French Emergency Management System: Moving Toward an Integrated Risk Management Policy

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Introduction

The emergency management system in France is based on systematic risk assessment and risk management policies. These policies evolved mostly through European Union (EU) land use, environmental and industrial safety directives. Today, the European Union is moving towards becoming one nation with its social and economic systems including the possible adoption of one constitution. France acts as the leading EU nation that actively creates and enforces hazard risk management policies. The French emergency management system today is based on the notion that emergency management effectiveness needs the appraisal of social, economic and environmental risk acceptability by the public. This is achieved through examining casualties and damages from each and every major disaster, and learning and incorporating lessons from the failures into remedying policies. That does not mean, however that French emergency management system is perfect. There are lessons waiting to be learned and policies waiting to be improved.

This chapter explains the hazards that affect French mainland territories and how the emergency management policy evolved following some significant events.

Hazards and Vulnerabilities in France

The devastating French disasters are mainly climatic. Among them, floods are prevalent and have dramatic human and economic consequences. Floods have been the touchstone hazards that shaped emergency management policies in France as about one third of French mainland territory is subject to flooding risk. The second half of the 20th century has seen an elevated pattern of water-related disasters in France. The nature of these events changed from slow water risings of the rivers Louire and Seine, to highly destructive flashfloods in recently urbanized mountainous areas south of France. Another main natural hazard is the seismic activity involving the south-east of metropolitan French territory. More recently, in 2003, due to climatic changes, extensive heat waves caused massive number of deaths especially among the elderly people like never seen before.

On the other hand, France has historically been a target of Islamist terrorist events mainly bombing campaigns by outside terrorist organizations. However, there have been some frequent Corsican independent movement bombing events as well.

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Attention to the significance of industrial hazards has heightened during the last few decades. There is a heightened awareness towards long-term chronic public health risks such as soil contamination stemming from resettlement on abandoned gas plant sites, and quarries and mines converted into toxic landfills. Part of this new interest in the form of new directives and regulations came due to the 2001 AZF fertilizer plant explosion in Toulouse, and later the 2002 Erika and 2003 Prestige Tanker oil spills (see the next section about these disasters).

France has also seen numerous transportation accidents in the air, on land and at sea. One notable one was the crash of a Concorde airplane in 2000 which resulted in 113 deaths. It resulted in the end of the Concorde and was major setback to the era of supersonic flight.

Over many decades throughout its existence, France has endured two world wars and numerous wide spread epidemic disasters that cost millions of deaths and economic consequences. France has certainly had its share of disasters.

Ordinarily, the inhabitants of a country with such a long history of disasters develop some risk awareness which results in local specific strategies to reduce vulnerabilities. It is not the case in France, where risk culture is rare and where —in contrast to the US—you can find nothing like strong neighbor communities except in deep rural areas. In France, people's sensitivity to risk is usually either too low or too excessive. However, French people have the ability to easily compare and balance vulnerabilities and the benefits they can have living in a dangerous environment, choosing rationally to expose themselves or not. It is a kind of paradox.

One reason for this irony may be due to the fact that disasters in France are responsible for only few casualties but large financial and social costs. To back up this argument, statistics show that between years 1980 and 2008, 21,533 people have been killed due to natural disasters. 19,490 of these casualties (about 90%) were in one year alone during the 2003 extreme heat waves. Only about 2% people have been killed from other natural disasters (Preventionweb.net). On the other hand, total economic damages per year amount to a whopping 1 billion US dollars in France (PreventionWeb.net). See below for more statistics regarding French casualties according to type of disaster between years 1980 and 2008.

The History of Disasters

- **Historic earthquake disasters** (Quenet, 2005):
  - 1644 Vésubie valley earthquake – 350 deaths
  - 1708 Manosque earthquake – 900 deaths
  - 1887 Nice earthquake- 12 deaths
  - 1909 Lambesc earthquake – 40 deaths
- **Flooding disasters:**
  - Loire Valley Floods, in the years 1846, 1856, and 1866 caused extensive human and property damages as mentioned in Champion (1859).
  - Seine Valley Floods (1802, 1876 and 1910): The most severe event occurred in 1910. The rising of the Seine River after weeks of heavy rainfall drowned Paris under more than 8 m of water and had devastating social and economic consequences. Hundreds of thousands of people were

temporarily left homeless. Political tensions and struggles between the classes were put aside by the citizens in order to help rebuild the city until the world wars devastated it again. Parisians learned the art of rebuilding and need for resilience after the 1910 flooding disaster.

Over decades, floods in France have changed from classical slow water risings of the Louire and Seine to highly destructive flashfloods in recently urbanized mountainous areas south of France**.** Examples of more recent large flooding incidents include Nimes (1988), Vaison-la-Romaine (1992), the Aude (1999), and the Gard in 2002. For example, on September 8, 2002, 670 millimeters of rainfall occurred in Gard which is equal to more than 50% of an entire year's precipitation amount in just one day in that region, according to Feunteun et al (2000).

- **Terrorist events:**

France is unique in terms of its distribution of territory. It can be divided into three separate geographical groups: the French continent, Corsica and DOM-TOM (overseas departments and territories). The French continent is 213,010 sq mi and consists of 65,000,000 inhabitants while Corsica is 3,351sq mi and 302,000 inhabitants and the DOM-TOM are collectively home to 2,625,000 inhabitants. As can be seen, geography plays a large role in French terrorism for both logistical and ideological reasons (Lafree, n.d.). Since 1980, terrorist acts perpetrated on French soil have come from three fairly distinct types of groups (Shapiro & Bénédicte, 2003):

(1) Home grown radical leftist groups who are ideologically committed to overthrow the capitalist and American-led imperialist system. *Action Directe*, the most prominent of these groups was active between 1979 to 1987 but later lost popularity and was eventually closed down by French authorities. The group carried out some 50 attacks on French government buildings, military installations and the government of Israel. They carried out robberies, or "proletarian expropriation" actions, and assassinations, one of which involved killing the manager of French arms sales in 1985. They were also accused of killing the then head of the French automaker Renault in 1986. Although they denied it during their trial two women members were charged with his murder in March 1987 and were sentenced to life imprisonment in 1989. Two other Action Directe members were convicted as accomplices and also sentenced to life imprisonment.

(2) Regional separatist groups that advocate independence or autonomy of certain regions such as Corsica, Basque Country, and Brittany. In general, separatist violence is one of the key themes in French terrorism. They are the most consistent and persistent perpetrator of terrorist actors (Shapiro & Bénédicte, 2003). Corsican independentist terrorists have been active by engaging in coordinated multi-site attacks known as "blue nights." The Southwestern Basques also have been active; however, they do not play as big of a role as the Basques in Spain (LaFree, n.d.). These groups have evolved into criminal organizations, presenting an extremely difficult and challenging problem than that of purely politically motivated terrorism. Typical militant acts by the *Fronte di Liberazione Naziunale Corsu (*FLNC) are bombings, aggravated assault, armed bank robbery and extortion through 'revolutionary taxes,' and these actions are mostly aimed at public buildings, banks, touristic infrastructure, military buildings and other symbols of French control. Usually the attack is against buildings and infrastructure, and not against persons. The overwhelming majority of their

attacks on the French mainland take place in or around the cities of Nice, Marseilles and Avignon.

(3) International terrorism which is overwhelmingly of Middle Eastern origin. Although French authorities had vast experience dealing with leftist and separatist terrorism in the past, they had little familiarity with transnational and international terrorism until the 1980s.

In the early 1980s, French policy in Middle East conflicted with policies of Syria, Iran, and Libya, the principal state sponsors of terrorism in the Middle East (see Shapiro & Bénédicte, 2003). These three regimes worked in concert with Palestinian and Lebanese networks in France to attack French interests to alter its policies in the Middle East. The most devastating one was the October 1983 suicide bombing of the French contingent of the multinational force in Lebanon that killed 58 French troops. A simultaneous attack killed 242 US marines (Shapiro & Bénédicte, p.73). Palestinian conflict inflicted against French targets was manifested in the series of attacks in Paris in 1986. At least 14 attacks caused 11 deaths and more than 220 injuries. These were claimed by a relatively unknown group called the Committee for Solidarity with *Near Eastern Political Prisoners* (CSPPA) (Shapiro & Bénédicte, p.71).

A notable terrorist attack was the Orly Airport attack on July 15, 1983 which involved the bombing of a Turkish Airlines check-in counter at Orly Airport in Paris, by the Armenian militant organization ASALA as part of its campaign for the recognition of and reparations for the Armenian massacres. The attack killed 8 people and injured 55 (New York Times, 1983). French authorities effectively eliminated the group within months after the attack.

Another terrorist wave started after the Algerian civil war. A radical terrorist group named Armed Islamic Group (GIA) rallied all of the Algerian Islamist movements under its banner and gathered external support from Islamists from Tunisia, Libya, and Morocco. This group spread its actions into French citizens by hijacking French consular agents in 1993 in Algiers, but soon the perpetrators were arrested by French authorities. GIA then hijacked an Air France flight from Algiers to Paris in the Christmas of 1994. The French commandoes assaulted the plane on the tarmac in Marseille, killing the hijackers. Documents found in London showed that the terrorists intended to crash the plane over Paris, probably into Eiffel Tower (Shapiro & Bénédicte, p.80). Between July and October of 1995, a wave of other attacks have been carried out by GIA that killed 10 and wounded over 150. Within four months, French authorities were able to roll up GIA.

- **Industrial accidents/events:**
    - Montchanin waste disposal incident: An industrial waste landfill located within a residential area received 400,000 tons of toxic wastes between 1980 and mid 1988, in Montchanin, France. Triggered by odor nuisances caused by emissions of volatile organic compounds (VOCs), intense local community concern led to the decision to close the site in 1988.
    - 2001 AZF fertilizer plant explosion in Toulouse: The explosion of this agrochemical plant resulted in 26 deaths and hundreds of casualties. The explosion blew up roofs and buildings as far as downtown Tolouise while

a toxic cloud spread all over the conurbation. Due to prior planning based on earlier danger studies, warning, civil security and civil protection deployment and blockading of the roads, railways and airways were implemented successfully. However, the long term disaster recovery was not very well planned and it took many years to recover from the disaster.

  - 1999 *Erika* Tanker oil spill: The *Erika* tanker sank off the coast of France and the resulting oil spill impacted over 400 km of shoreline along five "departements" (local government areas) and the shoreline cleanup lasted more than two years. It is considered as one of the greatest environmental disasters of the world. More than 260,000 tons of oily waste was collected (Gouriou, 2003). The accident triggered new EU-legislation in terms of transport by sea.
  - 2002 *Prestige* Tanker oil spill: In 2002, the *Prestige* tanker sank off the Galician coast and the resulting oil spill impacted over 12 departements and caused great damage to fishing industry in Spain and France. Over 27,000 tons of waste was collected (Gouriou, 2003) and the estimated cost of the clean-up to the Galician coast alone is at €2.5 billion. Since the disaster, oil tankers similar to the *Prestige* have been directed away from the French and Spanish coastlines. Also, as a result, EU commissioners pushed for the ban of single-hulled tankers. The US and most other countries are phasing out single-hulled tankers by 2012.

- Heat waves: In August of 2003, excessive heat caused more than 14,000 deaths in mainland France. The temperatures rose up to 104 °F and suffocated especially vulnerable people like the elderly and sick in a country where air conditioning is rare (USA Today, 2003). Victims often lived alone and died in their apartments. The number of deaths is attributed to a lack of information about the heat wave in the media and the isolation of the elderly in the French society.

Disaster Policy

In the past, France emergency management system strictly distinguished between natural hazards (e.g. floods, landslides, fires, volcanic activity, and earthquakes) and man-made hazards that involve risks produced by industrial, agricultural activities and transportation hazards. While this differentiation seemed convenient, it also proved unrealistic over time (see Mancebo and Renda-Tanali, 2009). When an incident causes a disruption, no matter the cause of occurrence, it may lead to other significant hazards in a cascading manner. Research and evidence has shown that it would be more feasible to manage complex risks as a whole system rather than managing them according to incident type (see for example Godart et al, 2002). Thus, as a result of several different disaster incidents during the past couple of decades, and with an additional push from the EU, French policy evolved from disaster-specific risk management approach into complex risks approach.

Also, until the beginning of the 1970s, French public policy had a 'zero hazard' dogma that was centered around the idea that as long as enough money is invested in disaster risk mitigation, it was possible to live in an all safe universe. This Promethean attitude was based partly on a self-assurance rooted in a post-World War II technical advancement and demagoguery. It was also what could be called 'safety mongerism' which proved unrealistic. Once again, EU directives with the harsh reality of numerous

disasters (mainly floods) changed French policy (Cohen de Lara and Dron, 1998). Another accelerating factor for policy change was due to the 1970s oil embargo causing the abrupt ending of an incredibly prosperous period when there was money galore for everything.

A more pragmatic approach was brought about more recently which is based on the more notion that disasters cannot always be avoided. Therefore acceptable levels of risks are determined and disaster preparedness and recovery plans should be prepared around the accepted risks. Some of the specific milestones in French disaster policy are highlighted below.

Evolution of counter-terrorism policy

French capacity to fight terrorism has improved over years of hard-won lessons. France has a long history of terrorism that dates from the coining of the word during French revolution (Shapiro & Bénédicte, 2003, p.68). As a result of decades of terrorist waves from domestic to international perpetrators, France developed a fairly effective system for fighting terrorism at home that fits into French's distinct civic culture. Other countries and, especially U.S., can benefit from French experience (as terrorism is a relatively new phenomenon for the U.S.).

Before the 1986 Palestinian terrorist attacks, France used the so-called *sanctuary doctrine* that attempted to isolate the country from international terrorism by creating a sanctuary both for and from international terrorists. This doctrine failed because the attacks created an anger in the public that made the idea of negotiating with or harboring terrorists politically risky. Later, as a result of foreign and intelligence policy changes (see the discussion below), the French remained largely free of international terrorist attacks on its home soil from 1987 until 1994 (Shapiro & Bénédicte, p.74). Historically, France struggled with two interrelated problems in its dealing with counterterrorism: a lack of coordination and centralization of anti-terrorist policies internally, and politicization of the struggle against terrorism. In the early 1980s, at least seven different police services in four different cabinet ministries had a variety of overlapping responsibilities relating to matters concerning terrorism. These agencies distrusted and misled each other, and sharing of intelligence was therefore made almost impossible. The then-president created an ad hoc counterterrorism cell within the Presidential Palace that only increased the tension and resentment among the already established agencies. Adding an overwhelming public outcry for increased security, in September 1986, after the devastating terrorist attacks (see the discussion under the history of disasters above) legislation was passed to create a variety of new organs within the government that specialized in dealing with terrorism and coordinated and centralized the activities. These organizations were created within the interior ministry (*Unite de Coordination de la Luttle Anti Terroriste* – SCLAT) which were tasked with making connections between all of the various intelligence and police services within the French government related to terrorism. According to Shapiro and Bénédicte (2003), this system was in part explicitly modeled on the US National Security Council and the interagency process it oversees. For a more detailed discussion on French anti-terror policies refer to Shapiro and Bénédicte (2003).

Evolution of natural hazards policy:

Natural hazards affect more than 50% of the French territory. Poor risk policies in sustainable local development planning and greater exposure of wealth in dangerous areas over the past 50 years have lead to increased losses in property and dozens of deaths. Understanding the hazards, French policymakers focused their risk mitigation policies around the following four spheres:

a. Risk identification and preparing zoning and settlement strategies based on identified risks.
b. Consideration of natural hazards as part of urban planning process.
c. Eliciting input from residents.
d. Preparation of emergency response and preparedness plans.

Related to the issues above, between 1935 and 1994, a large number of zoning instruments designed to control urbanization were developed (Dauge, 1999). However, they were conceived and adopted without any cohesiveness or coordination. The complexity and the disparateness among the policies prevented their proper implementation and use. To end this chaos, a law called "Loi Barnier' (the name of the person that sponsored the bill) was issued by the French Congress in February of 1995 that replaced those discordant instruments with what is called a Major Risks Prevention Plan (*Plan de Prévention des Risques Majeurs – PPR*). PPR covers all types of natural hazards including avalanches, storms, forest fires, floods, landslides, earthquakes, and volcanic eruption. The plan was meant to be a flexible approach that would easily adopt to the needs of local, communal, and river basin authorities.

The PPRs are used to prevent new construction and other settlement activities in areas designated as dangerous and to regulate in less exposed areas. For example, to mitigate the effects of flooding, the spreading of agricultural land use is controlled by the local PPRs in order to diminish surface water runoff. Also the standard minimum first story heights are also specified in the local PPRs.

The communes (smallest French administrative division) are required to have their PPRs prepared according to the specifics of their region and approved. In fact, the procedure of having communal risk plans was established in April of 1994 even before the 1995 introduction of Loi Barnier. According to the 1994 legislation, French regional prefects are required to setup a structure in their *département* (French administrative district) called the Risk Analysis and Preventive Information Unit (*Cellule d'Analyse des Risques et d'Information Préventive – CARIP*). The role of CARIP is to assess the natural hazard risks to the community, decide on the hazard risk mitigation options, and impose and implement them. Towards this purpose, each commune in France has been required to prepare a synthetic document named Communal Information File on Major Risks (*Dossier d'Information Communal sur les Risques Majeurs --DICRIM*) to be added to the Departemental File on Major Risks *(Dossier Départemental sur les Risques Majeurs – DDRM).* DDRM is a final département level document worked out by CARIP. Both the DICRIM and DDRM are made available at the city halls of each département.

If there are several types of hazards that the commune is prone to, it is highly likely that it has a PPR and is in an approved status. (Note that DICRIM is compulsory to every commune – it is a kind of risk diagnosis. When some risks are determined to exist in a commune, then this commune has to create a PPR which defines the exposed areas and bring prohibitions or restrictions to constructions or activities in the exposed areas. PPR is a planning tool). However, those communes that are prone to only one type of

natural hazard are likely not to have a PPR or a PPR that is in an approved status. According to Callon et al, in 2001, 26% of all of the French communes affected by four types of risks had a plan versus 6% of those affected by just one hazard. Moreover, the existence of PPR was directly proportional with a commune's population: 35% of all of the communes with population of 20,000 to 100,000 inhabitants had a PPR, versus 6% of those with 100 to 500 and 3% with less than 100 inhabitants. This could be interpreted as: the more urbanized a commune is, the more is the risk of potential losses from hazards.

Additionally, in terms of PPR coverage, there has been a discrimination against the type of hazard. According to IFEN (Institut Français de l'Environnement –French Environmental Institute), in 1999, 36% of avalanche affected zones in France were covered by a PPR versus only 12% of those zones affected by landslides, and 11% of those affected by floods. Strangely enough, forest fires had not been covered in many PPRs. To illustrate the imbalance, 2001 statistics show that 11,699 French communes have flood risk; 6,038 have landslides; 5,189 earthquakes; 3,905 forest fires, and only 355 communes are prone to avalanche risk.

Evolution of industrial/technological hazards policy:

About half a century ago, dealing with industrial/technological hazards consisted primarily of limiting construction in exposed areas, much like the natural hazard risk mitigation policies. However, later, in the beginning of the 1980s, it became evident that there were many dangerous industrial installations already located in densely populated urban locations and these posed extreme danger to inhabitants. The reason of the proximity of these dangerous installations to urban populations can be explained by the fact that, a) some of these areas were located in the large industrial sites built in the 19th century and were already urbanized long before zoning legislation was in place and these industrial plants attracted a multitude of workers who settled their homes near their workplaces, b) the dangerous installations indeed consist of the necessary supply infrastructure for the urban needs such as local power transformers, gas retailers, train stations, etc., and c) those concerned areas which were initially located on the outer edge of the city may have caught up with the urban sprawl and became part of the urban area (Boltanski et al, 1996).

Effective zoning requires periodical assessment and reassessment of area hazards, vulnerabilities and, hence, acceptable risks. It also requires modification as the urban settlement areas evolve through time (Glatron, 1996). Thanks to the EU, technological risk management in France began by directives and policies that came about after the Italian Seveso disaster. There was a massive dioxine emission in 1976 near the Italian commune of Seveso which provoked an early attention to the prevention of industrial risks in France and the EU. Since 1976, any plans for industrial activities that pose high risks and hazard to the environment and public health in France are required to be submitted for administrative authorization. In order to establish the authority for coping with potential disasters and mitigating against them, this requirement was concretized by a 1982 EU directive, called COMAH (Control of Major Incident Hazards) also known as the Seveso directive. This directive requires EU member countries to specify the inventory of all of their industrial risks and to register all their dangerous industrial sites to the Regional authority and to the European Commission. These inventories are edited online by the French government (See https://seveso.developpement-durable.gouv.fr/)

These dangerous sites are called *Installations Classées pour la Protection de l'Environnement ICPEs* (Classified Installations for Environmental Protection). Next, regional authorities and local governments have to develop a zoning policy and a document named Danger Study that specifies how to mitigate, prepare for and respond to any possible major incidents in each of the defined danger zones.

The French policies concerning technological and industrial risk management is greatly influenced by COMAH. Since 1982, the more dangerous ICPEs (like chemical or nuclear plants) must strictly comply with COMAH. COMAH has been modified several times, gradually enlarging its competencies until it was replaced by a new directive COMAH 2 (96-82-CE) known as Seveso 2 on February 3, 1999. This new directive is an extension of COMAH with further control mechanisms on long-term urbanization with provisions on land use and construction, specifications on disaster recovery and logistics, and restrictions on activities such as hazardous waste disposal and agrochemical storage. COMAH 2 also offers improvements in Danger Study contents, and enhancements to public information sharing and participation in the decision making processes concerning hazardous activities. The new directive introduced a clause that requires the careful assessment of potential consequences of an accident in the installation on neighboring installations. Cooperation between adjacent dangerous installations through exchange of information, common and coordinated emergency plans, is thus required by the local authority within a Danger Study (Chateauraynaud and Torny, 1999).

COMAH was put into test when the AZF fertilizer plant explosion in the French town of Toulouse occurred in September 2001. The explosion blew off roofs and buildings nearby, killing 26 people and injuring hundreds of others. At the same time, a toxic cloud spread all over the conurbation. AZF was classified as ICPE as an agrochemical plant under COMAH 2. Right after the incident, a warning was issued according to the Danger Study, and the first response measures were also implemented according to the same plan by the prefect's authority. All the pertinent roads, railways and airways were closed and/or secured, civil protection measures were put into place. Although the response was successful, long-term disaster recovery was a failure since there were no plans for recovery.

Organization of Emergency Management

As we have indicated in the previous two sections, French policymakers have come to the realization over the years that: (a) it is necessary to work on complex risks without dissociating them as natural and technological since they interact, (b) standard procedures and plans prove to be inefficient, therefore they must be differentiated enough as to be adapted to local conditions and specific situations, and (c) disaster and post-disaster recovery should be clearly defined and fully operational.Based on the above premise, a new risk and disaster management mechanism was created into law on July 30, 2003. The new mechanism is centered on French communes: the smallest French administrative territorial division. Accordingly, a commune's mayor is given authority over risk prevention, mitigation, risk warning, and emergency planning with the help of a local document called *Plan Communal de Sauvegarde* – PCS (Safeguard Communal Plan). The PCS details actions and measures to be taken in case of emergencies as well as post-disaster recovery actions. If the emergency situation crosses several jurisdictions,

then PCSs of all of the affected communities can be unified to issue an inter-communal PCS (Urfalino & Hubert, 2000).

When the local mechanisms and plans such as PPR, PCS, ICPE, or DICRIM are not sufficient to mitigate an emergency or a disaster, the *Plan ORSEC-Organization des SECours* (Rescue Organization Procedure) is used which is the French generic emergency plan which is really a civil security emergency plan. The ORSEC plan is for widespread and long lasting disasters such as storms, floods, earthquakes or major industrial disasters. ORSEC is carried out by gendarmerie. The gendarmerie is a French police force with a military commandment coming under the control of the French Defense Department. Its missions can be partly compared to those of the US National Guard**,** fire and police departments under the joint authority of the prefect and mayor. It organizes population evacuation and relief operations, medical assistance, and other technical interventions to address the causes of the disasters and further mitigate its consequences. ORSEC is articulated at two levels: 1) a standard plan that is applicable under any circumstance and at any place, and 2) a specific plan that is adapted for the local context at French département level. Yet at the same time there are many other emergency procedures that can parallel ORSEC plan such as *Plans Particuliers d'Intervention* – PPI (Specific Intervention Plans) in order to deal with highly localized danger sources such as ICPE installations; *Plans de Secours Spécialisés* – PSS (Special Emergency Plans) that deal with diffused hazards such as flooding, transportation accidents involving hazardous materials, tanker oil spills, etc.

During the past three decades, French hazard and risk management policies have evolved from nationwide standardized procedures discriminated according to type of risk (natural or man-made) into "complex risks" management strategy that is based on assessing and managing all potential hazards affecting each local administrative district. These procedures have become more integrated covering all phases of disaster management from mitigation to preparedness to response and to recovery. Furthermore, these policies and procedures have become part of local sustainable development public policies.

Challenges and Opportunities

In his book *Risikogesellschaft - Auf dem Weg in eine andere Moderne* **(**Risk Society: Towards a New Modernity**)**, Ulrich Beck suggested organizing our societies around risk pervasiveness (Beck, 1992). The multiplication of disasters this last decade combined with people's increasing insecure feelings about food, health, environmental changes, economy, social violence, and terrorism proves him right.

The French emergency management system has moved toward an integrated risk management policy partly to become a key element of local planning and local policies.

Effective risk management depends on: information devices, criterions defining risk acceptability, anticipation of people's reactions when a disaster occurs, and inventorying of all available resources (financial and technical) to act.

It is therefore necessary: (a) to establish operative and comprehensive (including financial backing) post-disaster plans, (b) to develop alert procedures and a forecast system, (c) to inform the population about the risks and about disaster management procedures, and (d) to define local risk zoning maps where construction and some activities are restricted, and they must be applied to urban and land planning documents.

In France, the implementation of such policies is often made difficult by the discrepancy between the local elections timescale (usually five-year or six-year terms) and the much longer risk timescale.

There is a second pitfall: risk actors are subjective in their choices like anybody else. They tend to favor decisions that coincide with corporate or individual interests and with their own representation of risks. This issue is becoming crucial in French risk management. It becomes clearer and clearer that a risk is not only an objective measurable entity, but comes also as the upshot of a confrontation between different individual and collective representation of the future in which a disaster can take place, since a risk is nothing but a potential disaster.

Risk managers are supposed to "tell the truth" about risks, but their opinion is largely dependent on their beliefs (Coanus, Duchêne & Martinais, 2004). Indeed, if you want to point out a risk in order to manage it you need: a) to believe in the existence of a danger and give it content and b) to give a prediction about its occurrence.

Eventually, new risks can be considered as the emergence of pre-existing risks that were hidden from the conscience of the actors. Hence, how is it possible to identify what can get wrong when everything seems to go well? It is a matter of which interpretations and which representations of the future are regarded as possible— or say it better: believable.

Every time a new type of disaster happens (explosion of the AZF plant in Toulouse) and every time a study points out the possibility of a new disaster (e.g. possible linkage between cell phone usage and brain tumors, inhalation of radon closely associated with an increased risk of lung cancer, etc.), new unexpected risks to come to light that usually don’t square with the current risk management framework. This means that the system classically used to manage risks is not efficient to predict new risks, and the reason probably is that it never questions the interpretative frame in which risks are taken into account. Nowadays, for example, —10 years after— no one can give a clear explanation of why and how AZF plant exploded apart from some technical specifications about chemical reactions (Arnaudiès, 2005).

Therefore, French risk management has just engaged itself in an important reorganization: the point is the obligation to define before any plan or action which interpretative frame risk actors use to analyze the situation.

Thus, French risk zoning tends to gain plasticity as acceptable risk level (and its corollary – population security) becomes negotiable during the zoning process. In this negotiation, issues other than risk and security are considered. Those are: control on the urban sprawl, development of urban programs, financial restraints, and quality of life of the communities concerned by the zoning. As an example: how can France tune up risk management with sustainable development in urban areas where frequency of disasters increases with the density of population, facilities, flows and activities? Densely occupied urban areas are conducive to domino effect (a disaster triggers another). Therefore, in urban sprawl, low density tends to diminish the probability for disasters resulting from complex risks. However, very low density urbanized areas are not prone to sustainable development. Here, choice has to be made between sustainability and risk management (Andres & Strappazzon, 2007).

Conclusion

In the French emergency management system, risks are now managed as complex risks as a whole system rather than managing them individually according to the nature of the risk (see our discussion in the *Disaster Policy* section above).

French risk zoning tends to gain plasticity as acceptable risk level becomes negotiable during the zoning process (see *Challenges and opportunities* section above). The examples are the use of PPR in the case of dealing with natural hazards and ICPE in dealing with industrial and technological hazards.

Thus, the French approach to emergency management, with all its challenges, is better off than it had been before in dealing with new and emerging risks such as changes in environmental patterns (issues related with global warming), new health risks due to use of technology and other future hazards that are not known well yet.

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Attachment

Table 1: Natural Disasters from 1980 – 2008 (source: PreventionWeb.net)

No of events:	109
No of people killed:	21,533
Average killed per year:	743
No of people affected:	3,593,117
Average affected per year:	123,901
Economic Damage (US$ X 1,000):	29,951,700
Economic Damage per year (US$ X 1,000):	1,032,817

Figure 1: Natural Disaster Occurrence Reported

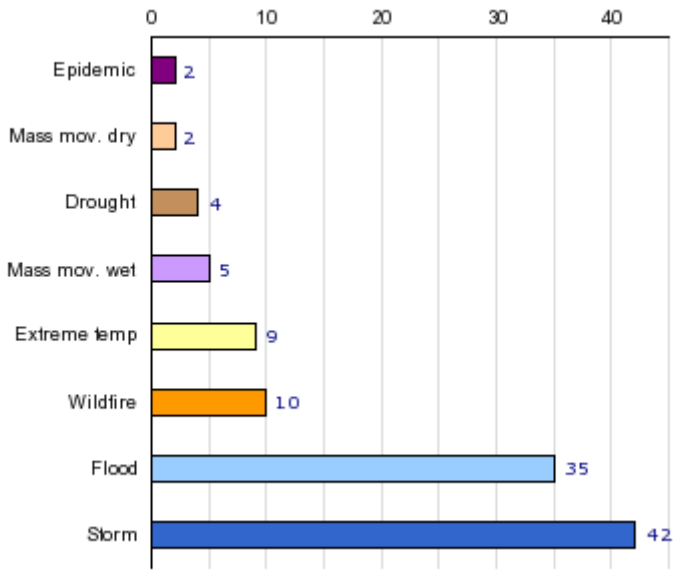

Table 2: Average Disaster Per Year

Drought:	0.14
Earthquake*:	...
Epidemic:	0.07
Extreme temp:	0.31
Flood:	1.21
Insect infestation:	...
Mass mov. dry:	0.07
Mass mov. wet:	0.17
Volcano:	...
Storm:	1.45
Wildfire:	0.34

Top 10 Natural Disasters Reported

Table 3 a: Affected People

Disaster	Date	Affected
Storm	1999	3,400,011
Storm	1999	100,020
Flood	2003	27,000
Extreme temp.	1997	10,000
Flood	2001	8,100
Flood	2001	7,371
Storm	1995	5,000
Flood	1983	3,500
Flood	1999	3,005
Wildfire	2003	3,004

Table 3 b: Killed People

Disaster	Date	Killed
Extreme temp.	2003	19,490
Extreme temp.	2006	1,388
Storm	1999	92
Storm	1992	47
Flood	1999	36
Flood	1987	23
Storm	1990	23
Extreme temp.	1997	23
Flood	2002	23
Extreme temp.	1991	20

Table 3 c: Economic Damages

Disaster	Date	Cost (US$ X 1,000)
Storm	1999	8,000,000
Extreme temp.	2003	4,400,000
Storm	1999	4,000,000
Storm	1987	1,700,000
Drought	1989	1,600,000
Flood	2003	1,500,000
Flood	2002	1,190,000
Storm	1990	900,000
Extreme temp.	1991	772,000
Storm	1995	700,000

Statistics Per Event

Table 4 a: Killed People

Drought:	...
Earthquake*:	...
Epidemic:	10.50
Extreme temp:	2,326.00
Flood:	4.60
Insect infestation:	...
Mass mov. dry:	11.00
Mass mov. wet:	8.40
Volcano:	...
Storm:	7.64
Wildfire:	3.20

Table 4 b: Affected People

Drought:	...
Earthquake*:	...
Epidemic:	3.00
Extreme temp:	1,111.11
Flood:	1,825.54
Insect infestation:	...
Mass mov. dry:	7.50
Mass mov. wet:	57.20
Volcano:	...
Storm:	83,630.93
Wildfire:	641.70

Table 4 c: Economic Damages

Drought:	402,500.00
Earthquake*:	...
Epidemic:	...
Extreme temp:	574,666.67
Flood:	146,795.71
Insect infestation:	...
Mass mov. dry:	...
Mass mov. wet:	2,158.00
Volcano:	...
Storm:	428,834.76
Wildfire:	1,000.00

Statistics By Disaster Type

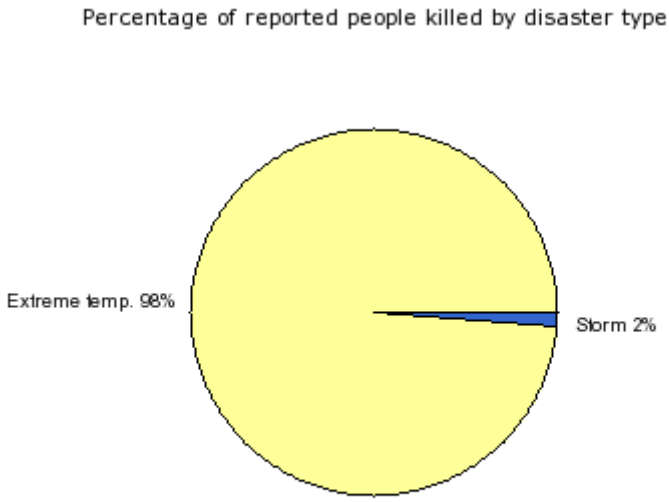

Figure 2a: Percentage of reported people killed by disaster type