

## Executive summary

The OECD expert review team has made its recommendations in light of the need for flood risk management policies in the Loire river basin to further develop four capacities in the context of its forward looking and holistic flood control strategy: threshold capacity; coping capacity; recovery capacity; and adaptive capacity. These capacities, which reflect international best practice, are the key to dealing with changing future flood risks and are used here to assess the effectiveness of the measures and processes in the Loire Basin.

Threshold capacity is the buffer against risk of damage due to extreme events. It sets the “design” and operational standards for the dikes and other flood risk management measures. This capacity is comprised not just by technical expertise and the infrastructural system, but also by the institutional and social capacity.

Coping capacity is the ability to reduce the damage caused by a significant flood threat that exceeds some specified “damage threshold” (usually the event return period). It requires effective emergency plans and good pre-communication with those most vulnerable populations. This capacity has to be effected instantaneously during an event, although pre-event communication should be an on-going process, with training and practices. Where flooding is rare, as in the Loire basin, a lack of community and individual memory leads to complacency and an erroneous belief of security. Coping capacity requires the dispelling of such beliefs, especially where inhabitants and economic activities are located behind flood protection infrastructure, such as dikes.

Recovery capacity is the ability to recover after an event, *i.e.* to return to sensibly the same state as pre-event (resilience). Recovery needs to establish an equivalent condition of society as that which existed before, though not necessarily the same, and ideally should include measures that reduce the vulnerability to damaging events – such as restored buildings that are flood proofed. In most cases, it is the economic capacity that determines the ability to recover and in what form.

Adaptive capacity involves the anticipation of uncertain future events or conditions and then planning for these. Generally, it is applied to the most

extreme events rather than “normal” or expected events, and this has now become more important in light of climate changes. The precept is that it may be possible to influence these changes (e.g. mitigation for climate change), but they cannot be controlled with any certainty, hence adaptive capacity is needed. There is a need here to respond using a range of diverse options (a portfolio) rather than sticking to historically tested approaches. By using reversible, adaptable and flexible options, where these are found to not be effective in the light of changing external factors, they can be reversed or abandoned and substituted by alternatives. It follows then that large scale infrastructure options, that “lock-in” their use for generations should only be used with caution.

### **Adopt a strategic approach vis-à-vis the assessment and management of flood risk management**

The *Plan Loire Grandeur Nature* (Loire River Interregional Programme) has reinforced institutional threshold capacities by integrating flood protection into a holistic river management framework with long term objectives at the river basin level. Historically, flood risk management in the Loire river basin emphasized structural measures that attempted to control where water flows, whereas the Plan Loire reflects modern approaches that seek to reduce violent floods by creating space for water. The shift toward a more balanced approach of structural and non-structural measures is evidenced in land use prescriptions that limit construction in flood zones, the promotion of wetland restoration projects, and aspirations to restore the main river bed. Eventually, residents could be removed from flood planes, and buildings constructed prior to modern land use plans would be demolished.

In the context of the Plan Loire, an action plan for reducing the vulnerability of businesses throughout the Loire basin to flooding (hereafter referred to as the “Industrial Plan”) has been implemented. It focuses on the reduction of flood damages where they are estimated to be the most severe and have long lasting effects on the basin’s economy. The Multidisciplinary team for the Middle Loire estimated that 60% of the damages arising from a catastrophic flood derive from direct damages to businesses and the difficulties associated with starting activity anew. Potential damages from a catastrophic flood for the entire Loire basin are estimated to be in the order of EUR 10 billion. The OECD review team considers the “Industrial Plan” to contain elements of a strategy well suited to developing threshold, coping and adaptive capacities. There is scope to reinforce recovery capacity by promoting business continuity planning through the programme of subsidized flood risk diagnostics for businesses.

The Plan Loire provides a forum and structured approach for representatives of the State, local levels of government, the private sector and associations

to devise and discuss policy options for flood risk management and to review them. It has made consistent efforts to inform the decision making process on the basis of international best practices in many areas of flood risk management and supported several comparative studies such as “Freude am Fluss” to compare the situation of flood risk in the Loire river basin to that of river basins in different European countries. This has proven successful in particular in the development of a collaborative process to improve local decision making. The expert team also found examples of forward looking studies underway to evaluate the effects of climate change on the territory’s vulnerability to floods, although some stakeholders question the utility of these studies for policy decisions, given the uncertainty of the phenomenon involved and given that the risk of flood is already sufficiently high to require reinforcement of threshold capacities. This position, in the opinion of the expert team, reflects a lack of vision concerning the possible changing character of flood risks. Adaptation to climate change should not necessarily assume more frequent and stronger floods, but rather consider that climate change could result in the emergence of different phenomenon than today, such as pluvial flooding, and thus the potential need to integrate models for urban draining with models for the river.

Responsibility for reducing vulnerability to floods in the Loire river basin involves every main level of public administration, from the ministries of the central government and the decentralized services of the State at regional and departmental level, to representatives of local levels of government. The Plan Loire creates structures to foster cooperation and to achieve consensus on broad, long term objectives. Nevertheless there seems to be a tension brewing between these various actors, especially between the local levels of government and the services of the central government, concerning the realisation of these objectives. There is a popular perception amongst local governments that the State is not doing enough, especially when it comes to identifying where repairs to the dike system are needed and actually carrying the repairs out. This is of paramount importance since dike breaches are the flood scenario with the highest potential for damages. They also contend that designated flood zones are sometimes overly expansive, which restricts building and thereby curtails local economic development. For its part the State is concerned that the local governments and individuals rely too heavily upon it, especially since it is the insurer of last resort for natural disasters in France, and furthermore that they sometimes are neglectful of their own roles, such as developing a “Local Emergency Plan”. Indeed, the Plan Loire could pay more attention to developing the coping capacity of the localities. Performance measures for projects carried out under the Plan Loire are not always measured against standards that have been agreed to in advance. To alleviate tensions between the partners of the Plan Loire, there is scope first to clarify who is responsible for doing what, and secondly to agree to measures by which they can evaluate each other in the performance of their responsibilities.

## Develop synergies between the public and private sectors

The review team found that infrastructure operators for the electricity and water distribution/ purification sectors are actively involved in policy planning through the Plan Loire. Both have conducted flood risk assessments for their operations, and put into place emergency management plans. While the operators of the railways and gas distribution networks demonstrated strong recovery capacity, they do not seem to avail themselves of opportunities to work within the policy planning *fora* established by the Plan Loire. For this reason, there is concern that they might not develop adaptive capacities for the long term, and in any case their coping capacity remains unknown to official emergency planners. The review team did not have the opportunity to interview operators from the telecom or road transportation sectors. This is regrettable in both cases since telecoms should play a key role to alert the public in case of flash floods in the Upper Loire, and communications networks are relied upon as a key resource in the coordination of emergency response services. Likewise, ensuring that road conditions are fit for use is a priority objective in disaster management, since road obstructions are a well-known obstacle to speedy recovery from disasters.

The *Etablissement public Loire* (EP Loire) and its constituent members are trying to further knowledge of how infrastructure operators prepare for and react to floods, and have attempted to invigorate collaboration and improve information sharing arrangements with them. This last point is a typical challenge in many OECD countries, and calls for action by the central government to require operators not only to provide information about vulnerability to natural catastrophes, as is already the case in France, but to undertake the assessment of vulnerability as part of a collaborative emergency planning process. For the time being, the EP Loire and its members have succeeded in making progress through studies of networks in three cities: Saint-Étienne in the Upper Loire; Blois in the Middle Loire; and Nantes in the Lower Loire. These studies provide the basis to conduct a diagnostic of network operations and the extent to which they are vulnerable to floods. In addition they should lead to a generic guide for all communities in the river basin who wish to put in place a plan for information sharing on the actions of critical networks in cases of emergency.

## Inform and involve stakeholders and the general public

Different communities in the expansive Loire river basin have varying degrees of awareness about the risk of floods, largely due to whether they have directly experienced one or not. Since major floods of the Loire are infrequent, a primary challenge for policy makers who wish businesses and individuals to take mitigation actions on their own is to convince them that there is a risk that needs to be addressed. National legislation provides a

strong framework for risk communication, although the means used to inform the public of the natural and technological risks they face are not always effective. Mayors are responsible for developing risk communication tools, but they are given wide discretion on the means to diffuse them and there is little oversight to ensure they actually raise public awareness of risks. An important aspect of the “Industrial Plan” are programmes aimed at setting the stage for mitigation, whereby multiple actions have been taken to raise awareness not only amongst the business community, but also the managers and technicians in public bodies. There was anecdotal evidence of outreach to schools about the risk of floods, but no such efforts were brought to the attention of the review team regarding vulnerable populations. Local collaborations with NGOs, especially WWF, have produced excellent brochures that place the issue of flood risk management in a holistic context, and which were distributed to inhabitants of towns at severe risk of flood.

As mentioned above, the Plan Loire places the policy making process for food risk management within a coherent and inclusive process at the river basin level. This ongoing plan constitutes a shift in risk governance for the management of floods by complementing the traditional top-down approach of legislation and ministerial policies with a bottom-up approach whereby the interests of river basin stakeholders such as local government representatives, NGOs and industry associations can be represented. While the Plan Loire provides a forum for a broad range of views on flood risk management to be heard, there were some complaints voiced that the actual decision making process is neither clear nor inclusive. It can be concluded that the Plan Loire enhances dialogue, but as a platform for integrated river management it has not yet achieved a full degree of trust amongst all stakeholders. The same challenge is present throughout OECD countries, namely; policy deliberations are increasingly open to NGOs, but decisions about where the investment of public funds will be spent are the domain of the parties that actually put up money. Public trust could also be reinforced by improving the transparency of analysis. For example, the cost benefit analysis of major protective works could be made more readily accessible, and the recently developed data bases on the condition of the dike system should be a matter of public domain. Implementation of the European Flood Directive is an opportunity to provide clear guidance on how public consultation processes should be conducted, and to build capacity, where it is lacking, to hold such consultations.

### **Strengthen co-operation between actors throughout the basin and risk managers**

Cooperation with local stakeholders goes far beyond the formal structures within which funding decisions are taken. The EP Loire in particular has mounted numerous collaborations with professional associations,

universities and research institutes to further knowledge about the risk of floods, and to raise awareness amongst the business community, elected officials and the general public. As part of the “Industrial Plan” special training courses have been put in place to ensure that technicians and managers of the localities that are exposed to the risk of floods are made aware of the importance of sustainable economic development that reduces their vulnerability. These courses may be used as a means to strengthen threshold capacity by ensuring that local technicians and managers are made aware of best practices in cost effective flood protection measures, modern building techniques and materials and sustainable land use practices.

The Plan Loire provides for the possibility of conducting “3P” studies, the objective of which is to deepen and share knowledge about flood risks (the nature of possible events, the potential stakes, and measurements of vulnerability) with the aim to lead to coherent and coordinated action plans to reduce them. They entail, first of all, diagnostics (hydrological, regulatory, socio-economic, environmental), and secondly suggestions for improvement (in the areas of forecasting, monitoring, prevention and protection), taking into account an optimal mix of actions in furtherance of economic activities, public safety, cultural heritage and environmental protection.

In terms of present coping capacity amongst emergency management services at local, departmental, regional and several national defence zones, stakeholders reported a favourable opinion of their ability to coordinate, but the coordination of these services are untested and have not been exercised recently. Furthermore, the agglomerations are becoming increasingly engaged in matters related to flood risk management. Although the agglomerations coordinate well within their own territorial limits, the prefects do not take full advantage of this level of public administration. Prefects could better include agglomerations in emergency management, and benefit from economies of scale, to bolster threshold, coping, response and adaptive capacities.

## **Make better use of technological potential and enhance research efforts**

The review team was presented examples of recently improved coordination between the national meteorological services and the Loire’s flood forecasting system that measures water levels and velocity in real time. The CRISTAL system collects automated, but highly reliable and timely, data that feeds into a warning report, which is made publicly available via the internet. The report indicates different levels of hazard for the watercourses monitored: green, yellow, orange and red. This report is complemented by a bulletin that may be used to provide suggestions for immediate action. These documents are update twice per day, and can be done so even more frequently in times of an emergency. These services, therefore, serve not only

as a decision support tool for alerts, alarms and evacuations, but as a resource to the general public that can be put to use to take timely preparations. Data from these systems can also be used in the design and testing of new hydrological models that serve as the basis of flood maps.

Technical cooperation under the direction of EP Loire, composed of localities in the Middle Loire, facilitates the exchange of experience and know-how regarding flood risks. This network has progressively moved toward implementation of a web portal on floods, which EP Loire provides and administrates. Its aim is to facilitate information exchanges between stakeholders, and the debate of issues concerning flood risks in the Loire river basin. It is composed of two parts: one that reaches out to individuals with information on what different actors in the river basin are doing with regard to flood risks; the second is oriented toward professionals and allows for information exchange, debates and the publication of more technical documents or information about flood risks.

The Plan Loire has reinforced flood risk management decisions by commissioning research in several areas of specialized knowledge, for example: a methodology for evaluating potential damages at the entire river basin level; extensive studies on changes to the river bed; and a series of studies on the potential impacts of climate change for the risk of flood. Given the above mentioned studies and those under completion, it seems to the expert team that the decisional process related to sorting out prioritisations for investment and maintenance should be conducted in light of them.



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