



ENSURE PROJECT

Contract n° 212045

ENSURE E-LARNING TOOL

Sol07a

Working on the assessment process

Reading the assessment steps in Vulcano case study



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Area "Environment"
Activity 6.1 "Climate Change, Pollution and Risks"



Working on the assessment process

Vulcano case study ENSURE_DeI5.3.3

Synthesis of the working sequence

See also file F31 in module 2 *Methodological framework for an Integrated multi-scale vulnerability and resilience assessment*

1. General presentation

- ✓ Brief description of the region from a physical-geographic perspective and identification of the hazard – volcanic eruption – which will be the assessment object in the case study.
- ✓ First brief reference to the exposure and vulnerability of the local community and of the main economic activities sites.
- ✓ Brief history of the volcanic activities and of the previous eruptions in the region in time.

2. Hazards characterization

- ✓ Brief description of the characteristics of eruptions: event typologies, severity, dynamics and impacts on people and territorial objects.
- ✓ Description of the main characteristics of each type of hazard coming from an eruption in a theoretical perspective: impacts/hazard scenarios, parameters of analysis, elements which can impact on event dynamics, analysis of events in time. Notice the application of theory to the Vulcano Island. Notice the use of risk/hazard maps, tables of data and graphs, scenario maps.
 - Tephra fallout
 - Lahars
 - Ballistics
 - Landslides
 - Tectonic earthquakes

3. Socio-economic settings of the case study

- ✓ Selection and description of some main indicators describing the socio-economic elements and values exposed to hazards. These are the basics to understand the potential impacts of hazards in the exposed region and how fragile some elements, subjects and activities could be facing different danger profiles produced by different events.
- ✓ Indicators: resident population, resident population age, present population, tourists, working population and working sectors of resident population, characteristics of production sectors (agriculture, tourism and services), facilities, accessibility and transport infrastructures.
- ✓ Brief presentation on risk perception in the Vulcano Island
- ✓ Brief presentation on the existing database used for the hazard and vulnerability assessment of Vulcano island. Notice the selection of data and data sources.

4. Mitigation capacity

From file F31, chapter 2.3 *“In the first set of matrices, the capacity to mitigate is addressed; this means concretely that the vulnerability of the natural environment, the characteristics of the hazard are known, mapped and monitored appropriately. With respect to the vulnerability of objects and artefacts what is checked here is whether or not vulnerability assessment has been carried out and taken into consideration in planning and risk prevention policies; in the case of critical facilities, not only the awareness of systemic vulnerability is addressed but also the capacity to reduce it in ordinary maintenance programs should be envisaged and new facilities or replacement of existing ones must be considered. With respect to agents, their awareness of existing threats and fragilities is assessed as well as their willingness/capacity to address them when the hazard does not seem to impede in any particular fashion and time has passed since the last catastrophic event”*.

- ✓ Application of the ENSURE Project vulnerability assessment matrices for volcanic eruptions, taking into account the system of hazards which comes with an eruption.
 - Volcanic risk
 - Seismic risk
 - Landslides
- ✓ Discussion on the application criteria of ENSURE Project vulnerability assessment method in this particular case:
 - Aspects discussed for each system to which assessment is referred
 - Key topics to be investigated and identified for each system and weight criteria
 - Parameters, criteria for assessment (type of assessment scale, information source, etc.), descriptors and specific notes on the case-study for each system
- ✓ For each hazard four assessment framework are considered
 - Natural environment
 - Built environment
 - Infrastructures and production sites
 - Social system
- ✓ Notice the introductory discussion for each typology of hazard, highlighting specific territorial elements and criteria for the analysis
- ✓ Notice which aspects, parameters/indicators, criteria, descriptors for assessment have been selected for each sector.
- ✓ Notice here the selection of weight (importance associated with each criterion in the assessment process) and the assignment of scores (importance ranking associated with the result of the measurement)

5. Physical and systemic vulnerability

From file F31, chapter 2.3: *“In the second set of matrices, the physical propensity to damage of the natural environment, objects, critical facilities and people is assessed. All factors that may increase the potential damage are considered, including the possibility of enchainned effects, both between natural hazards (like for example landslides triggered by earthquakes) or between natural and vulnerable built systems (like for example na-tech)”*.

“In the third set of matrices, the potential reaction to first level losses is addressed: secondary effects in the natural environment, like for instance lahars or debris flows consequent to fires denudating entire slopes is considered. With respect to artefacts, urban areas and critical facilities, the capacity to keep functioning despite some level of physical damage is evaluated, considering the interdependencies among systems and among components of vital systems. With respect to agents, the capacity to manage emergencies, to endure in time of limited facilities and restricted access to resources and markets is considered.”

- ✓ Application of the ENSURE Project vulnerability assessment matrices for volcanic eruptions, taking into account the system of hazards which comes with an eruption.
 - Tephra
 - Lahars
 - Seismic
- ✓ For each hazard four assessment framework are considered for both physical and systemic vulnerability
 - Natural system
 - Built environment
 - Critical infrastructures
 - Socio-economic system
- ✓ For each hazard a discussion highlights local characteristic and specific elements, phenomena or problems.
- ✓ Notice the production/use of maps - hazard maps, exposition maps, vulnerability maps, scenario maps –, images and tables of data.
- ✓ Notice the use of data tables and graphs showing the characteristics and dynamics of elements with an impact on vulnerability (positive or negative) or exposed/vulnerable to hazards in the region concerned.

6. Resilience

From file F31, chapter 2.3: *“In the last set of matrices, the recovery potential is appraised. As for the natural environment the ecological resilience is referred to, particularly for those hazards like fire or drought that may significantly disrupt the natural environment itself with permanent damage. For buildings and cities, the capacity to embed the lessons learnt in the disaster while reconstructing artefacts and places is evaluated, as well as the capacity to couple the physical reconstruction with the symbolic one, accompanying the healing process of a traumatized social system. Regarding the latter, access to resources for reconstruction, availability of good administrative procedures, fast delivery of compensation are elements that seemed particularly relevant to recover in a satisfactory way. Fast access to compensation need not to be taken as an isolated indicator: the capacity to couple it to the control of how reconstruction will proceed and to what extent pre event vulnerabilities will be addressed is equally, if not more, important.”*

- ✓ Application of the ENSURE Project resilience assessment matrices for volcanic eruptions.
- ✓ Four assessment framework are considered:
 - Natural system
 - Built environment

- Critical infrastructures
- Socio-economic system

7. Weaknesses and strengths of the Ensure framework

- ✓ Some points about the operational performance of the ENSURE project methodology. Useful for future research developments and operational application of the methodology in other regions.
- ✓ Particular attention has been paid to the performance of the ENSURE framework for the assessment of different hazards – volcanic, seismic, landslides, lahars – with reference to the different matrices.