THE NECESSITY OF A FLOOD RISK MANAGEMENT STRATEGY FOR A SUSTAINABLE RURAL DEVELOPMENT

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ABSTRACT
Flooding is a natural process; they become a risk to society as human develop activities in the riparian areas without paying attention to the measures required by each situation. In rural areas, floods have significant impacts on agriculture and can cause visible damages for property and settlements, as a consequence of land cover change. The development plans of rural areas must take into account the Directive 2007/60/EC on the assessment and management of flood risk, because its implementation is a necessary measure for a sustainable development. Flood risk management re presents the application of policies, procedures and practices, having as objectives risk identification, their analysis and assessment, treatment, monitoring and reassessment of risks in order to reduce them, undertaking of preventive measures in order to limit the effects of floods. The core objective of the research is to enhance the role of the land use planning in the flood risk management plans. Planning purposes to guide the new development of the area to reduce the vulnerability and the flood risk; if not, the development could be compromised. The article includes several proposals for the issues which must be taken into account for a flood risk strategy.

Keywords: floods, land use planning, rural areas, flood risk management strategy, sustainable development

INTRODUCTION

Floods are a natural phase of the water cycle, resulting from the temporary covering by water of land that is normally dry. Vulnerability to floods increased as human occupation of floodplains intensified. Floodplains and deltas offer favourable conditions for human settlement and economic development (VIS et al, 2003): floodplains provide fertile farmland, drinking water, food and they act as corridors for transport etc (PETROW et al, 2006). The rural space appeared with the arising of first settlement and first amenities in order to achieve agricultural production. Under the impact of industrialization and urbanization, in rural space there are obvious structural changes, amenities and improvements to increase the capacity of production of farmland, development of communication routes and the quality of live. At the same time, rivers have negative effects on human activities and human himself, so settlements may experience high damage if they are affected by floods. This is the case when human activities in the river channel and the adjacent floodplain have been developed without taking into account the associated risks (UNECE, 2009). Many floodplains have been embanked, streamlined and drained for agricultural purposes. This had a negative impact on the river bad, as the appearance of flood events was enabled. Water flows rapidly, through a narrow channel, and the flash flood is amplified. Floods in the river floodplains should be seen as a normal process; that is the nature of things as continuous rain causes the river to overflow their usual banks and human activities such as agriculture, industry, roads or human settlements been affected. Due to an increasingly human intervention on natural system, its normal evolution is disturbed. If the changes are fundamental, the intervention breaks the rhythm of the natural evolution (IANOŞ, 2000). Human interventions in the river runoff, deforestation or intensive grazing play an important role in the evolution of the system.

The land cover change caused a disorder of water cycle, by accelerating the runoff and the soil erosion and by reducing water infiltration into the soil. Human intervention on the environment must be limited to certain intensity and certain components because of the brutal intervention that generates instability in the system.
Risk (an expression of the combination of the flood probability and the magnitude of the potentially adverse effects for human health, environment, cultural patrimony and economic activity) is inherently related to human presence in a certain area, because human is able to understand the causes and the consequences of the natural hazard. The existence of a community impose the term of "risk", if the society would not exist (people and material goods), then we would only talk about the term of "natural hazard" (which is viewed as a naturally occurring or human-induced devastating event, in a certain period and for a certain territory) (ARMAŞ, 2006). A flood produces in unpopulated areas, where the natural land cover had not suffered changes (so it is not used for agricultural or settlement use), would cause less damages than a similar one, where anthropic intervention is visible. Although the environment and natural landscape are very important for society, they are less priority than threats to people life or property. An absolute protection against floods shall never be possible, and floods risk management is not a synonymous to flood protection. Floods cannot be prevented, but it can be mitigated by technical measures. Therefore, a flood management plan in a hydrographical basin should focus on the activities of preparedness and prevention, for a sustainable protection against floods.
There are many areas which are already undergoing a periodical risk to floods, and after such an event, everyone agrees that measures must be taken, but nobody dares to implement them for a better protection against floods. As time passes by, such measures seem to be partially abandoned and forgotten, even if they are legally required, although these are precisely the opportunities to adopt the policies against floods. Three causes explain this: the absence of a planning framework of the land (in default of any control regulation of the land market), the absence of competent authorities, able to take measures for such purpose and human's indifference. The process of learning from past experiences and possibly past mistakes needs to be improved. Examples from past situations should be assessed, documented, taken into account for a good planning and for a good risk management. A new flood should be the feedback into the risk management cycle.

MATERIAL AND METHOD

This article is about the importance of land use planning and how it should be integrated in a flood risk strategy management for a sustainable development. The effects of climate change, as the production of more violent rainfall (after a period of drought) will increase the floods risk in areas which have never been flooded before. Therefore, the planning process must take it into account and must integrate flood risk, starting from a local scale, up to regional, national and cross-border. Thus, planning must integrate the flood vulnerability and flood risk, from local scale, continuing with regional, national and even transboundary scale. Land use planning is a step in the activity of flood prevention and it is managed by the public sector. Thus, it will be promoted a control of land use for a new development, reducing or limiting the impact of natural disaster (SMITH, PETLEY, 2009). To manage flood risk, the planning authorities must take into account the development trends of society, both long and short time. Also, the communities have to manage effectively the land use and the development in flood-prone areas. Early identification and communication of risk is viewed as a factor in community's success.

The research points the most important aspects that should be pursued in the development of localities: population, settlements and economic activities. Each of this aspects may be at flood risk, so must be protected from any potential damage.

RESULTS

Flooding can cause significant detrimental environmental effects (like soil erosion, bank erosion, land sliding and damages to vegetation), damages to the infrastructure and properties, but the most important is the social impact (like the physical injury, illness and loss of life). In most cases, social and environmental flood risks are often neglected, because risk assessment often focuses to damages that can be easily measured in monetary terms. The ability of people to respond and recover from a flood can vary. Vulnerable people, such as those who are old, disabled or have a long-term illness, are less able to cope with floods than others. Some people may have difficulty in replacing household items damaged in a flood and may lack the financial means to recover and maintain acceptable living conditions after a flood (http://www.flooding.ie/en/).
Tunstall, Johnson and Penning Roswell (2004), identified, in the flood hazard context in UK, three phases of change, each characterised by terms commonly used at the time to describe the main policy approach:
- land drainage (focused on structural flood defences);
- flood defence (with flood warning systems and public awareness raising);
- flood risk management (with land use planning and development control for flood risk areas). In flood risk management most attention is given to prevention and mitigation.
Flood risk management strategies should follow all the steps of the risk management cycle: preparedness, response, recovery and reconditioning of the management system. Preparedness aim is to minimize the vulnerability of people and material assets to natural hazards through preventive (like land use planning, hazard assessment and hazard maps, technical and biological measures) and precautionary measures. The main duty is to correctly convert the results of the disaster-analysis and to integrate them into planning (http://www.planat.ch/).
Land use planning is beneficial because it promotes a better quality of the environment in certain areas, creating better conditions for development and investment. The flood risk management strategy has to promote sustainable land use practices, particularly in vulnerable areas. Here are some directions to be applied in the land use planning: care for the environment, care for the people, their settlements and their activities.

Farmland

Agriculture still plays a dominant position in the land use and countryside, although this economic sector suffered a decline in recent years. Spontaneous vegetation diminished the surface due to increased demand for agriculture land, being mostly replaced with crop plants. Unsustainable agricultural practices, such as downslope ploughing, suppression of hedged farmland or fragmentation of plots, enhance the effects of floods (CHAMLEY, 2003). The decline of agriculture is best seen in periurban areas, where the extension of cities and industrial sites changed the land use. So, many farmlands were replaced with impervious surfaces, namely buildings and paved areas. These land cover changes will modify the infiltration of precipitation, the evapotranspiration, the soil moisture, the interception and accumulation of water in microdepressions, the surface runoff and even the drainage basin.
A solution of this is the control of new development, on the one hand promoting the re-use

of brownfield and on the other hand the protection against hazards (SMITH, PETLEY, 2009, UNECE, 2008). Re-use of land is necessary because it protects the greenfield land and reduces the degradation of the natural system. Land most vulnerable to flooding should be used as grassland and meadows, and if it used as arable land, people should take out property insurance in case of floods, to recover the losses.

Settlements

In most cases, the development of rural settlements has been made without taking into account the further rapid development. Settlements situated in river floodplains are most vulnerable, especially in densely populated areas, where measures of prevention and protection are low. The flooding hazard is increased also due to deforestation practices or due to rapid snow melting or dam breaking.

Particularly in periurban areas, local authorities tend to allow new, but unsustainable development plans, obtaining rapidly financial resources. A sustainable rural development aims to improve the quality of people's life, preserving the landscape and permitting a controlled development of the rural area: not only what investor wants, but also what the environment allows. There is a close relationship between the intensity of flooding and the area affected by flood; the higher are the intensity and duration of the rainfall, the greater the surface will be flooded. So, the identification of flooding areas and the classification of flood vulnerability of different types of development are essential. We distinguish three types or levels of flood zones: high, moderate and low probability of flooding. So, the use of high probability of flooding zone should be avoided for settlement development, it should be used for grassland and meadow. If there is a construction in these areas, the solution would be to transfer it in a safe area. People should be also encouraged to take out home insurance to recover the cost necessary for reconstruction. For each case, it is necessary to identify priority areas for land use planning or solving the existing problems.

Floodplains are important in attenuating or storing floodwater, so areas of floodplain and wetlands should be recognized and preserved to the extent possible as natural defences against flood risk. This is an important element of the now internationally accepted philosophy of "giving more space to the rivers".

The social dimension

Flooding can cause significant detrimental environmental effects (like soil erosion, bank erosion, land sliding and damages to vegetation, impacts on water quality, habitats and flora and fauna caused by bacteria and other pollutants carried by flood water), damages to the infrastructure and properties, but the most important is the social impact (like the physical injury, illness and loss of life) (http://www.environ.ie). In addition to number of deaths during the event, a large number of people would be unsheltered or would live in makeshift camps and the society would suffer economic losses, mainly as agricultural losses.

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Flood risk strategy management should take into account the good communication and cooperation between authorities, different specialists and community. Also, a risk culture is required because it allows and enables society to assess, evaluate and show the prevailing risks and their changes as well as the necessary protection measures. Although people

know that floods and other natural phenomena exist, they often find it hard to recognise it. It is easily to attribute the problems elsewhere, to somewhere safely, behind a blue door.
Land use controls are most successful in areas that are growing and still have undeveloped land available. In areas where the pressure for land development is high, zoning will be less effective. There are some limitations of land use planning, like the presence of existing development, high cost of hazard mapping, local resistance to land controls, market forces, and even the opposition of authorities (SMITH, PETLEY, 2009).

CONCLUSIONS

People shape the environment, building settlements and working the farmland. These artificial changes in the natural system cannot remain without effect on the hydrological cycle. Extreme phenomena such as floods have caused damages to the environment, to the socio-economic system, even loss of human life. Early identification and communication of risk is viewed as a factor in community's success. The uncertainty, fear and lack of useful information to guide individual and common actions are risk factors that affect personal and community's safety. In this sense, land use planning authorities have to establish flood risk management plans, focusing on prevention, protection and preparedness.
The flood risk management strategy should aim to reduce the potential risks to people, property and environment through a sustainable land use planning. The community and local authorities have to manage effectively the development of settlements in flood-prone areas and the land use. Development should be located in areas with little or no flood hazard, thereby avoiding or minimizing the risk. It is preferably to chose lower risk flood zones for new development.
An absolute protection against floods will never be possible, so we have to learn how to live with floods.

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