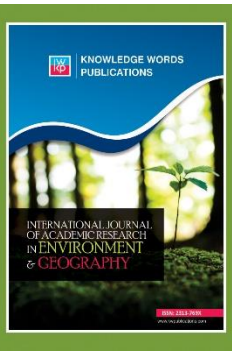

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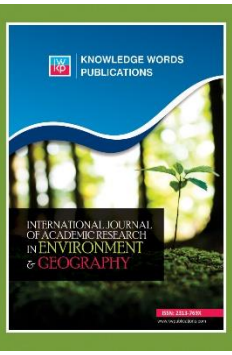

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Floods in the Last Decade: Management Flood Risk Strategy in Novaci City, Romania

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Abstract

Floods are natural phenomena and constitute a natural component of the hydrological cycle of the earth. Floods, especially the largest floods, are one of the natural phenomena that have deeply marked and mark, in the present, the development of human society, in geographical terms being the most widespread disasters around the world and also the largest producer of damage and human casualties. At the same time, major floods represented the triggering and catalyst factor for big changes in the approach of this phenomenon, from accepting floods as a quirk of nature, to man's attempt to oppose nature through approaches such as fight against floods to the flood defence until not long ago to flood prevent.

The aim of this article is to present the catastrophic flood that took place in Novaci City, Gorj County on July 29th 2014 when the city was the scene of a tragedy after a heavy rain fallen on slopes over a few hours. The damage estimation was 35 million lei.

Keywords: Floods, Novaci, Rains, Risk Management.

Introduction

The floods of the past decade were caused by multiple factors represented by natural climatic conditions that generated large amounts of precipitation, storms, and evident imbalances in the general nature of each season separately.

Although floods are natural phenomena, they may be intensified due to environment deterioration, for example the changes of water collection systems through urbanization, inadequate agricultural practices and deforestation. It is one of the reasons why, in many cases, the impact of floods, expressed in terms of human life and health, but also in economic losses, has significantly increased.

In recent years, European documents are considering those climate causes involving an increase in levels or flows of water than normal (Duțu, 2003).

As noted, the rains and snows fallen in the last decade were actually large amounts of rainfall in a very short time. At the same time, the infiltration capacity of the soil was completely

overcome, due to the carrying capacity of the minor beds. As a result, water discharges occurred in floodplains with flood production.

Rainfalls and snowmelt represent another factor of floods in temperate and cold zones. Rapid snow melting process due to sudden rise in temperature generates these vast amounts of water (Bronstert, 2003).

Massive and aggressive deforestation led to the destruction of several links of fluid circuit and hence there was a water leak on the energetic slopes (Grecu, 2009).

Hydraulic structures imposed by increased energy that were needed in recent years, have been made without a thorough knowledge of the causes that can lead to these maximum flows of water, which, as noted, have produced some of the greatest human and material damage. Along with rain or snowmelt after the withdrawal of water, significant economic damage with temporary or permanent discontinuation of production processes were found and there have been losses of human life, the pace of social life has changed and the environmental profile changed due to the consequences of ecological aspect.

Materials and Methods

National strategy for flood risk management, as well as practical implementation requires a multidisciplinary effort and sectorial activity. In this regard, we must consider water management, spatial planning and urban development, nature conservation, agricultural development and the forest protection, transport infrastructure, construction and tourist areas.

Important documents regarding flood risk are:

- ✓ National Strategy for Flood Risk Management in the medium and long term (period 2010-2035), Government Decision no. 846 of 11.08.2010 approving the National Strategy for Flood Risk Management in the medium and long term, published in Official Gazette no. 626 of September 6, 2010, Environment Opinion no. 18 of 04.06.2010 issued in order to adopt the National Strategy for Flood Risk Management in the medium and long term (period 2010-2035), Directive 2007/60 / EC on the assessment and management of flood risk;
- ✓ Water Law that creates the necessary application of the European Parliament and Council Directive 2000/60 / EC of 23 October 2000 establishing a framework for Community action in the field of Water, published in the Official Journal of the European Communities (OJEC), no. L 327/1 of 22.12.2000.

These documents concern the many common policies that refer to common interest and convergent effort in reducing flood risk. Essentially, common policies aim to reduce the damage in order to protect life, property and the environment against the phenomenon of flooding.

Today, it is clearly stead that circadian activities along with human interventions in natural processes, lead to dramatic changes in all river basins. Therefore, flood risk management must become an important component of watershed management plans and implementation of the national strategy for flood risk management, this situation being actually a connivance of the efforts of several institutions, ministries, national, regional, county authorities, etc.

In the broad enforcement action of implementing flood risk management, there are important sponsor factors: Ministry of Environment, Ministry of Transport, Ministry of

Economy, Hidroelectrica – private actors or governments: National Administration, „Romanian Waters", National Administration of Land Reclamation, Forest National Administration, Romanian National Administration of Roads, Railways.

National Strategy for flood risk management is based on the following principles: the principle of sustainable development, including the economic acceptability, social acceptability, ecological acceptability, the principle of solidarity, strategic approach for some time, simplicity and transparency, basin approach and interdisciplinary approach regarding the problem of flooding, maintaining a balance between preventive measures and actions, implementation of best practices proposed by the European Union and the United Nations Economic Commission for Europe, concerted and integrated over the entire basin, cooperation in risk reduction flooding in terms of international regulations on transboundary rivers, according to the geomorphology of the territory of Romania and its geographical position (Duțu, 2003).

Results and Discussion

In 2014 the hydrological regime basins rivers in Romania was situated above-average.

In 2014 the most important meteorological and hydrological dangerous events were recorded between April – October and also in December. Between April – October the accumulated amounts of precipitation exceeded between 800 – 1000 mm in several basins river in the south-west, south and south- east of the country, causing particularly severe floods and in many cases there were 3 – 4 times in the same river basins.

The most dangerous hydrological phenomena, which were recorded during this period, were: important leaks on slopes, torrents, rapid rivers floods and significant increases in the levels and rates on small rivers in the upper basins rivers. Many of small basins were not been monitored in terms of hydrological and rapid propagation of downstream floods in some cases led to the formation of large-scale floods and the level of catchment basin larger surfaces.

According to the preliminary results of the analyzes conducted to date, based on available data from operational data flow, levels and maximum flow rates recorded during this period were close to historical peaks, and in some catchments even exceeded these highs values.

In terms of return the average associated by maximum flow recorded (probability of exceedance), the flow peak values were frequently exceeded by maximum flow rates with an average return of 20 – 50 years, and for the most severe floods exceeded the maximum flow rates with an average return of 100 – 200 years.

In 2014, based on the hydrological and meteorological forecasts, during dangerous hydrological phenomena were issued 60 warnings – Orange Code and Red Code (55 for inland rivers and 5 the Danube River), 30 warnings - yellow code (29 for inland rivers and 1 for the Danube River).

In 2014, annual average temperature in the country (10.2 °C) was higher than normal climatological 1.3 °C standard (1961 – 1990). Positive deviations of monthly mean temperature to normal climatological standard for each month part were recorded in all months except May, when average monthly temperature in the country was lower than the climatological normal standard 0.2 °C. The average temperature in June 2014 was equal to the climatological normal month.

The annual amount of precipitation, the national average (807.8 mm) was higher by 26.6 % than the climatological normal standard (1961 – 1990). Thus, the deviations were positive in most months, varying between 10 % (March) and 77 % (October), and negative deviations ranged from 0.5 % (in June) and 65.5 % (February).

For the case study, Novaci City which is located in Gorj County, was selected (Figure1).

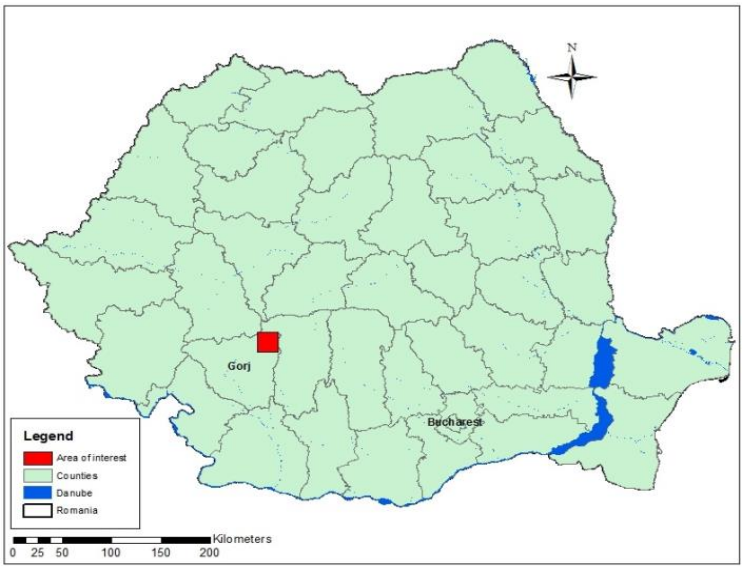

Figure 1. The location of study area in Romania
Source: our processing ArcGIS

The Gorj County's relief is varied and can be divided into three geographical units: Carpathians represented by mountains Godeanu, Vâlcan and Parâng, Getic Sub- Carpathians between Motru and Olteţ rivers, hills which stretch southern along the Piedmont Plateau. The altitude varies from 2.518 maBSL in Grand Massive Parângu, to 100 maBSL in the Jiu Valley in the southern county.

Novaci is located in the foothills of Parâng, at a distance of 44 km from Târgu-Jiu city and 80 km from Râmnicu-Vâlcea (Figure 1).

Novaci is guarded by the highest peak of Parâng Mountains, namely the peak Parângul Mare (2.518 maBSL). On July 29th 2014, Novaci has been strongly flooded due to the broken dams and river banks protection from Gilort River. According to briefings issued by the National Institute of Hydrology and Water Management, a red code warning has been given for the Gilort River**.**

According to the alert emitted, it was indicated that flooding will take place on the mountain sides due to torrential rainfall recorded in the last hour.

It is also clear that increases in rapid flows will take place, thus exceeding of danger elevation on Gilort River upstream hydrological station Tg. Cărbuneşti (The Gorj County), Lotru River (Vâlcea County), on the upper Olteţ River and its tributary Cerna (Gorj and Vâlcea). An extreme flood with a height of 3 to 5 meters occurred in Novaci City which brought stones and logs. Flood peak was recorded at around 14.00- 14.30.

The digital elevation model (DEM) was used for hypsometric map that can be found free of charge on CGIAR-CSI geo-portal in WGS84 geographical projection [CIAT, site accessed in Sept, 2015]. The DEM has a spatial resolution of 90m and spatial resolution of 30 m was obtained by interpolation. The program used to create maps for this study case is ArcGIS 10.1.

It is noted that the area has an altitude of 368 maBSL in the south where it is the high density of localities situated mostly on rivers and in the north and a maximum altitude of 2377 maBSL is – Parâng Mountains (Figure 2).

The hypsometric map is relevant to identify areas that are susceptible to certain geomorphological processes.

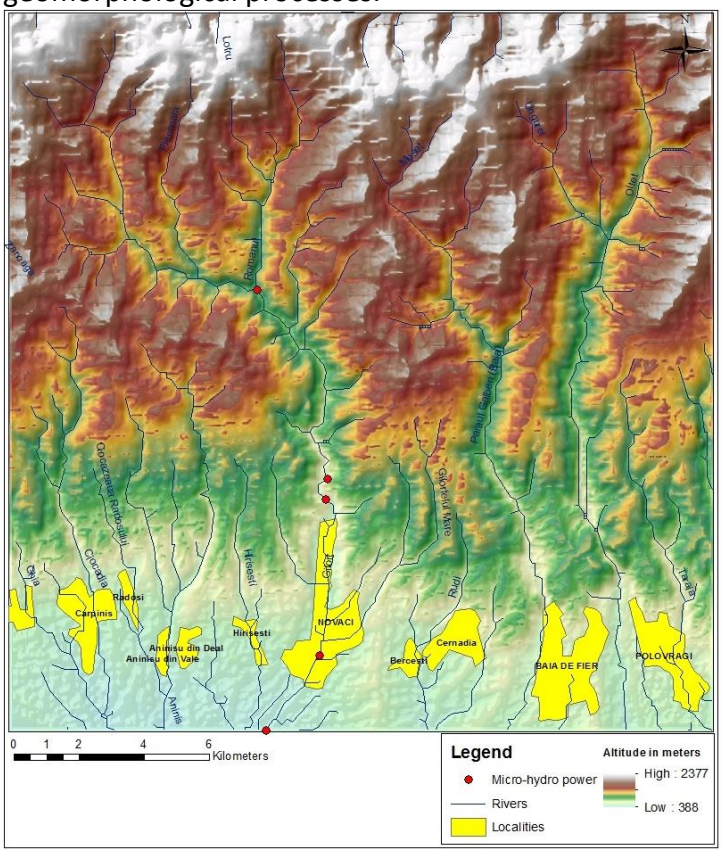

Figure 2. The hypsometric map of study area
Source: our processing ArcGIS

Further, the areas susceptible to flooding land were identified highly dependent on topography, soil type and vegetation. Flood modelling process was achieved using ArcMap and ArcScene [Monde Geospatial, 2015], resulting simulation map of flooded area (Figure 3).

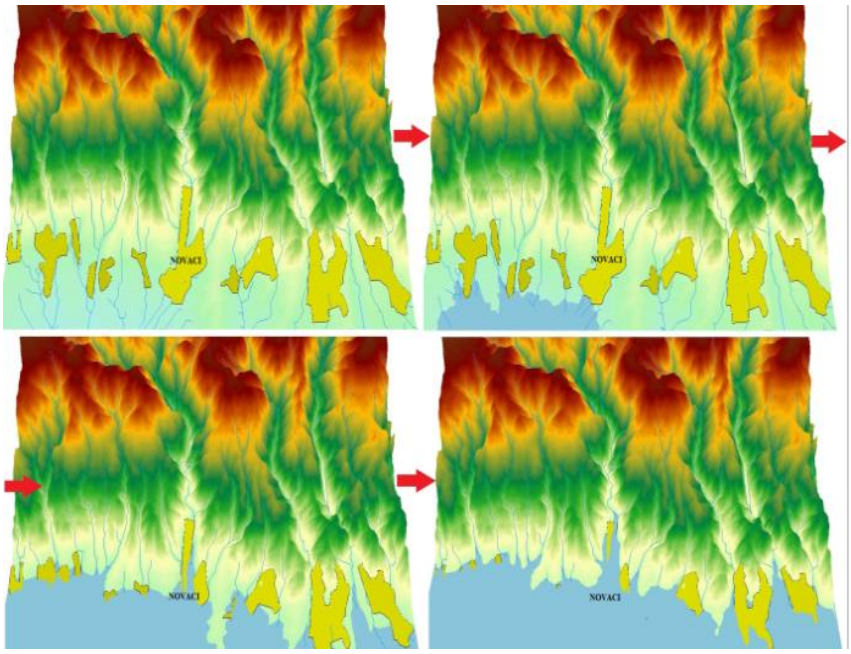

Figure 3. Simulation map of flooded area

Source: our processing ArcGIS

Analyzing the maps, it can be observed that the entire area can be flooded. Correlation of the data obtained can be done using satellite imaging of the studied area (Figure 4).

Figure 4. Aspects of Novaci on July 29th 2014

Conclusions

World practice has shown that no flood events It cannot be avoided, but they can be managed, and their effects can be reduced by -a systematic process leading to a series of measures and actions to help mitigate the risks associated with these phenomena.

Flood management is facilitated by the fact that their event is predictable, it is often possible warning, and usually it is possible to specify and who and what will be affected by flooding.

Flood risk management is the application of policies, procedures and practices with the objectives of risk identification, analysis and evaluation, treatment, monitoring and reassessment of risks in order to reduce human communities so that all citizens can live and work in a sustainable physical and social environment. The essential problem in flood risk management is risk accepted by the population, given that there is complete protection against flooding.

Flood management strategy implies the existence of an important framework document which is required for: knowledge of flood risk, monitoring of flood phenomenon, informing people, consideration of flood risk in all activities of landscaping, adopting preventive measures, proper preparation for emergency situations, reconstruction and learning from previous experience.

Strategy is the starting point for central and local government regarding the implementation and application of specific measures of flood protection and regional development (Plate, 2002).

In the last decades, globally, floods have had very serious consequences therefore these flood management and flood management strategy have been imposed.

Natural hydrological cycle of the planet entails dealing with floods, which are found to be increasingly frequent and aggressive.

These natural phenomena affect the human society development, being appreciated, in geographical terms, as the most widespread disasters globally, after which there are recorded huge damages and losses of life.

The floods must be approached as absolutely natural phenomena, but also as events that can be anticipated and whose negative effects may be diminished. From the vast global practice.

References

Bronstert, A. (2003), Floods and climate change: Interactions and Impacts, *Risk Analysis,* vol. 23, No. 3, 545-547.

Duțu, M. (2003), Tratat de dreptul mediului, *Lex Publishing Hous*.

Florina, G. (2009), Natural Hazards si risks, *University Publisher House, Bucharest*.

Plate, J. E. (2002), Flood risk and flood management, *Journal of Hydrology* 267, 2-11.

Simones, S. J. (2012), GIS Application in flood management – a case study: Praiba do sul basin, *Southeast Brazil* Aqua-LAC, vol. 4, no. 2, 29-44.

Wang, Z. Y. (2000), Recent flood disasters in China, paper presented at the Second World Water Forum in the section: Living with rivers—floods, March 2000, The Hague, *The Netherlands.*