

Turning hazards into resources, and back again? State of the art in flood management strategies in the EU and the US

Transformer les risques en ressources, puis revenir en arrière ? Les plus récents développements en gestion des inondations dans l'Union Européenne et les Etats-Unis

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RÉSUMÉ

La Directive relative à l'évaluation et à la gestion des risques d'inondation de l'UE (2007) exige pour la première fois de tous les Etats Membres de cartographier les risques d'inondation, tout en reconnaissant que les inondations sont des événements naturels, bénéfiques pour les écosystèmes. L'application de la Directive Inondations est étroitement liée à la Directive Cadre sur l'Eau (2000), reconnaissant l'importance des bassins fluviaux pour mettre en œuvre une planification et une gestion de l'eau. La recherche proposée ici analyse comparativement la gestion des inondations dans l'UE au titre de la Directive Inondations et la gestion des inondations actuelles aux Etats-Unis, s'appuyant sur des exemples précis sous climat méditerranéen en Espagne et en Californie. Notre travail s'est appuyé sur l'examen de documents relatifs aux politiques publiques, d'entretiens avec les fonctionnaires et autres experts responsables de leur mise en œuvre, et notre expérience au sein de la Commission européenne et au sein du Corps de l'armée américaine des ingénieurs, ainsi que sur les synthèses résultant d'ateliers scientifiques à Berkeley et à Washington DC, où ces questions ont été discutées par les acteurs compétents. Les principales différences et similitudes ont été identifiées et synthétisées afin de fournir des indications pour améliorer les futures stratégies de gestion des risques d'inondation en Europe et aux Etats-Unis.

ABSTRACT

The EU Floods Directive (2007) requires for the first time that all Member States map flood hazards, while also recognizing that floods are natural events, with positive ecosystem benefits. The implementation of the Floods Directive is closely tied to the Water Framework Directive (2000), which requires river-basin-level planning and management of water. This research contrasts flood management in the EU under the Floods Directive with current flood management in the US, drawing on specific examples from Mediterranean-climate Spain and California. Through review of policy documents, interviews with agency officials and other experts, drawing upon our experience working inside the EU Commission and within the US Army Corps of Engineers, and through workshops in Berkeley and Washington DC where these issues have been discussed by knowledgeable actors, key differences and commonalities have been identified and summarized in order to provide insights to improve future flood risk management strategies in Europe and in the US.

KEYWORDS

European Union, flood Directive, flood management strategies, flood maps, United States.

INTRODUCTION

In response to extensive flooding in Central Europe in 2002, in 2007 the EU adopted the Directive 2007/60/EC on the assessment and management of flood risk, also known as the *Floods Directive*, to reduce and manage risks posed by floods to human health, the environment, infrastructure and property. Under this Directive, floods are no longer seen simply as a 'hazard' but rather as recurring, natural events, which have important ecosystem benefits (e.g., groundwater recharge, soil fertility). Flood mapping is a crucial element of the Floods Directive. Two types of maps are required: *flood hazard maps*, which show areas that will be inundated under three different scenarios: low probability (ordinary floods), medium probability (centennial floods), and high probability (extraordinary floods), and *flood risk maps*, showing potential population, economic activities and the environment at potential risk from flooding. The Flood Risk Management Plans are due in 2015, in coordination with the River Basin Management Plans required under the Water Framework Directive.

The Floods Directive is a step forward from previous EU policy, which only *recommended* natural hazards mapping, and from previous national flood-management strategies, which were more focused on hard infrastructural approaches for risk reduction. However, the Directive does not call for specific measures to be taken and the way in which flood management is handled strongly depends on the national approaches. Thus, some published hazard maps show areas protected by levees as not being in the flood plain and thus suffer from a shortcoming that also plagues FEMA maps in the US: neither residual risk from larger floods, nor the risk from levee failure, is reflected on the flood hazard maps. For example, in Catalonia (Spain), potential flooding areas were mapped based on geomorphological/topographic criteria, and also accounting for hydraulic structures such as levees. Thus, these maps do not show the residual risk associated with the possible failure of hydraulic infrastructures. According to some experts, flood maps can create a misperception of the actual risk and it can have severe implications both for risk perception and for preparedness.

METHOD

Drawing upon published research, EU Commission documents, interviews with EU Commission staff, and past experience with the EU Commission on flood policy, flood policies at the EU level have been documented. Similarly, drawing upon published research, documents, and prior experience, national-level flood policy in Spain has been documented. Current flood policy at the federal US level and at the California state level has been documented based on published research, documents, and prior experience working with government agencies and other actors. Specific attention has been focused on issues of how levees (dykes) are considered in mapping of flood-prone areas, how residual risk is communicated to floodplain residents, and more generally how floodplain residents perceive their risks. Workshops in Berkeley and Washington have drawn out lessons learned from recent floods and presented the concepts of the EU Floods Directive to US partners.

RESULTS AND DISCUSSION

The EU Floods Directive provides an interesting point of reference during the on-going discussion of federal flood policy (and proposed legislation) in the wake of this year's flooding in the Mississippi River basin. There are several components of the Floods Directive that are innovative and that could provide useful models for the US. These include 1) the emphasis on regarding floods as natural events with ecosystem and water supply benefits, and not necessarily negative, 2) river-basin approach to water management (already being implemented under the Water Framework Directive) within which flood management approaches must be integrated, 3) the use of three different scenarios to map flood hazard, and 4) to take into account the future changes in the risk of flooding as a result of climate change.

The EU can potentially learn from the US experience as well, because floodplain mapping has been implemented across the US for over four decades, whereas in some parts of Europe, such maps did not exist before requirements of the Floods Directive. The experience of the US in floodplain mapping, including problems arising from 'removing' lands behind levees from the official floodplain, could provide useful insights to EU Member States as they implement mapping programs.

CONCLUSIONS

At the international scale, there appears to be a new emerging paradigm of integrated risk management that regards floods as natural –and essential- events with positive impacts for ecosystems. In terms of their benefits to society, ecosystems deliver a wide range of services that contribute to human well-being, such as the supply of water, food and fibre, water purification, climate regulation, flood regulation, coastal protection, recreational opportunities and, increasingly, tourism. Both the US and EU current flood management systems have already begun to pay attention to the new emerging paradigm of flood management and are ‘prepared’ to increase the resilience of their socio-ecological systems in order to reduce their vulnerability to the impacts of climate change. Still, important adjustments in current policies and flood-management approaches are needed. In particular, in flood maps, a simple line can convey the idea of areas being safe or unsafe in absolute terms. The use of this type of graphic language to portray the level of risk can have severe implications both for risk perception and for preparedness. Thus, disaster risk reduction strategies such as spatial land use planning and issues such as residual risk must be given greater attention, not only at national but also at regional and local levels.

LIST OF REFERENCES

- Integrated Risk Governance Project (IRG). Serra, A., Tàbara, J. D. and Chabay, I. (2011). *Assessing the role of vertical and horizontal communication in disaster risk reduction learning and planning. The case of the Spanish Tous dam-break, 1982*. A report for United Nations International Strategy for Disaster Reduction – ‘Hyogo Framework for Action 2005-2015 Mid-Term Review’, UNISDR.
- Ludy, J. and Kondolf, G.M. (2011). *Flood risk perception in lands ‘protected’ by 100-year levees*. Natural Hazards (in revision)
- Serra A. (2011). *Turning Hazards into resources? Floods, wetlands and climate change in the Mediterranean coast of Spain*. Doctoral Thesis. Institute of Environmental Science and Technology (ICTA), Autonomous University of Barcelona, Barcelona.