

TERRITORIAL PLANNING FOR THE MANAGEMENT OF RISK IN EUROPE

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1 INTRODUCTION

Natural disasters are a typical example of people living in conflict with the environment. The vulnerability of populated areas to natural disasters is partly a consequence of decades of spatial planning policies that failed to take proper account of hazards and risks in spatial planning and development decisions. Therefore it is critically important to bring together knowledge, technology and actors in the field of risk governance and spatial planning to achieve more effective natural disaster prevention and mitigation.

This paper presents eight country studies and their assessment which have been carried out as a part of the research project «Applied Multi Risk mapping of Natural Hazards for Impact Assessment» (ARMONIA, 2004-2007), funded under the EU Sixth Framework Programme. The overall aim of ARMONIA is to provide the EU with a set of harmonised methodologies for producing integrated risk maps to achieve more effective spatial planning procedures in areas prone to natural disasters in Europe (floods, earthquakes, landslides, forest fires, volcanic eruptions, meteorological extreme events).

In view of the project objective, the assessment presented in this paper focuses on three main questions:

- How does spatial planning take into account the risks of natural hazards?
- Which role does spatial planning play in practice in the risk governance process of natural hazards?
- Which kind of information does spatial planning need to play an important role in natural risk mitigation?

2 ASSESSMENT OF SPATIAL PLANNING APPROACHES TO NATURAL HAZARDS IN SELECTED EU MEMBER STATES: GENERAL FINDINGS

The country studies were initiated by the ARMONIA project and originally carried out following a common structure which enabled a comparative evaluation of the case studies and the identification of advantages and problems of the different planning systems and the

practices of dealing with natural hazards. The questions that had to be answered in the country studies went into two directions: First it was asked how spatial planning considers natural hazards and second how the assessment and management of natural hazards are organised and if spatial planning plays a decisive role herewith. The answers to these questions will be summarised and commented in this paper (Greiving, Fleischhauer & Wanczura, 2005; 2005a; 2005b).

On a very general level (without distinguishing between planning levels and single hazards) the table shows that most natural hazards (landslides, floods, forest fires, volcanoes and earthquakes) are addressed by spatial planning. However, comparing this list with the country profiles of natural hazards (see Table 2) it is obvious that natural hazards are not taken into account by spatial planning in every case. Here, significant differences exist between the different countries.

On the other hand, the studies have revealed some surprising similarities between the assessed countries concerning the responsibility of risk assessment and risk management. In all countries, only sectoral planning divisions are responsible for the assessment of risks. Spatial planning plays no significant role in this context.

Further, risk management is mainly based on hazard related information while no attention is paid to the given hazard exposure (Germany, Finland and Spain). Only in France the use of hazard and risk maps for all relevant hazards seems to be common. The analysis revealed that in planning practice the use of hazard maps is made only in a few countries (France, Spain) whereas risk maps are not in use at all. This corresponds with the fact that there is a dominance of hazard assessment in the assessed Member States. Similarly, only little attention is paid to vulnerability, i.e. the use of vulnerability indicators or vulnerability maps (as e.g. seen in the example of Germany).

The responsibility for risk management is shared by sectoral planning and spatial planning whereas spatial planning plays only a minor role and mainly acts in the area of hazard mitigation due to the long-term character of planning decisions. On the regional level, various responsible sectoral planning divisions are in charge of the management of natural risks. Regional planning is often only *one of many* supporting actors with the duty to implement measures, or to secure the implementation of measures which are carried out by sectoral planning divisions. Only in the context of non-structural mitigation measures is spatial planning important for the minimisation of damage potential (Finland and Germany). In contrast, municipalities which are a major actor at the local level use land-use planning as only one of many other tools to reduce the risks within their area of responsibility (Germany, France and Poland).

A further question in the focus of the analysis was, if multi-hazard approaches for assessing natural risks exist and if they were taken into account in planning practice. This was assumed to be of importance as a spatial view of natural hazards should consider *all* kinds of hazards through a multi-hazard or multi-risk approach on all spatial levels. Spatial planning cannot reduce its focus on only one or two hazards because it is responsible for a particular spatial area and not for a particular object. In contrast to the theoretical ideal, most risk assessment approaches analysed in the different Member States have a single hazard focus and/or a project oriented perspective. In some cases they are based on scientific studies without any significant influence on planning practice (Germany). In the analysed countries

the only examples of a multi-risk approach systematically introduced as an analytic basis for planning practice have been found in France, Greece and also Italy. It is necessary to note that some countries are affected by a larger number of natural hazards (e.g. Greece in contrast to the United Kingdom), so especially in those countries a multi hazard approach will be quite ambitious.

Above these findings, an additional observation in all assessed countries was that the intensity of attention paid to natural hazards depends on the experiences from *recent* disastrous events rather than the occurrence of disastrous events in the more distant past or scientific hazard assessments (disaster driven process). Consequently, risk assessment and management focus on more frequent hazards than on less frequent events. The result is a tendency to underestimate the hazard and risk presented by extreme events.

Further, in all of the presented best practice examples, special attention is paid to the coordination of the activities of all involved actors in the whole disaster driven process, i.e. mitigation, preparedness, response and recovery. The general planning practice however is characterised by actors who operate without or with only a few coordination among each other.

A basic requirement for any kind of risk assessment to be used in spatial planning is the existence of and a legally binding basis for hazard and risk maps. This means, spatial planning needs specific spatially and cartographically presentable information as a basis for decisions about future land-use as well as land development. It is necessary that this information has to fit with the spatial scale to be used on regional or local level. The analysed planning practice indicates that hazard mapping is an obligatory task in most assessed countries, at least for the most relevant hazard river floods (Germany and United Kingdom). Only in some analysed countries the existing legal basis for hazard and risk maps is actually neither sufficient nor satisfactory (e.g. in Poland where until present no legal framework exists at all).

3. ASSESSMENT CONCLUSIONS

Potentially, all identified chances can be considered as useful elements for a general application in any country and therefore also for a harmonisation of spatial planning practices and methodologies among Member States. However, it should be emphasised that this expectation is rather unrealistic because certain chances, which can be seen as strengths in some Member States just cannot be easily implemented or adapted by other countries. Therefore, the main criteria for the selection of key elements of best practice have to be the possibility of their adoption independently from the existing planning systems and planning cultures or other social, cultural and financial backgrounds. In consequence, the findings concentrate on procedural and methodological aspects. The following points form a certain minimum core of useful elements.

3.1. Hazard assessment

Hazard assessment is – as already mentioned – a task for sectoral planning. In consequence there is no need for focussing on hazard assessment as a part of the spatial planning process. Nevertheless, spatial planning can be seen as one important end-user of hazard related

information, provided by sectoral planning. In order to meet the requirements of spatial planning, minimum standards for hazard mapping are indispensable. Additionally, sectoral planning should indicate those areas, which might be threatened by hazardous events. In consequence, the authority in charge of risk management would be able to weighing-up the existing threats with other interests in those areas where the spatial extent of a hazard and certain land-uses overlap.

On this basis, specific risk management strategies can be chosen for areas which are prone to certain hazards. Moreover, comparable procedural requirements as well as the results of the hazard assessment, made by sectoral planning can be guaranteed. Furthermore, it is clearly visible, that any forthcoming EU directive on hazard or risk mapping has to be addressed at all planning authorities dealing with hazard assessment.

3.2. Risk assessment

A multi risk perspective is not easily taken on by sectoral planning divisions which in general are focused on particular hazards. It can be understood as a task for spatial planning which is concerned about all potential threats to a given spatial area and their possible interaction. The results of a multi-risk assessment lead to risk management measures which can influence the risk management of single hazards that is carried out by sectoral planning divisions. In other cases sectoral planning might be responsible for the implementation of appropriate measures which aim at the reduction of the overall risk in a certain area. In consequence, an involvement of the several sectoral planning authorities in the field of multi-risk assessment and management seems to be indispensable aiming at a coordinated and integrated strategy.

Further, the coordination of activities has to be seen as an important aspect in risk management, especially on the regional level. Integrated risk assessment needs a coordinating actor. Due to the wide range of existing responsibilities, this task can mainly be taken by municipalities. A special risk unit or task force shall be in charge of the coordination of risk assessment and management. Land-use planning can be understood only as a supporting actor in this context by (1) providing support for vulnerability assessment because spatial planners know about e.g. vulnerable populations or future development of damage potential and (2) implementing protection goals e.g. by means of settlement restrictions.

Finally, the Strategic Environmental Assessment Directive shall be considered as a common tool. A procedural framework for risk assessment will be indispensable for reaching the political goals of EU environmental policy. The SEA is well established by legislation and can be described as an existing common procedural framework for managing risks threatening the environment. However, given that SEA is relatively new and does not appear to be used to address hazard issues, it would be useful to emphasise the potential role of SEA to planning practitioners.

3.3. Risk management

Regional and local authorities need the know-how to conduct an effective risk management process. The analysed best practice examples indicate that risk management within spatial

planning can be successful. However, in each example the success is based on sufficient information being available, first about the existing risk and second about appropriate measures aiming at tolerating or altering the assessed risk. In consequence, it seems to be promising to disseminate existing information, which in most cases is not available for every planning authority. *The establishment of guidelines and handbooks for risk management* could fill this gap.

Further, a proactive involvement of the public is helpful in order to influence single households. This involvement has two dimensions: first, providing extensive information about the existing hazard potential as well as the already existing mitigation, preparedness and response elements in order to improve the public awareness and second, based on the awakened public awareness, the active integration of single households in risk management.

Another important aspect is the need for integrative concepts which became obvious in the best practice examples. Such integrated concepts cover structural as well as non-structural mitigation measures, preparedness and response elements. In consequence, their perspective has to be much broader than only land-use oriented. Spatial planning is consequently only one of many actors in this field of action.

Finally, a reorientation of funding policy combined with the development of protection goals is considered to be an important element of risk management. Presently, the funding of single projects aiming at risk management is state of the art. Normally, these projects were chosen without any operationalised protection goals as a basis. In consequence, the fulfilment of certain goals can not be guaranteed or even evaluated. The main idea behind the development of protection goals is to produce arrangements in combination with a quantitative output. The government shall allocate finances in line with the goals. The regional or local levels take the responsibility for the implementation of measures in order to reach the protection goals.

4. CONCLUSION

Spatial planning is not responsible for undertaking risk assessment, but makes use of the results provided by sectoral planning. However, the relevance of risk assessment for spatial planning has to be readjusted again: Spatial planning normally needs only hazard information; risk and vulnerability are only important in a few extreme situations (e.g. where relocation of existing development is being considered). For risk management (non-structural mitigation activities), only the vulnerability of the different objects to be protected is, in general, of relevance (e.g. the different type of land-uses or the different types of buildings). In contrast, structural mitigation and emergency planning need information about the existing vulnerability. This information has to be seen as a basis for the analysis of costs and benefits of given alternatives or evacuation plans.

In consequence, the further scientific work should concentrate on the optimisation and harmonisation of hazard assessment, which is principally needed for the daily, routine practice of spatial planning. The findings should be part of the forthcoming directive on hazard mapping.

For extreme situations of high hazard and likelihood where the relation of existing population and development is being considered; further work should make use of an existing

multi-risk approach which can be adopted for spatial planning. This has to be understood as an ideal standard and should be presented as a recommendation, e.g. as a part of a handbook. Here, the need to agree on a common definition of «vulnerability» has to be seen as crucial.

In addition, the following observations, conclusions and recommendations have to be made:

- *Spatial scales:* Hazard information is needed on two different scales: a regional and a local one. In consequence, there is only a need for two harmonised legends.
- *Multi-risk approach:* There is no real need to create multi-risk indicators or indices from a spatial planning point of view. It is more important that all relevant hazards are really considered in spatial planning practice.
- *Multi-hazard approach:* Most of the examples have shown that relative hazard scales are a possibility to create integrated multi-hazard information.
- *Information management:* It is highly important that existing information is accessible and that information flows are managed.
- *Indicators:* the most important indicator for spatial planning is the extent of the hazard; further, the occurrence is important; for some planning designations, indicators about hazard intensities (water depth, water speed etc.) are important
- *Addressees:* Sectoral planning has to be seen as the direct addressee of the forthcoming directive whereas spatial planning can be characterised as one of several end-users which have to take into account the provided hazard information.