FLOOD RISK AND ITS MANAGEMENT OVER A LARGE AREA: THE RHONE PLAIN UPRIVER FROM LAKE GENEVA

Jean-Pierre Jordan[1] and Tony Arborino[2]

INTRODUCTION

The historical floods which affected the river Rhone in 1987, 1993 and still more so in 2000, clearly highlighted the limits, both in terms of capacity and of resistance, of the dikes built along the course of the river before it reaches Lake Geneva. Over 13,000 hectares of plain are at risk of flooding today, of which over 900 hectares constitutes delineated construction sites, in some cases already very densely built up. The damages could exceed 8 billion Euros. A third correction of the Rhone is therefore indispensable to ensure the protection of both people and materials assets and to allow the economic development of the plain.
The project considered will render the entire plain safe from floods up to a 100-year return period. Urban centres and large industries will be protected even from extreme floods. However, even if investments of over 1 billion Euros by 2030 are planned and implementation of priority and anticipated measures has already started, it will take several decades to totally secure the entire plain.
In this context, the following questions arise:

1. What spatial planning rules should be followed during this transition period, before the project is completed, that are both appropriate and do not overly hamper the development of the canton?
2. Which structural measures can be proposed that would ensure that the most sensitive areas are rapidly secured?
3. How does this situation affect risk communication and how should any problems in this area be tackled?

This presentation consists of a synthesis of the experience acquired in these matters.

TAKING ACCOUNT OF ACTUAL HAZARDS

The standard hazard classification model results in large areas that are already heavily built up being classified as red zones, i.e. as no-build zones. Implementing this into the spatial planning regulations for the next 30 years, till the 3rd Rhone correction will be completed, would be both disproportionate and disastrous for the economic development of the plain.
A more detailed analysis of the processes identifies, specific to the plain, two peculiarities that could lead to the adoption of less stringent measures for substantial hazard levels. First of all, there is the recognition that a flood is a slow process. Applying some simple reinforcement measures to new building structures will make them resistant to static water pressure. Second, comes into play the fact that flood happens after several days of unfavourable weather conditions, with hours of rainfall and a long time-to-peak. A global assessment of the emergency and planning as well as the risks in case of a natural catastrophe required, showed that, providing a number of requirements are met, the affected areas can be evacuated fast enough, before the predicted floods arrive. Under very stringent conditions, it is therefore possible to envisage relaxing the standard hazard classification rules, thus allowing a measure of economic development to take place.

[1] Dr. Jean-Pierre Jordan, Federal Office for the Environment, 3003 Bern, Switzerland (jean-pierre.jordan@bafu.admin.ch)
[2] Tony Arborino, Service des routes et des cours d'eau, 1950 Sion, Switzerland

PRIORITY STRUCTURAL MEASURES

In parallel with the elaboration of the overall project, several priority sectors have already undergone a detailed analysis, among others in Visp, a site which is both industrial and urban, where works have actually already begun. However, these advance measures in five priority sectors, which are to be implemented up to about 2025, are not enough to completely satisfy the authorities. Therefore, a review of feasible partial measures was made, with the aim of combining maximum efficiency and compatibility with the overall project. Those measures finally recommended favour integrated risk management over the entire range of discharge levels, as opposed to measures which only raise the inundation threshold, without providing any response to the residual risk, possibly even increasing it.

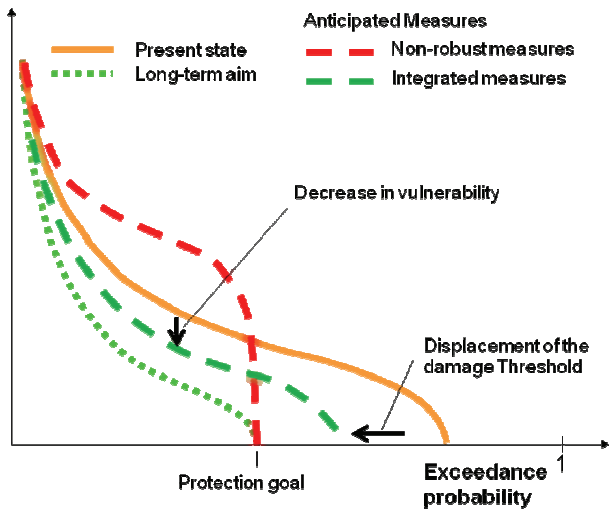

Fig. 1 Effects of the various actions taken against risks.

COMMUNICATING ABOUT RISK

The publication of the hazard maps for the entire Rhone Plain definitely requires a solid communication strategy in view of the size of the area affected. There is a real risk that the constraints these maps entail will favour the implementation of short-term measures to the detriment of sustainability. The interpretation made of the maps by those affected generally induces them to seek only to reduce the hazard level (down to low or residual, both of which generally have no building limitation attached), without any concern for the overall residual risk or the other functions of the river. A communication strategy exclusively focused on the hazard maps is therefore unsatisfactory: it should much rather aim to develop an authentic risk culture.

CONCLUSION

The Rhone engineering project upriver from Lake Geneva is exemplary of the challenge represented by a critical hazard situation which affects a very large geographical area and can only be mitigated by works lasting several decades. Adequate response must be given both to the fears of the population and to the pressing demands for immediate securing of sensitive zones. Actions must be taken to favour the acceptance of sustainable measures. However, this must not be done by compromising integrated risk management.

Keywords: hazard maps, flooding, land use planning, anticipated measures, communication