

Copernicus Master in Digital Earth

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BIP – Blended Intensive Course



Quantifying Vulnerability to Natural Hazards in Changing Patterns. New Perspectives and Methods.

A Report Statement.

During April 7 until April 11, the Blended Intensive Course - Quantifying Vulnerability to Natural Hazards in Changing Patterns. New Perspectives and Methods took place at Romania, more specifically on the region of Carpathian Mountains at the Buzau state of Romania. The region is located near to the Vrancea seismic region, one of the most active seismic region in Europe. Due to its unique characteristics and features, the region is prone to different hazards, such as earthquakes, flooding, landslides and droughts, being considered a region compound by a scenario of multi-risk assets.

During the presented BIP course, a main goal was to identify and assess multi-risk hazards that had impacted the region over the time schedule and quantify qualitative as well quantitative the vulnerability existent at the region.

The BIP was guided by Prof. Dr. Cosmina, an expert in impact chain and vulnerability assessment, researcher Dr. Mihai, a geomorphologist who works for the research center of geomorphology at the Carpathian Mountains for over twenty years, prof. Dr. Mikutu, an anthropologist with expertise at the social environment sphere and Dr. Drago, who works for the Seismic Institute of Romania.

Mainly activities were explored along the BIP, and mostly were based on fieldwork followed by lab sessions at the hotel where the student was hosted.

7th of April – Monday.

On the Monday, the first day of the BIP was an introductory day about the main goals of the BIP, a presentation about the schedule and a briefly presentation about Vrancea seismic region and its geological formation. The overview of the region was crucial in order to understand the bigger picture of the multi-risk hazards. The day was followed by a small tour on the city of Bucharest to understand better how past earthquake had affected the city, which are the vulnerabilities observed by the city and how infrastructure, government and civil society are preparing for impacts that may be caused by other earthquake on the region. After the walking tour, all the students got the bus to drive at the Buzau Mountains.



Figure 1 - Students exploring the Sub-Carpathian region.

8th of April – Tuesday

On the first day at the mountains regions, a fieldwork was proposed on the morning and guided by Dr. Mihai, which experience and vast knowledge of the area enhanced the field observation. The goal was to understand over the landscape perspective how landslides and mass movements that are extremely common on the region are happening nowadays. A very interesting landscape perspective was to understand better a correlation of different landslides for each sub-region of the Carpathian Mountains. In the morning, the fieldwork was concentrated on the sub-Carpathian mountains which denominates landslides with high frequency but low magnitude of impact. Due to geological formation of the sub-Carpathian region, being mainly formed with clay, silt and small rock fragments, the landslides are shallow and the mass movement is taking place with a high frequency. Understanding how these landslides are affecting whole communities and impacting on their sub existence was vital. High frequencies landslides had change orchard plantations and grazing pasts, forcing agricultures to restart their orchard yards on other areas. The area is mainly compound by hilly morphology and a challenging landscape. Dr. Mihai highlights that the area is going over a process called polycycle slope evolution, where the whole watershed is affected by such process. Micro geomorphological issues can represent a proxy over the land-scale dynamic and observation on the field are crucial to identify impact, risk and vulnerability.

The fieldwork was going through the hilly hills in order to observe a rotational landslide on the top of the basin that is changing for an earth flow on the base of the watershed.



Figure 2 - View from the landscape fragmented due landslides.

During the lab sessions, Dr. Cosmina, introduced for the entire student the concept of Impact Chain, and how to compound correctly an impact chain that holds the main elements Hazards, Impact, Vulnerability and Mitigation.

9th of April – Wednesday

On the Wednesday, the fieldwork was mainly proposed at the Carpathian Mountains. The landscape was completely different from the sub-Carpathian region and the geological formation

has changed completely the hazards and its risks. At the Carpathian regions, landslides are low frequency but high magnitude.



Figure 3 - View to the Carpathian Mountains area. Down part of the landslide.

The main goal of the fieldwork was to observe an old landslide that took place on the region and it was dated as being at least 300 years old. An interesting perspective from the age of the landslide and its associated impacts is that hazards can be easily erased from the collective memory. The landslide was huge, with over 90 meters of rotational landslide, however there are many dwellings on the earth mass and Dr. Mihai commented that people who live on that area does not believe

that landslides happens on exactly that point. Which shows that a few generations after massive landslides may not hold concerns of hazards on the place. Dr. Mihai also showed to all the students' different approach and proxies that are commonly used on the geomorphology in order to date landslides such as the one we were analyzing it. He cited two well recognized: Dendrology, by measuring trees that grow over the landslides is possible to age how long time ago that landslide happened. Liguensmetry. By measuring the size of specific liquens if possible to consolidate its age and be a proxy of age as well.

During the fieldwork, it was interesting to observe how communities and hazards interact with each other. The Romanian architecture of the houses show a high degree of adaptability within this high prone landslides area. Each traditional house is lightweight. For the foundation, they use limestone with shallow foundation, allowing water to infiltrate on the aquifer and over the foundation the houses are mainly build with wood and clay, which gives to the structure a deformability in case of earthquake and also provides lightweight structures when comparing with concrete.

10TH of April – Thursday

On Thursday, the fieldwork was focusing on understanding the vulnerability of the community. Walking around the community and identifying which vulnerabilities are being faced was a key point of the whole BIP. Not only vulnerability but understand about mitigation solutions that could be applied for the region.

Tree main vulnerability was identify: Physical Vulnerability; Social Vulnerability and Environmental Vulnerability (Susceptibility)

Elements of Physical vulnerability for the community was: narrow streets, degraded buildings, lack of infrastructure on water supply, energy supply, roads and trains. Lack of drainage solutions for rainfall events and dicing periods. Considering that the communities was mainly habited by ethnical minorities, the Roma people, a high social vulnerabilities was observed on the field as it can be informed as homeless, unemployment, lack of medical care provisions.

During the last lab session, the students conduced a creation of a Impact Chain with the observed elements from the field work.

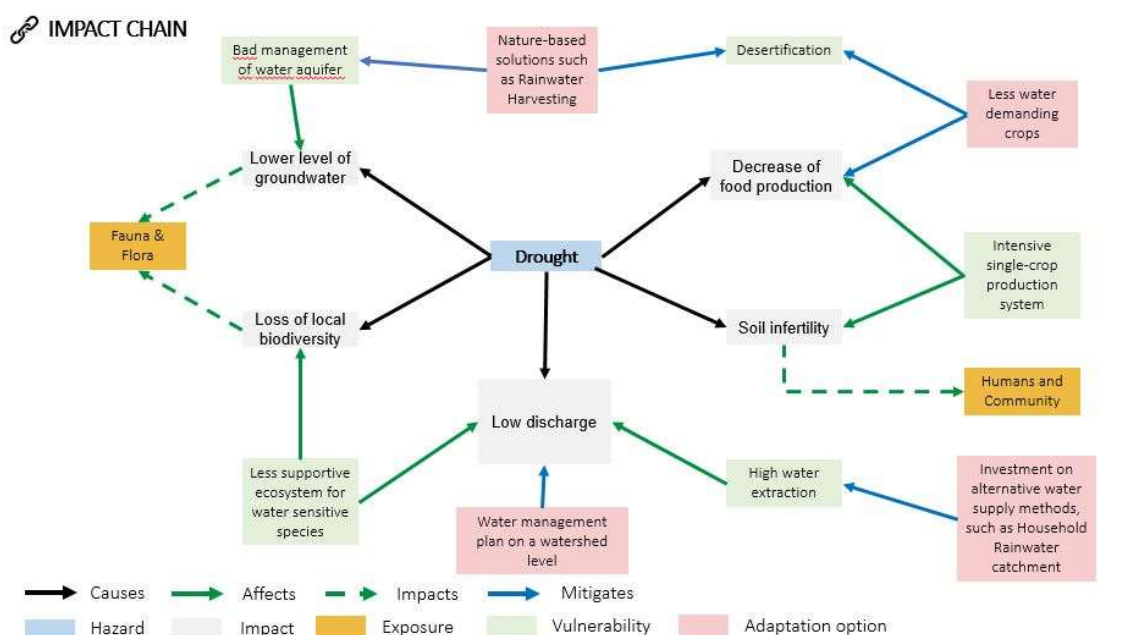


Figure 4 - Impact Chain develop with the exercise.

12TH of April – Friday

On Friday, the BIP was only focus in concluding the course, to sum up all the fieldwork and the presentation of the impact chain produced by each students.

Conclusion

The BIP was fundamental to understand besides theory about multi-risk and vulnerability. The unique region of the Buzau Mountains in Romania presents many interesting characteristic on the landscape, giving beautiful and breathtaking scenarios but also enforces a challenging task in order to preserve and reduce human losses. A fundamental part was looking from the first person, which allies literature and theory for a level of compassion and humanity, essential to deal with pre as post disaster event management.