Progress and challenges in fostering risk prevention and mitigation in a cross-country comparative perspective – OECD case study on the Rhone River

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Abstract. The OECD report “Boosting Resilience through Innovative Risk Governance” examines the efforts of OECD countries to prevent or reduce future disaster impacts, and highlights several key areas where improvements can be made. International collaboration is insufficiently utilised to address shocks that have increasingly global consequences. Institutional design plays a significant role in facilitating or hampering the engagement and investments of governmental and non-governmental stakeholders in disaster risk prevention and mitigation. To inform the design of “better” institutions, the OECD proposes the application of a diagnostic framework that helps governments identify institutional shortcomings and take actions to improve them. The goal of the case study on the Rhone River is to conduct an analysis of the progress, achievements and existing challenges in designing and implementing disaster risk reduction strategies through the Rhone Plan from a comparative perspective across a set of selected countries of this study, like Austria and Switzerland, will inform how to improve institutional frameworks governing risk prevention and mitigation. The case study will be used to identify examples of successful practice taking into account their specific country contexts, and analyse their potential for policy transfer.

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1 Introduction

The Rhône River basin is one of the largest river systems in France (see Figure 1). It covers a wide range of topographies making it subject to important flood risks, but also risks from coastal flooding, torrents, sediment movements, storms and storm surges. Earthquakes are an additional risk in the region of Provence-Alpes-Côte d’Azur.

The Rhône River basin accounts for a significant share of France’s economy, which has been facilitated by the river’s multiple uses: as a key navigation route, as a key source of irrigation for its large agricultural industry, but also by supporting an important share of France’s hydro and nuclear power production [1]. The socio-economic importance of the Rhône River basin makes a potential flood the third largest risk France could be confronted with, after a major flood of the Seine River in Paris and a significant earthquake in the Provence-Alpes-Côte d’Azur region or in the French West Indies.

Although flooding and related events have been relatively frequent along the Rhône a large-scale flood comparable to the one of 1856 has not happened in the recent past. This makes it important to assess whether current risk prevention engagements are sufficient to confront similar such events in the future.

The present case study report assesses the progress, achievements and potential challenges of the Rhône River’s risk prevention system, with a particular emphasis on its institutional design. The latter plays a significant role in facilitating or hampering the effective engagement and investments of governmental and non-governmental stakeholders in disaster risk prevention and mitigation.

The case study on the Rhone River is part of an OECD cross-country comparative study that assesses and compares disaster risk prevention and mitigation systems across a set of OECD countries. The objective of the analysis is to monitor the progress in countries’ risk prevention policies, to identify good practices as well as challenges that may persist and that may impede a whole-of-society approach to risk prevention and mitigation, bringing both governmental and non-governmental actors together. The case study of France’s Rhône River informs this comparative analysis.

2 Hazard sources and hazard exposure of the Rhone River basin area

The Rhône River Mediterranean Basin District (see Figure 2) has a varied topography and diverse climate making it subject to hazards such as river and coastal flooding, torrents and sediment movements, storms and storm surges and earthquakes [2].

On average, the region experiences three floods a year; the largest recent floods were those of 2014, 2010...
and 2002, with floods rarely affecting the entire basin area; the floods of 2003 that occurred downstream of Lyon caused damages worth over EUR 1billion.

The Rhône River basin accounts for a major share of France’s economy, with two thirds of hydropower supply and one fourth of nuclear power produced there.

5.5 million basin inhabitants are potentially threatened by floods (see Table 1 and Figure 3), with a significant exposure of critical infrastructure and the industrial sectors in close proximity to the river [3]; 6 of the 16 identified areas of high flood risk that are of national importance are located in the Rhône basin (see Figure 4).

<table>
<thead>
<tr>
<th>At risk from flooding</th>
<th>At risk from coastal flooding</th>
<th>Relative to total number of each indicator in France</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Population</strong></td>
<td>5.5 million</td>
<td>229,000</td>
</tr>
<tr>
<td><strong>Number of health facilities</strong></td>
<td>819</td>
<td>21</td>
</tr>
<tr>
<td><strong>Potable water facilities</strong></td>
<td>9,044</td>
<td>23</td>
</tr>
<tr>
<td><strong>Total buildings (m²)</strong></td>
<td>438 million</td>
<td>21,2 million</td>
</tr>
<tr>
<td><strong>Total business buildings (m²)</strong></td>
<td>153.96 million</td>
<td>5.4 million</td>
</tr>
<tr>
<td><strong>Jobs</strong></td>
<td>2.9 million</td>
<td>133,200</td>
</tr>
<tr>
<td><strong>Infrastructure lines (roads and railways)</strong></td>
<td>98,000 km</td>
<td>5,000 km</td>
</tr>
<tr>
<td><strong>Nuclear power stations</strong></td>
<td>57</td>
<td>0</td>
</tr>
<tr>
<td><strong>Nature protection zones (Natura 2000)</strong></td>
<td>6,500 km²</td>
<td>2,800 km²</td>
</tr>
<tr>
<td><strong>Cultural heritage buildings</strong></td>
<td>1.6 million m²</td>
<td>35,000</td>
</tr>
<tr>
<td><strong>Museums</strong></td>
<td>133</td>
<td>8</td>
</tr>
</tbody>
</table>

Table 1: Assets at risk in the Rhône basin

Figure 3. Population density in the Rhône River basin

Figure 4. Areas at significant risk of flooding
3 Risk governance in the Rhone River Basin

France’s risk prevention policy framework is guided by the principle of solidarity on the national level and of subsidiarity across levels of governance, whereby a complex web of national and sub-national actors has emerged that all play a role in the planning and implementation of flood risk policies of the Rhône basin (see Figure 5).

Ongoing territorial reforms could help regrouping many of the more fragmented sub-national actors and efforts to maximise the pay-offs of risk prevention efforts, to increase ownership by the direct beneficiaries and to improve accountability of the responsible actors to their citizens.

The process of decentralisation of flood risk management responsibilities may face several challenges: in a mostly unitary tradition, sub-national actors may not all have the technical and financial capacities to fulfil their new responsibilities; the regrouping of local jurisdictions will not solve cross-jurisdictional conflicts arising from negative and positive spill over effects of risk prevention investment up- and downstream of the Rhône River, but also between the main river and its tributaries.

The strategic framework provided by the Plan Rhône has been an effective and successful instrument to integrate economic development and flood risk management, bringing all relevant actors together to work on commonly agreed priorities, supported by consolidated financing across levels of government.

4 Management of structural and non-structural risk prevention and mitigation measures

The programmatic, bottom-up approach to central risk prevention co-funding under flood prevention actions programs (PAPs) and Rapid Flood Plan (PSR) projects has been particularly successful in rallying subnational risk prevention stakeholders to join forces in reducing flood risks and to jointly mobilise co-funding by the state.

Although PAPI and PSR funding proposals for risk prevention investments are evaluated against a set of criteria, no priority seems to have been given; instead of allocating funding to areas at highest risk this may have favoured those local authorities with stronger financial and technical capacities; with the expected decrease in future funding, allocation mechanisms could be revised in favour of equity- and risk-based prioritisation (see Figure 6).

![Figure 6. Risk prevention project funding under PAPI and PSR, July 2014](http://www.developpement-durable.gouv.fr/IMG/pdf/Projet_PAPI_et_PSRLabellises_par_la_CMI_-_juillet_2014.pdf)

The territorial reform process puts inter-municipal bodies (EPCIs) in the driver’s seat of risk prevention, which gives clear ownership structures at the local level. Two challenges will remain: (i) in a traditional unitary state careful sequencing of reforms will be required to ensure that local level bodies will have time to acquire the necessary financial and technical capacities to fulfil their new responsibilities; (ii) the consolidation of responsibilities at the local level will not resolve conflicts arising from risk prevention investments up- and downstream of the Rhône River and between the main river and its tributaries; complementary governance arrangements that ensure coordination may still be necessary at the basin level.

Hazard maps build the core for effective flood risk management, the delineation of high risk areas through a national hazard mapping exercise is a very good practice; the same homogeneity and coherence in terms of hazard...
criteria should be applied to develop local level hazard maps across the same river system. Hazard maps in the Rhône River basin could also benefit from integrating multiple hazards and cascading impacts on e.g. critical infrastructure such as nuclear power stations.

Although businesses and households have been mobilised through various risk prevention activities in the Plan Rhône, awareness and, as a consequence, investments in self-protection remain rather low. A whole-of-society approach should seek to mobilise contributions from all risk prevention actors to increase the effectiveness and the multiplying effect of public risk reduction investments.

5 Risk management financing

As in other OECD countries, it is difficult to establish figures indicating the total amount of investment for risk prevention on the national level, but also on the Rhône Mediterranean River Basin District level, across levels of government and across different sectors. The strengthening of a coordinating body like the District Flood Commission (CIB) already responsible for allocating resources for risk prevention for small PAPs and PSR projects could be charged with evaluating overall risk prevention investments and their effectiveness in reducing risks, helping the Joint Flood Commission (CMI) to follow up the national strategy implementation and the Floods Directive reporting.

The CATNAT disaster risk insurance scheme is an important solidarity mechanism in France’s risk financing system. Although it should have a wide coverage having its premiums tied to obligatory house insurances, some share of uninsured losses caused by the 2003 floods of the Rhône River, for example, were shouldered by individual households.

Given the CATNAT’s solidarity principle premiums are paid by each contributor independent of their risk exposure. To overcome potential moral hazard and over-reliance on the state, complementary policies should be considered that support individual households and businesses in investing more in self-protective measures. This could increase the efficiency and effectiveness of public investment in risk reducing measures. The national guidelines on reduction of vulnerability developed under CMI responsibility could become a point of advice for all non-state investments in risk prevention, guiding businesses and households in their investments in self-protection.

Although until present the available funding from the Barnier Fund was sufficient to cover the demands from local authorities for co-funding of protection measures, this is expected to change in the near future as more funding requests will be made based on the wider adoption and elaboration of risk prevention plans. Provided that sub-national co-funding rates have been quite considerable already (around 60%), other options of financing will have to be considered (see Figure 6). Increasing insurance premiums has been one proposition, but other sources of co-funding, perhaps across sectors, can be explored [4], such as for example from the water agencies (see Figure 7).

![Figure 7. Development of the Fond Barnier budget and forecast, 2008-2015](image)

**Figure 7. Development of the Fond Barnier budget and forecast, 2008-2015**


The territorial reforms require sub-national authorities to be in charge of not only managing but also financing considerable risk prevention tasks, such as maintenance of protective infrastructure (see Figure 8) [5]. A thorough risk prevention financing mechanism has to be elaborated to ensure the reform can at least maintain, if not increase, the level of risk prevention in France and of the Rhône basin in particular.

<table>
<thead>
<tr>
<th>Dikes managed by...</th>
<th>km of dikes managed</th>
<th>% of total</th>
</tr>
</thead>
<tbody>
<tr>
<td>CNR</td>
<td>570</td>
<td>57</td>
</tr>
<tr>
<td>SYMADREM</td>
<td>210 (+ 25 along the sea)</td>
<td>21</td>
</tr>
<tr>
<td>&quot;Orphan dikes&quot;</td>
<td>220</td>
<td>22</td>
</tr>
</tbody>
</table>

**Figure 8. Management of dikes of the Rhône River basin**

Source: Bravard and Clémens (2008)

6 References

[1] GTOPO30 Elevation Data by USGS via Wikimedia Commons: [https://commons.wikimedia.org/wiki/File:Rhone_bassin_versant.png](https://commons.wikimedia.org/wiki/File:Rhone_bassin_versant.png)

