

FLOODS PERCEPTION IN SUCEAVA RIVER BASIN

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Abstract. **Floods perception in Suceava river basin.** This study analyses the survey made from May 2016 till August 2016 with the inhabitants of the Suceava River basin, both in urban and rural settlements. 238 people were interviewed in a survey containing 21 questions, four of which are multiple-answers questions, the questions concerning general problems, such as age, sex, degree of education, but also more subjective opinions about their perception of floods causes, the extension at which they were affected by floods, their willingness to participate in volunteering actions, insurances, etc. This survey tried to show how people from Suceava River basin see the risk of floods after the difficult period of 2005-2010, which was filled with catastrophic flood events, the highest recorded in this basin. It could be observed how the people from villages have more knowledge about the floods than those from towns, because they were more seriously affected. Also, it could be observed that the knowledge and the memories were still there no matter the age, old or young.

Key words: flood risk, perception, public information, flood factors, Suceava basin.

1. INTRODUCTION

Floodings and floods are a natural phenomenon in a hydrographic system, which can occur periodically, at a reduced size, or exceptionally at very large scales. Although they should not be dangerous, their appearance in the vicinity of humans translates them into a risk phenomenon, with negative effects on human life.

The floods during 2005-2010 from Siret river basin, including the Suceava River basin, were great floods, which exceeded all previous limits with very strong effects on households and economic activity in the basin.

During May-August 2016 was made by the author of this work a survey on the floods perception and their effects in the Suceava river basin, in order to see how the inhabitants of the basin see this risk phenomenon after all the unpleasant experiences from 2005 - 2010 and the following (Cheval, 2003; Armaș, I, 2008).

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2. DATA BASE AND METHOD

This study was based on a survey containing 21 questions, four of which are multiple-answers questions, which makes the number of answers higher than those of the survey participants. The answers to the survey were obtained both physically by direct completion by the participants or were obtained from group or personal interviews with them, and by completing the survey on the phone or online.

In order to monitor the floods' perception of the basin's inhabitants, a comparative analysis of the perception of floods by rural and urban residents was attempted, with some questions being presented as a whole view of the inhabitants of the entire basin.

3. RESULTS AND DISCUSSIONS

Out of a total of 238 interviewed people, 116 are from urban areas and 122 from rural areas, this number being representative of the population of the whole basin. The people who participated in this survey come from 34 localities among the 50 located in the Suceava river basin.

The gender ratio for those who completed this survey is not very high, of which 42% are men and 58% are women, this difference being due to higher availability for completing surveys and for discussion of women compared to men.

Among these people were also people aged 18 and under; thus being able to observe that also young people aged 13-14 (in 2016) and not only the middle-aged and elderly people, remember the floods and their effects, because many of them have been witnesses or even been affected by the floods from 2005-2010. Thus, 75% of interviewees are aged between 19 and 59, 14% under 18, and 11% over 60 years.

At the level of studies, 48% of the respondents said they had higher education, while 31% said they had medium studies. Among those with grades 5-8 grades are mainly those who have less than 14 years, or did not yet complete their gymnasium studies during the survey. This shows the high study degree of population, which helps them better cope with the extreme risk phenomena they are exposed to.

Of the interviewed persons in the Suceava River Basin, most (50%) have their homes on the river terraces, being followed by the one in the meadow (34%). If an analysis is made at the level of the two environments, one can observe a difference from the total, 64% of the interviewed urban population living on the river terrace, while the largest percentage in the rural area living on the meadows (43 %), followed by the terraces (36%). This is due to the fact that in the city, especially in Suceava and Rădăuți, much of its residential area is located on the

river terraces to protect the inhabitants from the effects of the floods, but also to provide businesses with an easier source of accessible water. This area is also used in the city for leisure. In the villages, the river meadows and their lower terraces are the most inhabited, the water being, for the villagers, a source of food, a place for depositing household waste, the roads taking place on the ridges of the water in the basin relief.

At the question **Have you ever been a witness of a flood?**, 46.6% of the total number of interviewed people said they have witnessed floods with minor effects, while 19.7% floods with material damage, and 17.6% floods without damages. Thus, 80% of the subjects who completed this survey stated that they were witnesses of a flood of any type (Fig. 1a), all of which mentioned one or more of the 2006, 2008 or 2010 floods among the floods they have witnessed. This reflects the fact that many of the people in the basin have experienced the floodings and floods, but with a different level of damage.

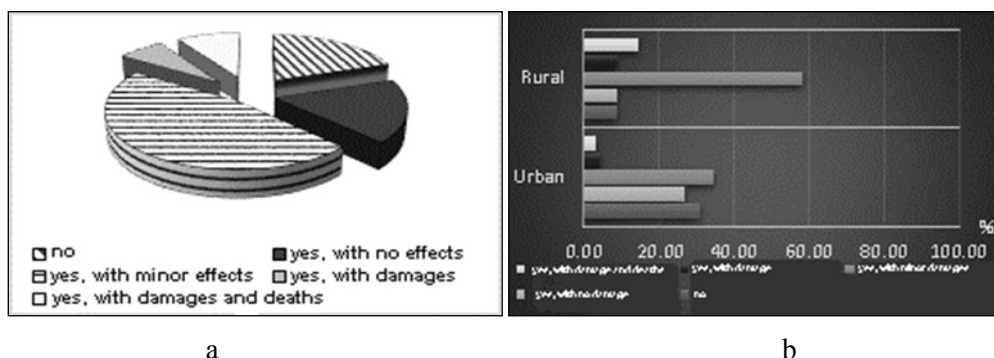


Fig. 1. Subjects experience with the floods in Suceava river basin; (a), urban environment, (b) rural environment

If a comparison is made between urban and rural areas, it can be noticed that in the urban environment, the number of people who have not experienced the floods is much higher, with a percentage of 31%, while in rural areas only 9% of the subjects said they did not witness floods (Fig. 1b). Surprisingly, only 30.5% of people in the urban area who declared they were not witnesses of a flood are under the age of 19. This reflects the observations made earlier in this chapter that the rural environment was much more affected by floods than the urban one, with urban residents having less experience of such natural hazards. In rural areas, 58% of respondents said they saw floods with major damage, 15% said they were witnessing floods with material and deadly damage. In urban areas, more than 90% of the subjects witnessed floods with no more than minor effects.

When asked about the main factors of flood genesis, most of the respondents said that the main factor is the rainfall (55% in rural areas, 49% in rural areas) (Fig. 2).

Differences occur further, in the urban areas the subjects stated that the second factor as importance in the genesis of floods is the clogging of the canals - 15%, due to the much larger presence of the urban sewerage network in the cities; 15% also said that they did not know what factors are involved in the floods, which shows that the cities were less affected by the floods. Rural subjects said that deforestation and dump disposal (14% each) were important in the outbreak of floods, factors that were heavily involved in the flooding that affected the villages in 2005-2010. One can thus see the much higher degree of knowledge of the causes of floods in the rural area, which was more strongly affected by the floods.

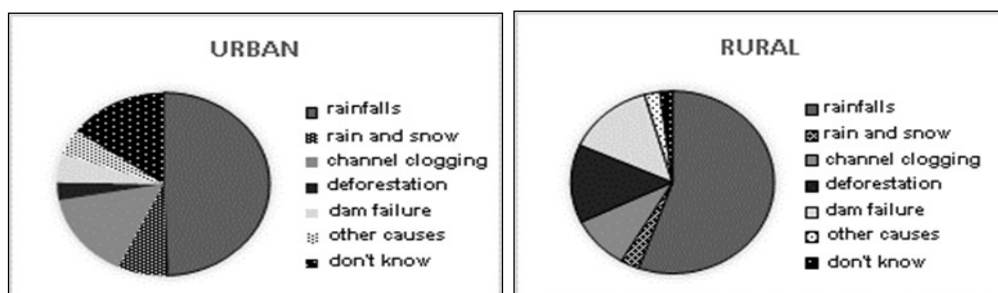


Fig. 2. The perception of the factors involved in floods' formation in urban and rural environments

To the question **Have you been affected by the flood?**, 79% of urban respondents said they were not affected by floods, while in rural areas 55% said they were affected by the floods. This can be easily correlated with the positioning of city dwellings on the river terrace, which has caused water not to reach housing. Also, the inhabitants of the cities are mostly in the block, being less threatened by the rage of the waters.

Given that many urban subjects (79%) said they were not affected by floods, 86% of respondents in this environment said they did not receive damage relief (59% in the urban area) or that they do not know how to get such help (26.7%). In rural areas, this percentage is lower (77%), with 66% of respondents saying they did not receive flood aid. A small percentage of rural people (23%) said they received help for flood damages, that is, only 40% of those who said they were affected by the floods received aid from the authorities; this was determined by the fact that, in some cases, the damages incurred by them were too small to grant aid, and in other cases the authorities did not offer any or not satisfactory assistance to the victims.

To the question **"What do you think is the natural risk phenomenon with the greatest impact on the place where you live?"**, there are differences between urban and rural areas. The first risk phenomenon observed by the subjects is floods, with 40% in both habitat environments. The second phenomenon is torrential rains,

but with different percentages in each environment - 31% in the rural area, 23% in the urban area, the third phenomenon being the drought in rural areas (10%), and in the urban area - the earthquakes (Fig. 3). The rest of the phenomena have lower percentages, below 10%. This proves that rural areas are quicker to take on climate change because of their influence on crops; in the urban environment they are less well felt, with people in this environment feeling more resolutely than the climate change because they do not physically see their influence on crops. The inhabitants also mentioned, depending on the areas of origin, the dangers to which the localities are exposed, those in the mountain area mentioning the landslides, and those in the plateau drought, which affect the crops more strongly.

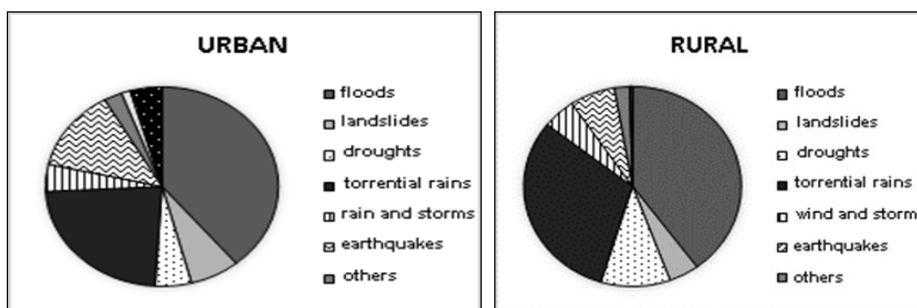


Fig. 3. The perception of the risk phenomena with the highest impact on the residents of Suceava river basin in urban and rural areas

To the question "Do you watch the meteorological forecasts and the hydro-meteorological warnings", almost 90% of the subjects of this survey mentioned that they are occasionally or almost daily watching these types of warnings (Fig. 4), which shows that the people in the basin want very much to be aware of the extreme phenomena that can occur in the basin. Of those who said they did not follow weather forecasts and warnings (only 13% of the whole pool), most people are under 20, less interested in weather.

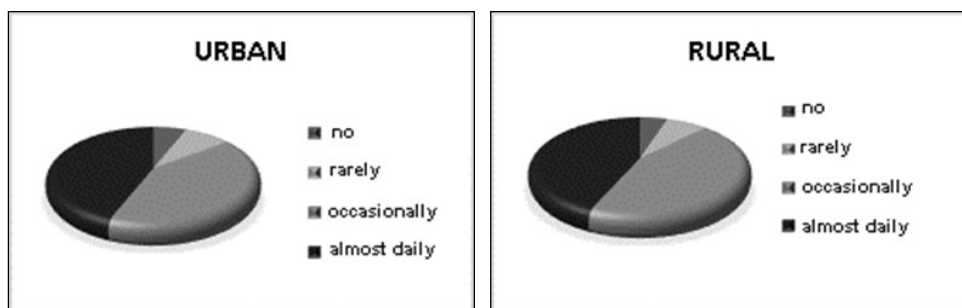


Fig. 4. Information degree for meteorological and hydrological forecasts

Asking if they know how to act in case of floods, 65.5% of urban residents said they knew how to act in case of floods, while in rural areas 85% of the subjects said they knew how to act. This shows that many more people in rural areas know how to act in the event of floods as a result of the still very strong presence in the population's consciousness and memory of floods from 2005-2010 and the following years, little influenced by the level of subjects' studies.

The question **In the event of flooding do you also involve yourself or only rely on the intervention of the authorities?** has given some different answers between the two environments. 73% of urban subjects said they were involved in floods, while 87% of rural respondents said they were involved, ignoring the authorities' intervention, showing the greater availability of people from villages to act in case of floods, and not to stay passive, waiting for the intervention of the authorities. Of those in the village who responded that they would not be involved in floods, most are very young or over 60s, especially women, who would or could not physically be involved in such of measures. In the city, people not involved belong to all ages and have different levels of study, which shows that they rely more heavily on authorities' intervention as a result of faster action by city authorities.

Measures taken by authorities to prevent floods are seen roughly the same in urban and rural areas, with only 24% of those in the urban area increasing the percentage of people who do not know the measures taken by the authorities (Fig. 5). In the rest, the main measures observed by the subjects of the survey were regularization work, both with values above 30% in both environments.

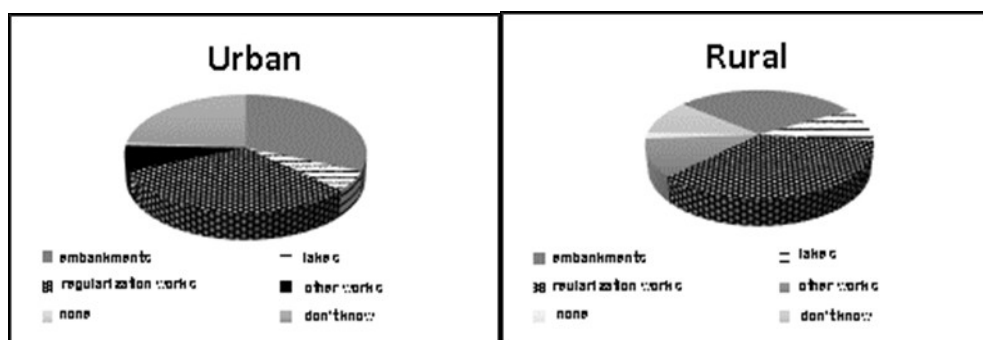


Fig. 5. The perception of the measures taken by the authorities to prevent floods

When analyzing the speed with which authorities acted, 20.7% of urban subjects said the authorities had timely interventions, 31% did not, and 47% had no knowledge of it. In rural areas, 45% of respondents said the authorities intervened on time, 41% that not only 14% did not know. The answers to this question and to

the other related to the way the authorities acted can be said to be slightly subjective, because the views of the subjects could be influenced by the general opinion of the subject about the authorities, also because part of the respondents former members of state institutions dealing with flood management.

To the question **What measures have the authorities taken to reduce the damage?**, there are differences between the responses received from the subjects in the two environments. People in rural areas are better aware of the measures taken during the floods, with similar percentages for measures evacuated the goods (32%), evacuated the population (31%) and warned the population (26%) (Fig. 6), while in urban areas, a large percentage is represented by people who do not know what measures were taken in the case of floods (25% of the total). This again demonstrates that floods have fared much better in the mentality of the rural population, affected much more by floods.

As with the question of the speed of action of the authorities, the answers to the question of how the subjects perceive the involvement of authorities in flood prevention can be viewed with some suspicion, because of the subjective character of the respondents' opinion in this case.

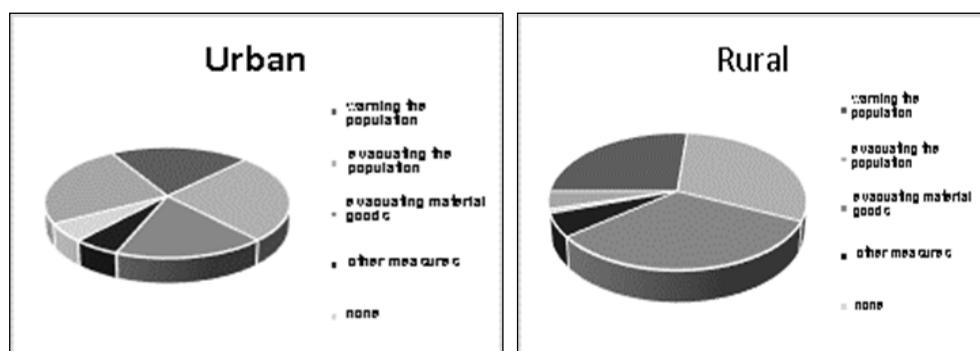


Fig. 6. The perception of the measures taken by the authorities to mitigate floods damages

In both urban and rural areas, most respondents felt that authorities did not do everything they could to prevent floods (41.4% in urban areas, 47.5% in rural areas), while 32.7% of urban people do not have anything to say about it. In rural areas, 41% of respondents said the authorities are doing everything they can to prevent floods, some respondents even being satisfied with the actions of authorities, others working within local authorities.

When assessing the willingness of individuals to volunteer and financial aid (including material), over 80% of respondents in both environments agreed to such actions, with higher values in rural areas (89%). In the case of financial aid, over 90% of respondents agreed to provide such aid. And these answers can easily

be questioned because an answer does not guarantee their action in the event of an extreme event, the opinion of the people may depend on material, psychological factors, etc. for the moment.

To the question **Are you willing to leave your household if you were affected by the flood?**, the answers were about the same in the two media, most respondents responding that they would leave their household at the recommendation of the authorities (42% in the urban area, 44% in rural areas), while 33% of the subjects in both environments said they would leave their own initiative. This is encouraging, given that in such cases rescue actions of the population would be much easier, with much of the population leaving their homes on time. Proof of this is the low number of people deceased following the floods in the Suceava River basin during the period 2005-2010 (22), half of them being recorded only in the case of the Arbore flood, 2006, which was an exceptional flood, with a low warning time, almost non-existent, due to floods occurring during the night.

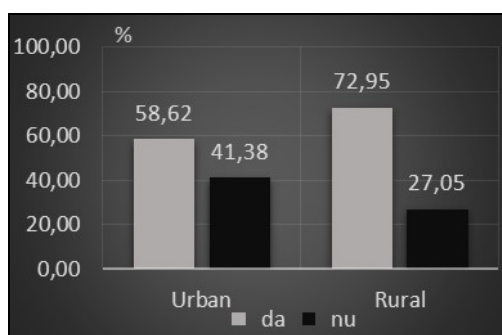


Fig. 7. Households' insurance level in urban and rural areas from Suceava river basin

of the rural inhabitants have compulsory insurance (73%) compared to the urban ones - 58.6% (Fig. 7) this being determined by the fact that the 2005-2010 floods caused the rural authorities to force the villagers to make compulsory insurance (at least with the minimum admissible values) that could cover the damage caused by possible future floods.

4. CONCLUSIONS

In the Suceava River Basin, there is an obvious difference between the way floods are perceived by rural and urban residents, rural ones possessing more knowledge about floods and other risk phenomena that could affect their locality.

In the case of moving from the household if the authorities would provide some facilities in another location, over 60% of the subjects said they would move, the percentage being a bit lower for rural subjects, more strongly related to material and sentimental reasons by their household.

If the insurance coverage by the inhabitants of the Suceava river basin is analysed, it was observed that a higher percentage

This is due to the fact that the last years were very rich in extreme natural phenomena, which affected mainly the rural areas where, although the level of studies should be and is slightly lower than the one from the city, so the level of the theoretical knowledge the floods should be lower, the recent experience of floods in rural areas has made people in the village have deeper knowledge about floods and how they are unfolding.

Also, rural people are more open to helping others, their troubles during floods making them more open to the troubles of others.

The high share of people leaving their home in case of floods and those who would move if they were offered acceptable conditions on the part of the state, which shows that the inhabitants are aware of the seriousness of the risk they pose in case of production of a flood. Subjects have brought some interesting answers to the causes of the floods, indicating among them, in addition to abundant rains, factors such as deforestation, increasing wind intensity and dam failure.

The 2005-2010 floods have had a very strong impact on the basin inhabitants' awareness, from the youngest to the elderly, each of them keeping in mind their very recent effects.

REFERENCES

1. Armaş, Iuliana (2008), *Percepția riscurilor natural: cutremure, inundații, alunecări*, Edit. Universității din București, 198 p.
2. Boholm, A. (1996), Comparative studies of risk perception: A review of twenty years of research. *Journal of Risk Research*1: 135-164.
3. Cheval, S. (2003), *Percepția hazardurilor naturale. Rezultatele unui sondaj de opinie desfășurat în România (octombrie 2001-decembrie 2002)*, în *Riscuri și catastrofe*, vol. 1, Editor Sorocovschi, V., Edit. Casa Cărții de Știință, Cluj-Napoca, p. 49-59.
4. Floca, L., Floca, Reteșan, Dana (2002), *Analiza percepției și acceptabilității riscurilor ambientale – premiză a dezvoltării durabile*. În vol. „Riscuri și catastrofe”, I, Editor Sorocovschi, V., Edit. Casa Cărții de Știință, Cluj-Napoca: p. 166-179.
5. Goțiu, Dana (2004), *Risk Assessment and Risk Management Strategies*, în „Riscuri și catastrofe”, vol. V, nr, 1, Editor Sorocovschi., Edit. Casa Cărții de Știință Cluj-Napoca.
6. Slovic, P., Weber, E.U. (2002), *Perception of risk posed by extreme events*. Paper presented at the conference „Risk Management in an Uncertain World”, Palisades, New York, April 12-13, 2002. <http://www.ideo.columbia.edu/CHRR/Roundtable/slovic_wp.pdf>
7. Sorocovschi, V. (2004), *Percepția riscurilor induse de inundații. Rezultatul unui sondaj de opinie desfășurat în Dealurile Clujului și Dejului*, Riscuri și catastrofe, I, Editor V.Sorocovschi, Editura Casa Cărții de Știință, Cluj-Napoca, p.122-137

8. Sorocovschi, V., Mac, I. (2004), *Percepția environmentală și răspunsurile umane față de risc*, Riscuri și catastrofe, , în vol. "Riscuri și catastrofe", Editor V.Sorocovschi, 1, Editura Casa Cărții de Știință, p. 25-38.
9. Sorocovschi, V.(2005), *Percepția riscurilor induse de inundații. Rezultatul unui sondaj de opinie desfășurat în nordul Câmpiei Transilvaniei*, SUBB, Geogr., L, 1, Cluj-Napoca, p.39-48.
10. Sorocovschi, V. (2006), *Percepția riscurilor induse de inundațiile din bazinul Nirajului*. în vol "Riscuri și catastrofe", 3, an V, Editura Casa Cărții de Știință, Cluj-Napoca, p.260-269.