



## **ENSURE PROJECT**

*Contract n° 212045*

# **ENSURE E-LARNING TOOL**

## **Sol02**

### **Look and “read” the images**



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## Look and “read” the images

Look at the video from the European Project *Scenario (Support on Common European Strategy for sustainable natural and induced technological hazards mitigation)*, funded as a Specific Support Action under the VI FP, and try to answer to the following questions.

1. (00.00-01:15) Even if you do not understand the written text in Italian, can you say what is going to happen? And what the images want to underline?

The images show what was going on in a private home immediately before a very strong earthquake in 1976 in Friuli (Italy) and the moments immediately after it.

The images want to make it very clear how much unexpectedly a natural hazard like an earthquake can rush into the life of people and communities. People’s lives as well as environments, production plants, public services, cultural heritage... can dramatically change from one moment to the next. We therefore want to focus the attention to the “*need for preparedness*” for event of all types of emergencies, especially when, like in the case of earthquakes or na-techs, the hazard is unpredictable and instantaneous.

2. (00:58) What does it mean “*human as victims but also creators of vulnerability*”?

Damage exists where there is something that can be damaged by the events. You can have damages to the natural environment produced by technological disasters (na-tech, see file F02 in module 1) or you can have natural disasters able to destroy human built environment and human communities. See file F02 in module 1: “*Vulnerability relates to the consequences of the impact of a natural force, and not to the natural process or force itself. In practice, vulnerability and consequences are linked*”. See, in the same file in chapter 3 the definition of different types of vulnerability.

3. (1:18) The image shows the rubble of a building but there is also something else behind: what do you think this image wants to say?

In the foreground can be seen ruined frescoes. These can be regarded as a piece of cultural heritage coming from the past. In other words, a piece of cultural capital or a territorial value that cannot be reproduced but only protected and/or restored. This must be taken into account when valuing vulnerability and exposure, while prevention seems to be the best possible “tool” to face major hazards. Here you can make reference to some documents. File F02 in module 1: “*The vulnerability term represents the pre-disposition of elements at risk (buildings, infrastructures, people, services, processes, organisations, etc.) to be affected, damaged or destroyed by the event.*” File F07 in module 1: “*Resilience: capacity of the exposed system to “absorb” or recover after a natural event...*” and the concept of resilience in file F09 in module 1. File F33 in

module 2 "*Vulnerability analysis and assessment of cultural heritage at risk*", with particular reference to the list of elements at risk.

4. (1:54-2:31) Try to say what these images want to describe and, therefore, what kind of information is needed to obtain a framework of the potential incidence of natural disasters in different European territories.

In these images you receive some messages. From minutes 1:54 to 2:04 the share of each type of natural hazards in the European Union is shown. But this is not enough to really understand how natural hazards affect the European territory. You therefore need some more information, here presented through maps showing the distribution of hazards (from minutes 2:06 to 2:17). Then we add information about exposure, that is what kind of territorial systems, infrastructures and elements are exposed to the previously mapped hazards (from minutes 2:18 to 2:31). The better possible information therefore comes from the overlapping of the thematic maps: which elements and systems of resources are more or less affected by what kind of possible natural hazard? Remember: the more a territorial area is rich of economic, social and natural capital and, at the same time, the more interested by major natural or na-tech hazards, the higher will be the damage in case of natural or na-tech disaster.

5. (2:25-2:57) What these maps offer information about?

Some vulnerability profiles are provided using different indicators. Pay particular attention to economic and social capital represented make reference to files F10, F11, F13, F14 and F15 in module 1, concerning vulnerability of social and economic systems and the relationship between territorial vulnerability and territorial capital. The goal is to underline the resources which would be seriously damaged or completely lost in case of a natural hazard occurs. Moreover is very important to understand which elements would be involved and with which possible impacts in time and on different categories of territorial actors and activities. The first map (2:24) underlines the presence of clusters of competitiveness and innovation, that is capabilities to produce goods and services and revenues for the territorial areas concerned well as for the whole European Countries. The second map (2:29) shows the position of the most important European cities, with all their resources, values and opportunities. The third and fourth ones (2:37-2:43) show the territories more likely to be flooded because of their elevation over the sea level. The fifth map (2:46) localises some major accidents occurred in the past. The final two maps (2:51-2:57) show three possible scenarios of population distribution in the European Territories from year 2000 to year 2030. That is, where the greater density of population could be in case of disasters and, therefore, how much people could be affected by such disasters.

6. (3:07-3:16) Four images are introduced by the following words: "Changes in land use modify vulnerability and create new exposure". What kind of changes are addressed in the images and why we can say that such changes can modify vulnerability?

In the two couples of images we can notice an augmentation of territorial objects – buildings, infrastructures, services. This matters with vulnerability in time and space as we have more material resources and people exposed over time and we have to deepen analysis to know how much new elements could affect the vulnerability profile of the area.

Land use models and urban development dynamics are a central matter in vulnerability and resilience assessment. Human activities may change the hazard scenarios adding territorial objects and activities in areas exposed to hazards – augmentation of exposure and, possibly, of vulnerability – or enlarge built areas entering in vulnerable territories. This of course deals with the coping capacity, that is the capability to face disasters both in the immediate aftermath as well as over the time needed for “reconstruction” of territorial systems.

This is an important point, and one of which we must not lose sight either now or in the future. Make reference to files F03, F04 and F05 in module 1. Moreover, to have an overview on the state of the art of research and on future activities see file F17 in module 1.

7. (3:27-5:58) Here a simple case study is offered: the eruption of Mount Vesuvius. Describe the sequence of images in terms of knowledge elements to answer a question like *“what elements have been described using such images and what one should know to set off a vulnerability assessment?”*

First you see the territorial area which lays under the volcano or could be affected by a possible eruption. We therefore describe the territory and all its elements. This means to identify exposed elements and to assess exposition to the hazard.

Then we can consider vulnerability, making reference to the definitions offered in the modules and considering physical, social and economic vulnerability.

From minute 3:56 we see some historical images of eruptions of the Vesuvius. This tells us about two main elements. History is an important part of a vulnerability and resilience assessment and we can learn a lot from what happened in the past for what concerns the characteristics of the eruption. Moreover this tells us about the return time of the event.

Of course, in time, the exposition changes because of the changes in the land use model. Look at the development of the urban area from some historical images and remember this, because you will find again maps showing such dynamics.

Images from minute 4:30 tell us about damages, improving over time because of the improvement of urbanised areas and of the number of people, buildings and activities.

At minute 4:44 we find the map of the present situation, while the following satellite image shows how big the affected area could be in case of an eruption and how vulnerable it because of the proximity to the volcano. Looking at images from minute 4:52 to 5:05 one could say everything seems so quiet and stable.. but we have to stay prepared, facing an unknown future.

From minutes 5:06 to 6:00 the video shows a simulation of the effects of an eruption over time and in space, telling us what we are supposed to become prepared for. Knowledge building on hazards and their characteristics is an essential part of a vulnerability and resilience profile of a specific territorial area.

To deepen knowledge on volcanic hazards see F13 in module 1 "*The concept of risk in volcanology*" in which you can find definitions, description of the phenomena causing damages, categories of expected damages on different territorial elements (especially buildings and people), the time perspective, the need for interventions for the strengthening of the resilience and coping capacity (i.e. emergency plans but also knowledge enhancement on exposition and vulnerability, in order to introduce rules and other tools able to make the community more aware and prepared facing the volcanic hazard). In file F40 in module 3, chapter 4.1.1 you can find "*Dynamics of Hazard determining temporal vulnerability changes: The case of Vesuvius Volcanic Eruptions*" where vulnerability in time is particularly concerned. In point b notice how each phase of the temporal evolution of the volcanic eruption is related with a sequence of impacts and potential damages. In point c notice the importance of knowledge of history.

You can also see the complete case study *Del.5.3.3\_Case study3\_Vulcano* in module 3.

8. (5:58-8:10) The final part refers to "tools and action" to strengthen coping capacity and resilience. Try to identify the different categories of tools.

Among others: integrated research activities; risk detection and prediction activities; integration between research, knowledge building, risk management and emergency planning; stable reduction of vulnerability of exposed elements and damage prevention.

From minute 6:30 tools for vulnerability assessment and risk management are displayed: maps showing the characteristics; territorial distribution and intensity of the investigated phenomena; vulnerability dynamics by diagrams or mathematical tools; planning tools based on exposure and vulnerability assessment; cultural exchanges between scholars, experts, practitioners and people working in the field; cooperation with people on the ground.

Make reference to file F22 in module 2 to deepen your knowledge about "*Tools for vulnerability analysis and representation*"