

RISK IN PRACTICE

A MULTIDISCIPLINARY APPROACH FOR A BETTER FLOOD MANAGEMENT IN MOUNTAINOUS AREA (CARNIC PRE-ALPS – NORTHEASTERN OF ITALY)

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INTRODUCTION

Risk is a well-known concept, largely analyzed by the scientific community and various types of definitions are accepted: some focus on hazard, others focus on vulnerability and the most recent definition integrates both components (Kelman, 2003). This diversity of risk's definitions results in a large number of methods and tools for risk assessment, and of measures for disaster risk reduction without bringing systematically some improvements in risk management. For example, regarding flood management, risk reduction is still largely based only on engineering and hydrological measures (Plate, 2002). However, flood risk should also be tackled following a vulnerability reduction approach, which could use a GIS method that would include all the different spatial, social, economical, and political factors contribute to the vulnerability of communities (Pottier, 2003; Barocca et al., 2006; Th. Plattner, 2005). So, how is risk concept applied by practitioners? Did they consider all dimensions of risk (hazard, exposition, structural vulnerability, resilience)? Do risk applications match risk concepts? If differences exist, what are their origins? In other words, is the report drawn up by Plate in 2002, regarding flood risk management, still holding true after 8 years?

In order to answer to those questions, we analysed the actual flood management in Casiacco village, which is located downstream of the Arzino Catchment (119.6 km²; North-eastern of Italian Alps). Three reasons motivated the selection of this catchment. First, although the Arzino Catchment is composed of mainly limestone, the catchment is prone to torrential phenomena. Secondly, in the past eight years of study, we observed a paradoxical state regarding torrential risk (including flood and landslides) and its perception by the local councillors, engineers and, inhabitants. It was found that they viewed the rapid progression of the forest cover in the 50-60's, as the main reason for the increase of floods. Thirdly, in various interviews (69 in-depth interviews which consisted of one to three hours) with local councillors, engineers, and inhabitants, we observed that risk's concept was frequently confused with hazard's concept and that the word "vulnerability" or the related aspects was very rarely cited. Finally, this research aims to: (1) define actual flood risk management at the local level; (2) identify the possible effects of these two paradoxical states regarding the flood risk management at local level.

METHOD

In this paper, we consider four aspects of risk management which are necessary to prevent disasters: (1) risk knowledge, (2) disaster prevention, (3) disaster mitigation, (4) disaster preparedness. In order to analyze these four aspects, we applied a pluri-disciplinary and pluri-scalar approach in three steps. Firstly, we verified the knowledge about hazard and vulnerability regarding flood phenomena in Casiacco in order to identify the weak points to improve. After identifying the weak points, a social and historical study allowed mapping of historical flood disasters in Casiacco's village (1910-2005). This step included an inventory of flood protection systems (dikes and earthworks) which characterized the topographical changes in Casiacco's village since the 70's. Secondly, we analyzed regional guidelines regarding flood risk in order to understand the applications of risk's concept.

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Finally, at the local level, we assessed the vulnerability of different districts and of the inhabitants using a socio-economical survey treated in a GIS. The aim of this third step is to underline the weak points regarding disaster mitigation and preparedness. Also, it allows the creation of a pamphlet to educate the public of the flood risks and a GIS project to improve the emergency system.

RESULTS

Regional planning program focus mainly on hazard with structural measures (like dikes), advocated by laws and safety standards. Although vulnerability's concept was timidly introduced in guidelines, risk reduction is principally based on flood prevention. The fact that local councillors and practitioners confused risk and hazard is not casual and, in a way, it is a mirror of actual flood management. Is this kind of management efficient to prevent disaster? In fact, the study of disaster prevention underlines one point: although hazard is well documented at a regional level, knowledge isn't sufficient to calculate the exact dimensions of dikes or others protection systems, at local level. It is now necessary to apply an inundation model for assessing inundation depth and flooding area. This point is important because Casiacco's village has had many topographical changes since 1976. Secondly, disaster mitigation and preparedness are reduce at the local level to the minimum requirement and are the weakest points in flood management. In fact, regarding disaster preparedness, inhabitants have a good knowledge of local flood areas, but they are not well prepared to face a heavy flood event. This is due to a lack of specific information, some difficulties in accessing the information, and a lack of risk awareness. Finally, to improve flood management at the local level, we supplied the municipality with four documents: (i) a specific information leaflet regarding behaviour before, during, and after a disaster; (ii) three papers were written in order to make the science accessible to the inhabitants and to engineers; (iii) a map of more vulnerable districts that should be a priority for emergency assistance; (iv) we proposed a new footpath with public notices about the flood's.

In conclusion, improving flood management is necessary to considerer risk as a system with strong interactions between natural and social components, and to adopt an integrated way of management, which includes local communities in the process of vulnerability mitigation. In fact, with the example of Casiacco village, we show the importance of a multidisciplinary approach in which all aspects of risk management are analysed. It allows the identification of the weak points at local level and the establishment of tools adapted to a specific situation. The next step will be to verify if this method can be directly used in others situations or if accommodations are necessary.

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