure to the industry. However, the agency rarely makes such requests. In fact, ANSES experts generally hesitate to ask for more data once the pesticide is on the market because it would delay the first-registration processes handled by the agency, which are a priority. Instead, ANSES' experts, as well as firms manufacturing pesticides, argue that there is no need to provide such studies during the first registration. Both rely on the MSA Phyt'attitude surveillance program to substantiate their claim that there is no need for further data.[13] In short, the division of labor between the MSA and the ANSES allows both agencies to shift the burden of responsibility for the data gap onto each other. In other words, organizational specialization entails a fragmentation of responsibility that tends to legitimize under-reporting.

The function of ignorance: solving regulatory inconsistencies

So far we have underlined the fact that the under-reporting of occupational pesticide poisoning has various organizational and institutional sources in France and in California. We will

now broaden our focus to show that, though it has different explanations, the downplaying of pesticides' harmful effects is a means to ensure the stability and legitimacy of the risk regulatory regime framework that France and California share.

Uncomfortable knowledge for risk assessment

Risk assessment procedures rely heavily on toxicological knowledge and data to bring dangers into the realm of the knowable and measurable. They may nevertheless be at odds with certain forms of knowledge in which hazards are not readily translatable into assessable risks, and which tend instead to emphasize the uncertainty characterizing the risks. Social scientists who work on risk issues are familiar with this feeling that their knowledge is disregarded and considered to be bothersome by the institutions in charge of the assessment and management of those risks. Such "uncomfortable knowledge" (Rayner 2012) may also be produced by surveillance systems, as the case of pesticide risk assessment in France and in California illustrates. We suggest that really efficient surveillance programs in these two cases would bring to light data that would be too abrasive for the routines of pesticide risk assessment. Despite their current limitations, these programs already produce uncomfortable data. At the beginning of the last decade, for instance, the MSA Phyt'attitude program recorded several poisoning cases occurring during farm-workers "reentry" into treated fields. These data cast light on the gaps in the risk assessment procedure on that issue, and led to additional provisions regarding reentry intervals in the risk management process in 2006. Apple growers protested loudly against this regulatory change.

Apart from these immediate political costs, producing "too much" knowledge on farm-workers' pesticide poisoning could challenge the implicit assumptions on which policies to control those substances are based. Whereas these policies rely on the idea that occupational pesticide poisoning occurs as "discrete" (Nash 2004) and rather exceptional events, more accurate surveillance data might demonstrate that they are ubiquitous and barely preventable through guidelines and rules for safe use. They may also cast light on the limitations of the models used for risk assessment, by comparing them to other methods such as the ergonomic study of the actual daily tasks of exposed workers. Such data can appear through official surveillance programs but not exclusively. Physicians or other officials can also investigate on pesticide exposure and produce uncomfortable results that lead to significant regulatory changes. In France in 2001, an exposure study conducted by MSA agents showed that farmers were dangerously exposed to a particular form of sodium arsenite, a pesticide used in wine production to fight a mushroom attacking the grapevine. The study highlighted that farm-workers were contaminated by this carcinogenic pesticide even though they were wearing their protective equipment and following the "safe use" guidelines correctly. The results of this study, confirmed by Phyt'attitude data, led to the banning of this pesticide in 2001. Grape growers were furious about this decision because there was no alternative chemical to fight this plant disease. In California, in early 2010, two fruit quality inspectors sought care for similar symptoms after assessing Chilean grape imports. Upon arrival in the US, grapes are required to be treated with the fumigant methyl bromide (MeBr). The inspectors visited their physicians for neurological symptoms such as dizziness, memory disorders and difficulty walking. Medical evaluations confirmed they had MeBr poisoning. In response, Californian cold storage facilities installed methyl bromide monitoring devices and implemented various exposure control protocols such as ventilation, work hour restrictions and pre-purging of trailers before off-loading. Workers were educated on the situation through training and posting.[14] These results demonstrate the significant gap existing between "theoretical" risk assessment and the reality of exposure.

The "double" utility of under-reporting

Under-reporting can thus be considered as a resource for French and Californian policies on the assessment and management of pesticide-related occupational hazards. It does not preclude agricultural business' strong reliance on chemicals, yet it maintains the illusion that the surveillance of pesticides is effective. With so few reported pesticide poisonings among farm-workers, changes in risk assessment and risk management procedures can only be incremental. Paradoxically, the inability of the regulatory system to produce effective surveillance data is a condition of its survival and legitimacy. Public authorities claim that surveillance programs play their role and can lead to regulatory changes. Thus, though exceptional, the rare examples of cases of regulatory change linked to surveillance data allow public authorities to believe in the usefulness of these monitoring programs. As Harrison (2011) notes, officials in charge of pesticide regulation have a contradictory discourse: whereas they acknowledge the fact that pesticide poisonings among farm-workers are underestimated by surveillance programs, they also point to the low figures of occupational injuries related to those products to reaffirm that they can be used safely. This ambiguity structures the institutional perspective through which public authorities notice and take into consideration the limitations of policies aimed at controlling pesticides in the workplace. These limitations are never considered as a symptom of political failure, but as the sign that there is still room for improvement within the regulatory system.

In short, the under-reporting of pesticide poisoning among farm-workers has a key function for the regulatory system: it helps to solve regulatory inconsistencies linked to the fact that experts and policymakers are confronted with two contradictory missions as far as pesticide control is concerned. On the one hand, they have to ensure effective pest control and protection of crops; on the other, they have to make sure that pesticides do not endanger farm-workers' health. Pushing knowledge production on occupational pesticide poisonings and their causes too far bears the risk of upsetting the tacit equilibrium between those two goals. Thus, it is necessary "not to know too much" about pesticide poisonings if those substances are to be governable. Ignorance can be viewed as a way to maintain a complex social compromise that supports intensive models of agricultural production.

Conclusion: ignorance and social order

This chapter has highlighted the relationship between ignorance and official regulation of environmental issues such as pesticides. The international comparison of regulatory risk regimes in agriculture shows that ignorance is both the outcome of a "machinery" of pesticide risk regulation (Kickert 1993; Rhodes 1997) and a means to ensure its legitimacy. As Moore and Tumin (1949) established, and prior to them Simmel with regard to secrecy (1906), ignorance has a social function. In Moore and Tumin's words, ignorance is not "an analytic element but rather a more or less hidden component of situations generally discussed in other terms . . . It may be viewed as an element or a condition of a circumscribed system" (1949: 795). In this instance it maintains a complex equilibrium between agricultural economic concerns and environmental and workers' protection underpinning the principles and rules of risk regulation. Pushing this idea further, the social production of ignorance appears to be close to Douglas's insight on taboo. In *Purity and Danger* (1966), Douglas analyses pollution and taboo in relation to the whole social structure. She argues that these phenomena have not only an instrumental function (influencing one another's behavior), but also a fundamental symbolic function: the fear of sex and bodily pollution reflects hierarchies and boundaries, and helps maintain the social order.

In our case, the order is a political one. It concerns the way of regulating chemicals in agriculture, defined as "controlled use". This policy suggests that chemicals which are known to be dangerous for human health are safe as long as they are handled correctly. The rules and principles shaping risk regulatory regimes ensure the boundaries of this order by imposing the definition of pesticide poisoning in terms of acute and reversible effects, and as the consequence of an accident in which no one was responsible. "Not knowing" about the heterogeneous and concrete ways in which pesticide poisoning occurs among farm-workers can therefore be interpreted as a means to maintain the agricultural "political order". The question of how this regulatory system is so well designed to maintain ignorance remains open. To what extent is it the unintended outcome of an institutional process of risk assessment framing? An historic perspective on these organizational regulatory systems should be able to provide answers to that question.

Notes

1 N. Bonnefoy (rapporteur) (2013). Pesticides, vers le risque 0. Mission commune d'information sur les pesticides et leur impact sur la santé. Rapport d'information pour le Senat n°42. ("Pesticides toward risk 0. Information mission on pesticides and their impact on health". Information mission for the Senate, Report n°42).
2 Average figure calculated from annual reports of the Pesticide Illness Surveillance Program of the Department of Pesticide Regulation (DPR) in California and the Phyt'attitude reports of the Mutualité sociale agricole in France.
3 Generic term given to insects and plant diseases that attack crops.
4 Interview with the General Director of UIPP in *20 minutes*, December 12, 2011.
5 http://www.msa.fr/lfr/phyt-attitude (free translation).
6 Such as the fields treated by pesticides, emergency medical facilities, etc.
7 This statement varies from county to county. Our data suggest that it depends of the sensibilities of each elected member of the board. Nevertheless, and to simplify our demonstration, we will base our analysis on the "rural" counties, those of the central Valley (Tulare, San Joaquin, Kern, etc.), in which agricultural business do play a key role.
8 The amount of the fine can be very high. It could reach 5,000 dollars per violation and/or per person intoxicated.
9 Ibid., p. 9.
10 In 2000, a majority of moderate fines (from $151 to $400) were issued by the CAC. In spite of the age of these data, they reflect the same political concerns by the CAC and growers. M. Reeves, A. Katten, and M. Guzman (2000), "Field of poison: Californian farm-workers and pesticides", One in a series of report of Californian for Pesticides reforms, p. 6.
11 Occupational pesticide illnesses in California 1998–2007.
12 Interview with a CDPH agent, August 2013.
13 The new 2014 "modernization of agriculture" law will probably modify this organizational structure, as it transfers to the ANSES the responsibility to run a proper post-market surveillance program for pesticides.
14 California Environmental Protection Agency: summary of results from the California pesticide illness surveillance program, 2013.

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