Union Civil Protection Mechanism (UCPM)

Progress Report

Version 1.0
23 July 2025

IMPORTANT NOTICE

What is a progress report?

Progress reports are deliverables which are sometimes requested at mid-term (or other crucial points in the project) if there is a long time-span without reporting.

The report (+ annexes) must be prepared (by all beneficiaries together) and uploaded on the Funding & Tenders Portal Grant Management System Continuous Reporting Deliverables screen.

Progress reports should NOT be confused with periodic reports. Periodic reports are linked to payments, progress reports are not.

COVER PAGE

PROJECT	
Project number:	[101140345]
Project acronym:	[SAFE-LAND]
Project name:	[MITIGATING THE RISK OF FLOODING AND LANDSLIDES VIA ARTIFICIAL INTELLIGENCE WITH A VIEW TO EXTREME CLIMATE EVENTS]
Project starting date:	[12/02/2024]
Project duration:	[24]

PERIOD COVERED ⚠ *Please note that this is only a progress report. The information in this report must also be included in the next periodic report/final report.*	
Period covered *(from last periodic report):*	from [12/11/2024] to [11/07/2025]

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1. MILESTONES, DELIVERABLES AND CRITICAL RISKS

Deliverables and milestones (outputs/outcomes)	YES/NO
We confirm that we updated the following Continuous Reporting screens: ● Deliverables ● Milestones	YES

Critical risks	YES/NO
We confirm that we have reviewed and updated, as relevant, the following Continuous Reporting screen: ● Critical risks	YES

2. OVERVIEW OF THE PROGRESS AND ACTIVITIES

Overview of the progress and activities

Please summarise progress in the implementation of the activities explaining how these will contribute to achieving the project objectives.

Elaborate on any emerging issue that may affect the implementation of the project and/or the achievement of its objectives.

SUMMARY OF ACTIVITIES CARRIED OUT IN THE FIRST REPORTING PERIOD (M1-M9)

WP1

The kick-off meeting (KoM) was held in Rome (Italy) on April 9, 2024 (minutes in D1.1).

After the KoM, on April 9, 2024 the first meeting of the SC took place and the project work plan was agreed among all the partners and approved (D1.2). Additional Technical and Steering committee meetings were held during the first reporting period:

- On October 3rd, 2024, a technical meeting of eCampus and MED in Čakovec (Croatia - minutes in Annex 2 of deliverable D1.4).
- On 6 November, 2024 in Budva (Montenegro), a technical meeting in hybrid format (minutes in Annex 3 of deliverable D1.4).
- On 6 November, 2024, at the end of the technical meeting, the second Steering Committee meeting in Budva (Montenegro - minutes in Annex 3 of deliverable D1.4).

Personnel and external experts have been recruited (eCampus: Ignacio Giomi, Salvatore Verre, Milena Rosa; UNIPI: Matteo Mugnai.

WP2

The project communication strategy has been assessed, as reported in the Communication plan (deliverable D2.1). The KN platform was used for increasing the impact of the project. The project web page (SAFE-LAND | UCP Knowledge Network), active since the start of the project, was continuously updated for quickly disseminating the results achieved by the project and advertising on the planned events. Social networking pages were created as tools to reach third parties, technical communities, and the general public.

WP3

The definition of Reference Areas (RAs), Reference Elements (slopes, rivers, and people), Reference Climate Events (RCEs), and Damage Parameters (DPs) was completed. The description of all technical parameters was reported in deliverable D3.1.

The Hydrogeological risk assessments of reference areas started: a part of the geotechnical analyses of stability of the reference “slopes” elements, and hydrological analyses of the “rivers” elements were performed, along with the evaluation of the effect of different reference climate events on the damage parameters of the elements. A research protocol was created to investigate in the reference people the psychological risk and the risk perception of floods and landslides in subjects aged 15 to over 65.

Preliminary activities started to draft guidelines suggesting the most effective mitigation measures to reduce the risk of a reference element. In the case of landslide and flooding risks, mitigation measures are based on technical and damage parameters. The assessment of an individual's level of psychological risk combined with the perception of the risk, was performed to provide guidelines to increase appropriate risk awareness, and identify the most vulnerable people exposed to the risk of floods and landslides.

WP4

AI techniques to reliably match Reference Areas (RAs) and Reference Climate Events (RCEs) with real geographical areas and actual climate events were developed. To find RAs similar to a given area, we employed feature-based distance metrics such as Euclidean distance and cosine similarity. Matching real climate events to RCEs required additional attention to temporal and intensity-based features. We also employed dynamic time warping (DTW) and clustering algorithms to capture temporal patterns and event profiles. DTW, for instance, accounts for variations in event timelines, enabling the system to match real events with RCEs based on both intensity and duration patterns. Cluster analysis further allows our system to detect groupings of similar RCEs, improving predictive accuracy for potential impacts on populations. To ensure trustworthiness, we designed the AI so that experts can access feature-based comparisons for each match, enabling validation and adjustment when necessary. This interpretability supports a reliable, human-centered system for assessing damage and psychological impacts effectively. Interpretability and explainability are also based on Shapley Additive Values (SHAP) that can show the importance of each feature to experts for informed decision-making.

The foundational approach and methodology to set the AI's ability to capture nuanced risk awareness levels and enabling us to tailor intervention among populations in Reference Areas (RAs) by combining AI with psychology and neuropsychiatry is based on the definition of psychological profiling based on data, considerations for vulnerable groups, and preliminary risk awareness metrics.

WP5

Design hyetographs pertaining to reference climate events were identified. Namely, a Chicago type Hyetograph is proposed for rainfall events with duration ranging from 1 to 30 hours and return period varying between 30 and 200 years.

WP6

Datasheets and manuals for collecting hydrogeological and psychological data for the real scenario were prepared. Regarding psychological data related to existing areas, a research protocol was created to investigate the risk of psychological difficulties and the risk perception of floods and landslides in subjects aged 15 to over 65. In addition, as for the hydraulic analyses of the real scenario, we selected three areas in Tuscany, Italy, characterized by different responses of rivers/streams to rainfall events.

Lists of milestones attained in the first reporting period

Milestone 4: Definition of RAs, RCEs and DPs

Due date: M4

Lead participant: eCampus

Progress: Milestone 4 was achieved on time: Definition of RAs, RCEs, and DP complete.

Lists of deliverables submitted in the first reporting period

Deliverable D1.1: Kick-off meeting minutes

Due date: M2

Lead participant: eCampus

Progress: Deliverable D1.1 was submitted on time.

Deliverable D1.2: Project work plan

Due date: M2

Lead participant: eCampus

Progress: Deliverable D1.2 was submitted on time.

Deliverable D3.1: Reference areas, reference climate events, and damage parameters

Due date: M4

Lead participant: eCampus

Progress: Deliverable D3.1 was submitted on time.

Deliverable D1.3: Mapping of relevant initiatives within UCPM including an evaluation of potential synergies between ongoing initiatives or incorporation of existing results

Due date: M6

Lead participant: eCampus

Progress: Deliverable D1.3 was submitted on time.

ACTIVITIES PERFORMED IN THE CURRENT REPORTING PERIOD (M10-M17)

The activities performed during the reporting period (from 12/11/2024 to 11/07/2025) and their contribution to achieve the objectives of each WP are described herein.

WP1

Task 1.1- Start-up activities

Activities of this task were completed before the reporting period and are described in deliverable D1.4.

Task 1.2: Coordination and internal monitoring

During the reporting period, the following Technical and Steering committee meetings took place.

- On December 5, 2024 an online technical meeting was organized (minutes in Annex 1). The main objectives of the meeting were: i) Overview: description of the deliverables and primary activities to carry out, ii) presentation of a state of the art of the activities performed by the all partners; iii) presentation and discussion on the technical parameters needed to select real areas; iv) discussion on the selection of real areas; v) Research protocol – ethical commission. A total of 13 people (7 of eCampus, 3 of UNIPI, 2 of MED, and 1 of MUP) attended the meeting.
- On February 25, 2025 an online technical meeting was held (minutes in Annex 2). During the meeting, administration and financial issues in managing project activities were discussed and technical activities were described along with the deadlines reported in the project Gantt timeline. Real areas regarding landslide and flooding risks in Italy were defined. A total of 16 people (8 of eCampus, 3 of UNIPI, 2 of MED, and 3 of MUP) attended the meeting.
- A technical and steering committee (SC) meetings were held online on April 17, 2025 (minutes in Annex 3). During the technical meeting the indexes of D3.2 and D3.3. were shared by the project Coordinator on the Drive folder. The main objectives of the meeting were the description of the selected case studies in Italy, Croatia and Montenegro, and the events organization in accordance with the communication and dissemination plan. During the SC meeting an update on the work plan was carried out and the economic communications were done. The project Financial Manager (eCampus) described the Excel file shared on GDrive for expenses monitoring and asked all representatives of each partner of the Steering Committee to fill it out by April 30th, 2025, in order to have a complete overview of all expenses incurred up to this point. A total of 18 people (10 of eCampus, 3 of UNIPI, 3 of MED, and 2 of MUP) attended the technical meeting.
- On May 23, 2025 a technical online meeting took place (minutes in Annex 4). A total of 15 people (7 of eCampus, 3 of UNIPI, 3 of MED, and 2 of MUP) attended the meeting. During the meeting the project financial manager provided an overview of the budgetary status and presented the Excel tool monitoring the expenses of eCampus, Med and MUP. The financial manager also proposed holding bilateral meetings with each partner to address any economic issues, identify any discrepancies, and, if needed, explore possible solutions - including cost item redistribution within the limits defined by the EU Commission. The overview of the project according to the timetable was provided. Discussion on the planned communication/dissemination events was done.

Task 1.3: Financial management

The activities performed within WP1 are on time and contribute to the achievement of the objectives. In particular, they assure the fulfilment of the requirements by EC regarding reporting and systematic monitoring of the planned activities. The project Financial Manager effectively continued supporting the coordinator in the financial management activities.

The involvement of the staff in carrying out the project activities for each partner of the consortium is reported below.

eCampus

During the reporting period, recruitment activities were carried out.

Comparative selection procedures were launched by the eCampus administrative department in order to select external experts to support the lead partner for technical issues, in particular:

- regarding technical consultancy for collecting hydrogeological data in pilot areas, testing of the system, and the hydrogeological risk assessment in pilot areas (WP6). The expert selected was Alberto Dusi, the contract entered in force on 10/02/2025 and will last until 10/02/2026;
- regarding technical consultancy for psychological data and methodologies, evaluation of people risk awareness, definition of reference guidelines on risk management planning and increasing risk awareness (WP3) and the application of the system in pilot areas - element people - (WP6). The expert selected was Cristal Sirotich, the contract entered in force on 15/03/2025 and will last until 15/09/2025.

Personnels from the eCampus University are working on project implementation. They were appointed as follows:

WP 1: PROJECT MANAGEMENT = Project coordinator, senior expert, and the recruited expert.

WP 2: COMMUNICATION = Project coordinator, Junior expert, Senior expert, and the recruited expert.

WP 3: HYDROGEOLOGICAL RISK ASSESSMENT, EVALUATION OF PEOPLE'S RISK AWARENESS, AND GUIDELINES FOR REFERENCE AREAS = Project coordinator, two senior experts, two junior experts, the two recruited researchers, and the two recruited experts.

WP 4: TRUSTWORTHY AI FOR HYDROGEOLOGICAL RISK ASSESSMENT AND EVALUATION OF PEOPLE'S RISK AWARENESS OF EXISTING AREAS = Project coordinator, junior expert, senior expert, and the two recruited researchers.

WP 5: GUIDELINES ON RISK MANAGEMENT PLANNING AND ON RISK AWARENESS FOR EXISTING AREAS = Project coordinator, junior expert, senior expert, and the two recruited researchers.

WP 6: APPLICATION TO PILOT AREAS = Project coordinator, two senior experts, two junior experts, the two recruited researchers, and the two recruited experts.

During the reporting period, equipment was purchased (see Sect. 3).

UNIPI

In addition to using internal staff, the University of Pisa (Department of Information Engineering to which the unit coordinator is affiliated) recruited two junior experts, in line with the budget set out in the Grant Agreement.

WP 1: PROJECT MANAGEMENT = Activities carried out by the Unit coordinator.

WP 2: COMMUNICATION = Activities carried out by the Unit coordinator.

WP 3: HYDROGEOLOGICAL RISK ASSESSMENT, EVALUATION OF PEOPLE'S RISK AWARENESS, AND GUIDELINES FOR REFERENCE AREAS = The activities related to the hydrological component of WP 3 were carried out by two senior experts from the Department of Energy, Systems, Territory and Construction Engineering (WPs 3 and 6), the junior experts (WPs 3, 4, 5, and 6) of the Department of Information Engineering, guided by the unit coordinator of the University of Pisa partner (all WPs), in close collaboration with experts from eCampus University for the geotechnical component, with the aim of generating synthetic data for the design of AI models in WP 5 (in particular, in WP 3, UNIPI dealt with data regarding floods).

WP 4: TRUSTWORTHY AI FOR HYDROGEOLOGICAL RISK ASSESSMENT AND EVALUATION OF PEOPLE'S RISK AWARENESS OF EXISTING AREAS =

WP 4 is currently ongoing and is being implemented, in line with the timeframe, by internal staff from the Department of Information Engineering along with the two junior experts recruited for the project (WPs 3, 4, 5, and 6). At this stage, the staff from the Department of Information Engineering at UNIPI is focusing on processing the data provided by eCampus (landslides) and the Department of Energy, Systems, Territory and Construction Engineering (floods). The ongoing phases of WP 5 involve the training, tuning, hyperparameter optimization, validation, testing, and implementation of the models.

WP 5: GUIDELINES ON RISK MANAGEMENT PLANNING AND ON RISK AWARENESS FOR EXISTING AREAS

This WP is carried out by the internal staff of the Department of Information Engineering of UNIPI, the recruited junior experts (WPs 3, 4, 5, and 6), in collaboration with the staff of eCampus. It is generally in line with the timeframe proposed in the Grant Agreement. In particular, Task 5.1 ended before the period considered by this deliverable. The other activities (Tasks 5.2, 5.3, and 5.4) are now focused on the techniques to generate guidelines for existing elements (i.e., slopes, rivers, and people) based on those regarding reference elements, provided by eCampus and the two senior experts from the Department of Energy, Systems, Territory and Construction Engineering of UNIPI (WPs 3 and 6).

MED

Four employees from Medjimurje County are working on the project implementation:

WP1: PROJECT MANAGEMENT = Unit coordinator

WP2: COMMUNICATION - Unit coordinator - and project administrator

WP6: APPLICATION TO PILOT AREAS - Unit coordinator, and two senior experts

NOTE: Since May 2025 Marija Marciuš has replaced, as Unit coordinator, Ida Kovač who has gone on maternity leave.

MUP

Employees from the MUP are working on project implementation. They were appointed by the management of the MUP as follows:

WP 1: PROJECT MANAGEMENT = Unit coordinator and Junior expert

WP 2: COMMUNICATION = Unit coordinator and Junior expert. During preparation and execution of the campaigns/ dissemination activities, two additional employees were involved, Branka Pejovic and Dragisa Ristic, as junior experts.

WP 6: APPLICATION TO PILOT AREAS = Unit coordinator and two junior experts.

WP2

Task 2.1: Project communication strategy

During the reporting period, the following events were held:

- 15-16 May 2025, see Annex 5 - On 15 May representatives of the Ministry of Interior, Rescue and Protection Directorate, Territorial Unit of Nikšić presented the SAFE LAND project to the students, teaching staff and school management from the First Secondary School in Nikšić (Montenegro). On 16 May 2025 the project SAFE LAND was presented to the local population in the areas with high risk of flooding in the Municipality of Nikšić, which were threatened during the floods in 2010 and in 2012. The areas are in Staševina, Kličevo and Ozrinići.
- May 20, 2025, see Annex 6 – Presentation of the SAFE LAND Project in the Municipality of Šavnik (Montenegro). Representatives of the Ministry of Interior, Rescue and Protection Directorate, Territorial Unit of Nikšić presented the SAFE LAND project to the citizens of Šavnik at the town square. The event was held as part of the celebration of the Municipality Day.
- June 4, 2025, see Annex 6 – Presentation of the SAFE LAND Project in the Municipality of Berane (Montenegro). Representatives of the Ministry of Interior, Rescue and Protection Directorate, Territorial Unit of Nikšić and Territorial Unit of Berane presented the SAFE LAND project to the citizens of Berane.
- June 5, 2025, see Annex 6 – Presentation of the SAFE LAND Project in the Municipality of Herceg Novi (Montenegro). Representatives of the Ministry of Interior, Rescue and Protection Directorate, Territorial Unit of Nikšić and Territorial Unit of Herceg Novi presented the SAFE LAND project to the public in Herceg Novi. The event was covered by local media.
- June 13, 2025, see Annex 7 – Presentation of the SAFE LAND Project in the Municipality of Plužine (Montenegro). Representatives of the Ministry of Interior, Rescue and Protection Directorate, Territorial Unit of Nikšić conducted an outreach campaign. The Public Institution Education Center Plužine was informed in advance about the campaign, ensuring the participation of students from the first shift, as well as teaching staff and school management.
- 16-18 June, 2025 - Presentation of the SAFE_LAND project, description of the implemented system and procedures to build the dataset training the AI toll at the workshop "*AI for Preparedness: Building capacity for AI-powered Disaster Risk Management*", organized by DG ECHO European Commission held in Bruxelles. Elisabetta Cattoni (eCampus) and Francesco Pistolesi (UNIPI) participated as invited speakers.
- The Organizing Committee of the *5th European Conference on Unsaturated Soils - EUNSAT2025* (https://eunsat2025.tecnico.ulisboa.pt/) accepted the sponsorship of the SAFE-LAND project. The conference will be held in Lisbon from 1 to 3 September 2025. During the conference, a Technical Exposition will take place and promotional items will be distributed to the delegates in the bags. The logo of SAFE-LAND will be published on the sponsor area, on printed symposium materials (flyers and symposium programme), and on digital proceedings of the conference. A delegate of the eCampus team will attend the conference and the Technical Exposition.

The dissemination events originally planned by the Croatian partner for May and June have been postponed. Specifically, these refer to the planned Rescue demonstration exercise and the Round table on innovative approaches in civil rescue. These events are now expected to take place at the end of September - beginning of October. The main reason for the postponement is that local elections were held in Croatia in May. In June the new civil protection headquarters had not yet been established, and their involvement is essential for the organization of these activities. We are confident that this delay will be recovered in the upcoming phases of the project. We have already started organizing these events in conjunction with the other planned activities for the coming months.

The research activities performed to assess the landslide and flooding risk have resulted in scientific publications.

In detail, with reference to geotechnical topics:

Two scientific papers were accepted for presentation at the Third Workshop on the Future of Machine Learning in Geotechnics, Florence, Italy, October 15-17, 2025:

1. Giomi I., Volpe E., Peiro Y., Baldassini M., Pistolesi F., and Cattoni E. *A dataset for landslide prediction through artificial intelligence with potential applications;*
2. Peiro Y., Ciabatta L., Giomi I., Volpe E., and Cattoni E. *Integrating slope units with remote-sensed hydrological data for landslide susceptibility mapping using machine learning.*

A scientific paper was submitted for presentation at the *Incontro Annuale Ricercatori di Geotecnica* [In English: *Annual Meeting of Geotechnical Researchers*] - IARG 2025, Florence, Italy, September 10-12, 2025:

3. Volpe E., Giomi I., Peiro Y., Baldassini M., Pistolesi F., and Cattoni E. *Modelli fisicamente basati e ia per la valutazione speditiva delle condizioni di stabilità dei versanti [In English: Physically-based models and AI for rapid assessment of slope stability conditions].*

A scientific paper was accepted for presentation at the *5th European Conference on Unsaturated Soils - EUNSAT2025,* Lisbona, Portugal, September 1-3, 2025:

4. Pucci A., Giomi I., Guida G., Navarro V., and Casini F. *Implementation and validation of a hydro – mechanical model based on the Clay and Sand Model extended to unsaturated conditions*.

A scientific paper was submitted for presentation at the Workshop *Evaluating Explainable AI and Complex Decision-Making* at the 28th European Conference on Artificial Intelligence (ECAI 2025), Bologna, Italy, 25-26 October, 2025:

5. Baldassini M., Pistolesi F., Giomi I., Volpe E., Cattoni E., 2025. *AI-based simulation surrogates for planning rainfall-induced landslide mitigation*.

A scientific paper is also in preparation for a publication to submit to the IEEE Data Description Journal.

With reference to hydraulic topics, two scientific papers were presented at the 41st IAHR World Congress, Singapore, June 22-27, 2025:

6. Pagliara S., Kumar A., Wei H., Palermo M. *Hydrodynamic impacts on bridge decks: a comprehensive literature review*;
7. Palermo M., Wei H., Kumar A., Bombardelli F.A., Pagliara S. *3D Scour due to low-inclined circular jets in cohesive soils: a preliminary analysis.*

Finally, the publication of a final and comprehensive paper is planned to describe the results of the project in terms of landslide and flooding risks, risk awareness, and the application of the system in the case studies.

The project web page within the UCPKN network for disseminating the project objectives, activities and results is continuously updated to report the main activities and achievements. Furthermore, the presence of the SAFE-LAND project on social media has been duly considered.

As outlined in the previous deliverables, the identification of stakeholders and end-users included the participants to SAFE-LAND communication and dissemination events held in Italy, Croatia, and Montenegro. Stakeholders were mapped in groups and levels of engagement also based on the results of the survey described in D2.1. Representatives of the municipality of Castel San Vincenzo (Italy) who participated in the Kick-Off Meeting and responded to the

survey questions expressed their willingness to be end-users of the system developed within the project and to participate in pilot testing activities, contributing data for collection. Therefore, the landslide-risk pilot area in Italy was selected in the Castel San Vincenzo Municipality (see the section describing the activities related to WP6 of this document).

The activities carried out under WP2 are progressing according to schedule and effectively contribute to the achievement of the project objectives, ensuring the dissemination and awareness of project outcomes among relevant authorities and stakeholders.

WP3

Task 3.1- Definition of Reference Areas (RAs)

Activities of this task were completed before the current reporting period and are described in deliverable D1.4.

Task 3.2- Definition of Reference Climate Events (RCEs)

Activities of this task were completed before the current reporting period and are described in deliverable D1.4.

Task 3.3- Task 3.3 - Definition of Damage Parameters (DPs)

Activities of this task were completed before the current reporting period and are described in deliverable D1.4.

Task 3.4: Hydrogeological risk assessments of reference areas (RAs)

The landslide and flooding risk level of each reference element subjected to a reference climate event was evaluated by performing analytical/numerical analyses based on hydrogeological data (slope and river elements). The results of the numerical analyses provide the damage parameters (DPs) able to measure the risk of each element subjected to the reference climate events (RCEs)s and provide the dataset - the knowledge base (KB) - used to train the Trustworthy Artificial Intelligence (TAI) system. The deliverable D3.2 reported the description of the procedures to perform the risk assessment of the reference elements.

Regarding the landslide risk, numerical simulations for reference slopes were carried out considering the effect of different reference climatic events (rainfalls), characterized by various return periods and accumulated precipitation. A comprehensive 2D numerical dataset was generated, where several combinations of geometrical, mechanical and hydraulic parameters were considered, also combining initial water table locations. About 23,500 simulations were carried out to identify the landslide hazard associated with reference rainfall events, and to predict the triggering of instabilities in slopes. Landslide risk was quantified based on the levels of hazard and consequences - on properties and people potentially involved - encompassing both vulnerability assessment and exposure level of the elements at risk. A final landslide risk matrix with risk indicators was implemented.

Regarding the hydraulic risk, simulations were carried out based on reference rainfall events and considering scenarios involving different combinations of parameters such as rainfall return period, drainage basin area, average slope of the drainage basin, average river slope, and average floodplain slope. For each simulation, GeoTIFF maps were produced showing the location of breakpoints, flow velocity, water depth, and arrival time. The results also include hydrographs at selected sections, longitudinal river profiles, and estimates of flooded volumes. Hydraulic risk was assessed by combining the damage class—which reflects progressively increasing potential consequences in the event of flooding, depending on the type and vulnerability of exposed elements—with the hydraulic hazard, which represents the statistical

frequency of floods of a given magnitude, regardless of exposure. A final hydraulic risk matrix was then developed.

Regarding the psychological section, the twofold objective was to identify individuals at risk of adverse psychological consequences and to assess the quality of risk perception in the case of floods and landslides. The implemented research protocol was approved by the Ethics Committee of e-Campus University (No. 6/2024). More specifically, the self-report questionnaires included instruments to collect socio-demographic information and to assess psychological well-being, coping strategies, vulnerability to PTSD, social support, perceptions of flood/landslide risk (including knowledge, awareness, worry, and previous direct experience), concerns about climate change, and personality traits. The self-report questionnaires were digitized by creating a web survey on Qualtrics.

The web survey was distributed through a QR-CODE/link via e-mail and posted on social media sites of the research staff, in order to set up a reference convenience sample (reference people) for a preliminary study (pre-test).

Access to the web survey included a description of the research protocol and informed consent, which, upon acceptance, allowed participants to complete the self-report questionnaires. The questionnaire continues to be sent to the reference population, and the database with the questionnaire responses is continuously updated.
The completion of the questionnaires was anonymous and voluntary, and could be completed within 15 days of the first access. In the data analysis phase:

1. To detect the individuals' risk of adverse psychological consequences, a series of socio-demographic factors (i.e., gender, age), and individual and relational pre-traumatic factors (i.e., prior traumatic events, social support) was considered. These factors were categorized into resources, distal risk factors, and proximal risk and protective factors, and were assigned a specific score for each. Then, the total vulnerability score for each subject was calculated by considering the scores of each variable. Finally, a K-means statistical analysis was performed to identify four groups of individuals with distinct risk levels of negative psychological consequences: no risk, low risk, presence of risk, and high risk of psychological vulnerability.

2. To assess the quality of risk perception for both floods and landslides, five variables (knowledge, awareness, worry, prior direct experience, and personality) were considered and were assigned a specific score to each. Then, a total score was calculated for each participant about the risk perception of floods and landslides. Then, a K-means statistical analysis was performed to identify three groups of individuals with distinct levels of floods and landslide risk perception: low, adequate, and high risk perception.

Task 3.5 - Guidelines on risk management plans and risk awareness

With reference to landslide and flooding risks, mitigation measures were identified based on technical and damage parameters values (of the reference slopes/rivers, from local to basin scale). Guidelines suggesting the most effective mitigation measures among all possible measures to reduce the risk of a reference element were prepared and will be detailly described in the deliverable D3.3.

Taking into account the assessment of an individual's level of psychological risk (no risk, low risk, moderate risk, high risk) combined with their risk perception (low, adequate, high) in the case of floods and landslides, we developed Guidelines that will be described in Deliverable D3.3. Specifically, the Guidelines aims to improve the emergency management system through the:

1- promotion of early identification of the subjects most vulnerable to adverse psychological consequences in case of floods/landslides for timely support in the post-event recovery phase,

2. promotion of effective preventive preparation and risk communication that support adequate knowledge and awareness of risks and consequent functional and protective response in case of a flood/landslide emergency.

Activities of WP3 are on track and are effectively contributing to the achievement of the estabished objectives.

WP4

Task 4.1: Trustworthy AI to map areas (climate events) to RAs (RCEs)

Activities of this task were completed before the period of this report and are described in deliverable D1.4.

Task 4.2: Trustworthy AI for hydrogeological risk assessment

Task 4.2 is progressing in line with the expected timeframe. The objective of this task is to design and develop trustworthy AI (TAI) methods to estimate Damage Parameters (DPs) for the slopes and rivers of a given area affected by a current climate event. The models are trained using the DPs obtained in WP 3 for Reference Areas (RAs) and Reference Climate Events (RCEs). To this end, the consortium has implemented a data-driven modelling approach using the outputs of the geotechnical and hydraulic simulations previously described in D3.4. In particular:

- For the *landslide risk*, simulations covering a wide range of geometric, hydraulic, and geotechnical configurations under different rainfall scenarios. These simulations provide detailed outputs regarding slope stability.

- For the *hydraulic risk*, simulations including flood scenarios considering parameters including rainfall return period, drainage basin area, river and floodplain slope. The resulting maps and hydraulic indicators (e.g. water depth, flow velocity, arrival time) support the definition of DPs for river-related elements.

Based on these simulation datasets, AI models are being designed, developed, and trained to obtain the outputs of the simulations in a significantly faster and computationally efficient manner. The AI models we are designing take parameters (so-called *features*) selected or computed from those describing the landslide and hydraulic risk scenarios and are being trained to predict the corresponding DPs. Regression AI models currently under evaluation include:

1. Random forest regressors and gradient boosting machines for baseline accuracy and interpretability;
2. Neural networks for capturing complex, nonlinear interactions between parameters;
3. Support vector regression (SVR) in low-dimensional subdomains.

In alignment with the TAI principles, special attention is being paid to transparency and explainability. For each predictive model, explainable AI methods are integrated to facilitate interpretation of the predictions. In particular, SHAP (SHapley Additive exPlanations) values are used to highlight the contribution of each input feature to the predicted DP. Domain experts can thus understand and trust the model's behaviour, thereby enabling collaborative decision-making for risk mitigation.

The integration of explainable models ensures that AI-based risk assessment is reliable, verifiable, and aligned with human expertise—fulfilling the TAI requirements of understandability, robustness, and human oversight.

Task 4.2 is proceeding according to plan.

Task 4.3: Trustworthy AI, psychology, neuropsychiatry for risk awareness

Task 4.3 is progressing as planned. Its aim is to combine trustworthy artificial intelligence (TAI) with psychological and neuropsychiatric frameworks to assess *risk awareness levels* among the population in the Reference Areas (RAs).

Based on the psychological data collected and analysed in Task 3.4, the team is designing and developing AI-based methods that use validated psychological indicators—such as perceived risk, prior trauma exposure, coping strategies, and socio-demographic information—to estimate individuals' *risk awareness* and *psychological vulnerability* in the context of hydrogeological disasters (floods and landslides). Following the analytical procedures adopted in Task 3.4, the modelling phase is currently focusing on exploring a multifaceted group of solutions based on different categories of AI techniques, including:

- *Clustering algorithms*: to identify *profiles* of individuals with similar risk awareness patterns,
- *Classification models*: to categorize individuals into discrete awareness or vulnerability classes (e.g., *low*, *medium*, *high*),
- *Regression models*: for continuous estimation of awareness/vulnerability scores.

These approaches aim to transform empirical clusters into interpretable classes that—in line with the project's aim—can be reused for automatic classification of new individuals and groups in the RAs. The outputs are expected to support tailored communication strategies and targeted awareness interventions.

To ensure trustworthiness, our modelling procedures and pipelines prioritize transparency and interpretability. Techniques such as feature importance ranking and SHAP are being accurately evaluated to ensure that decision-support outputs can be inspected and validated by domain experts in psychology and public health. Psychological expertise can thus complement and supervise AI-based assessments, in full alignment with the project's commitment to trustworthy, inclusive, and transparent AI systems.

Task 4.3 is proceeding regularly, and exploratory modelling is ongoing, with results to be refined and validated in the upcoming phases of the project.

Task 4.4:Trustworthy AI to estimate people's risk awareness levels

Task 4.4 is proceeding according to schedule. It aims to *transfer and generalize* the results of task 4.3 to real populations residing in existing, high-risk areas.

The objective of this task is to develop models that can estimate the *risk awareness level* of individuals in actual communities, based on the awareness profiles identified among representative subjects in the Reference Areas (RAs). These estimations are performed based on both:

- *the similarity of the target area to existing RAs* stored in the project's Knowledge Base (KB);
- *the clustering and classification models* developed in Task 4.3 to infer awareness levels for the population.

The methodological approach involves the design of AI models that match current areas and populations to the most similar RAs, with respect to socio-demographic, geographic, and environmental features. Once the best-matching RAs are identified, the idea is to use the risk awareness classes (e.g., low, medium, high) derived from representative individuals in those RAs to infer the likely distribution of awareness levels within the target population.

To this aim, we are experimenting with techniques that combine approaches including:

- *nearest-neighbour methods* and *similarity-based reasoning* to identify the most appropriate RAs;
- *probabilistic classification models* to associate awareness levels with individuals or groups;
- *rule-based or interpretable decision models* to ensure that estimations remain transparent and verifiable.

As in the previous tasks of this work package, the entire pipeline is being developed under the principles of Trustworthy AI, with particular attention to explainability and human oversight. The ability to explain why a specific awareness level is assigned to a given population group is thus key to enabling risk managers and public authorities to plan targeted communication and awareness-raising strategies.

In Task 4.4 we are thus making the psychological modelling outcomes of Task 4.3 operative by embedding them into AI-driven, context-aware estimation tools, enabling the proactive assessment of awareness levels in real at-risk populations. Task 4.4 is progressing regularly and in alignment with the technical roadmap of WP4.

Task 4.5: Implementation of the tool: risk assessment & awareness

Task 4.5 is progressing according to the planned timeline and is currently focused on the *integration and implementation* of the AI modules developed in Tasks 4.2 (hydrogeological risk assessment), 4.3 (risk awareness modelling), and 4.4 (population-wide awareness estimation). This task is the most crucial, as it delivers the technical foundation of the tool that is the final objective of the entire project.

In this phase, we are working on the selection and benchmarking of the most suitable models for integration. Both *classification* and *regression* models are being evaluated using advanced validation techniques, with appropriate precautions to ensure reliable results. Where needed, specialized data rebalancing strategies are being studied and applied to improve model performance and ensure consistency across diverse risk levels and population groups.

Following the selection phase, we have initiated the implementation of the tool architecture, which is designed to be modular and scalable. The system integrates the risk assessment and awareness estimation models within a single pipeline, connected to the Knowledge Base (KB) for inference support and contextual information retrieval. Standardized input/output interfaces are being defined to allow future extensions and facilitate interoperability.

The models being integrated will be chosen for their predictive accuracy, transparency, and interpretability, in line with the principles of Trustworthy AI. Explainable components, such as SHAP-based visualizations, are being embedded to support decision-making and enable domain experts to understand and validate the tool's outputs.

The upcoming months will be particularly intensive, as they will involve the second part of all these activities, including *model integration*, the *development of application logic*, and the *preparation of the system for deployment*. This phase is crucial, as the quality of the implementation will directly affect the system's effectiveness and impact in real-world settings.

The task is aligned with the project’s objectives and implementation plan.

WP5

Task 5.1: Identification of critical climate events end elements

Activities of this task ended before the period of this report and are described in deliverable D1.4.

Task 5.2: Guidelines on risk management planning for existing areas

Task 5.2 is in line with the project timeframe. It aims to use trustworthy AI methods to find tailored risk mitigation guidelines for physical elements (e.g., slopes and rivers) in real areas where the associated Damage Parameter (DP) values indicate an unsafe hydrogeological condition.

The work of this task is based on the guidelines developed in Task 3.5 for Reference Areas (RAs) and Reference Climate Events (RCEs), which associate specific types of landslide and flood risk with corresponding mitigation actions. These guidelines—based on geotechnical and hydraulic analyses—suggest the most effective measures to reduce risk under a variety of terrain, hydrological, and climatic scenarios, while also considering feasibility, time of implementation, etc. They are part of Knowledge Base (KB).

In Task 5.2, these reference guidelines are proposed for real contexts by identifying, for each at-risk element in an existing area, the most similar reference element (i.e., RAs and RCEs) in the KB. The similarity is evaluated using a combination of physical descriptors, such as the DP values regarding slope(s) and river(s).

Once the most relevant references are identified, the corresponding risk mitigation guidelines are inferred and associated with the current element. We are experimenting inference strategies that follow a structured matching process, in which multiple reference entries contribute to the final recommendation. This ensures both **r**obustness and traceability, while remaining fully aligned with the principles of Trustworthy AI.

Rather than relying on complex (and non-interpretable) black-box systems, we are studying transparent and rule-based approaches, ensuring that the rationale for each suggested guideline can easily be inspected and validated by domain experts. This promotes human oversight and supports expert-in-the-loop deployment scenarios, in particular with reference to the future stages of the project, when the system will be used and tested in the pilot areas in the presence of experts of Civil Protections involved in the consortium.

Task 5.2 is thus focusing on the *physical risk dimension*. Current activities are advancing steadily, and the experiments, development and refinement of the similarity and guideline selection methods are ongoing.

Task 5.3: Guidelines on increasing risk awareness in existing areas

Task 5.3 is in line with the project schedule and focuses on finding guidelines aimed at increasing risk awareness among individuals living in existing areas. The goal is to provide recommendations that help improve individual and community preparedness in the event of floods or landslides.

This task is based on the work carried out in Task 3.5, where awareness-enhancing guidelines were developed for representative population profiles. These profiles were defined by combining two psychological dimensions: *risk perception* (low, adequate, high); *psychological vulnerability* (no risk, low, moderate, high). Based on this taxonomy, targeted guidance was formulated.

In Task 5.3, the aim is to extend and apply this knowledge to individuals living in actual high-risk areas. The system estimates each individual's likely awareness profile using the AI models developed in Tasks 4.3 and 4.4, and then identifies the most similar reference profiles in the Knowledge Base (KB). Once this match is established, the corresponding awareness-raising guidelines are retrieved and proposed as tailored recommendations.

The inference procedure is designed to be **t**ransparent, traceable, and interpretable. As in the case of the guidelines described in Task 5.2, we are adopting a structured matching framework, where the individual's features—such as psychological indicators, socio-demographic traits, and environmental exposure—are compared to those of reference individuals. The guideline assignment follows a reasoned selection process, where the strongest matches across awareness dimensions are prioritized.

Experts will be given the possibility to visualize the guidelines and the profiles of target peoples. As in the case of the guidelines to reduce the hydrogeological risk, this approach is central to the project's strategy, ensuring that recommendations are technically sound and ethically responsible.

All work under Task 5.3, focused on *people risk dimension*, is progressing as planned. The current efforts are focused on refining the guideline selection logic and validating the interpretability mechanisms, in view of the upcoming deployment phase within the tool.

Task 5.4: Implementation of the tool: tailored guidelines

Task 5.4 is ongoing and in line with the timeframe. The aim of this task is to implement the software modules responsible for the inference and delivery of tailored guidelines for both hydrogeological risk mitigation and awareness raising, as defined respectively in Tasks 5.2 and 5.3.

This task represents the natural continuation of Task 4.5, which focused on the implementation of the core AI modules for risk assessment and awareness estimation. Task 5.4 extends this effort by integrating the decision-support functionalities that transform those assessments into actionable recommendations.

The work is currently focused on the major activities as follows:

- *selecting* the most effective and interpretable inference strategies among those developed in the previous tasks,
- *validating* their robustness and coherence with the Trustworthy AI principles,
- *embedding* them into the tool's architecture as modular components, ensuring compatibility with the Knowledge Base and other existing subsystems.

Given the dual nature of the guidelines (*risk mitigation* and *awareness enhancement*), the task involves parallel implementation efforts, both computationally and logically intensive. The integration of these modules will be critical to ensuring that the tool can provide comprehensive and context-sensitive support for decision-makers and end-users.

Activities are on track, and the task is aligned with the roadmap and objectives of WP5.

WP6

Task 6.1: Pilot studies: Data collection

The activities carried out under this task focused on identifying the real areas constituting the case studies in Italy, Croatia, and Montenegro. Several technical parameters relevant to testing the AI tool within these regions were collected. Further parameters are needed and will be obtained by sources such as institutional datasets, previous studies, and field data provided by local authorities. All the data are unprocessed and need to be interpreted and formatted to build the dataset domain to be used by the AI system. For this reason, we decided to extend the activities of Task 6.1 (data collection) on the Gantt chart by one month. In addition, field visits to the study areas will be scheduled if needed, in order to acquire further on-site data.

Below is presented a brief overview of the landslide and flood-prone areas selected in the three participating countries, along with the sources of the technical parameters.

Italy

Flood risk

For the hydraulic analyses pertaining to case studies in Italy, we selected three different basins in Tuscany. These areas are characterized by different responses of rivers/streams to rainfall events. More specifically, we identified a basin close to the city of Livorno (hilly basin), a basin in the area of Versilia (mountain basin) and a basin in the floodplain of Pisa (Fig. 1). All necessary data (i.e., rainfall, cross sections, discharge data, and topographic maps) pertaining to the selected basins were collected.

Fig. 1 Floodplain of Pisa (Tuscany, Italy).

Landslide risk

The pilot case study for landslide risk is situated in the Municipality of Castel San Vincenzo, located in Molise region (see Fig. 2). According to the Italian Landslide Inventory (IFFI), the area is affected by landslide phenomena (see Fig. 3), with the territory particularly prone to geo-hydrological events. Figure 4 shows the spatial distribution of available geotechnical tests in the area of Castel San Vincenzo. The results yield essential technical data, including position of the phreatic surface and the mechanical and hydraulic soil properties.

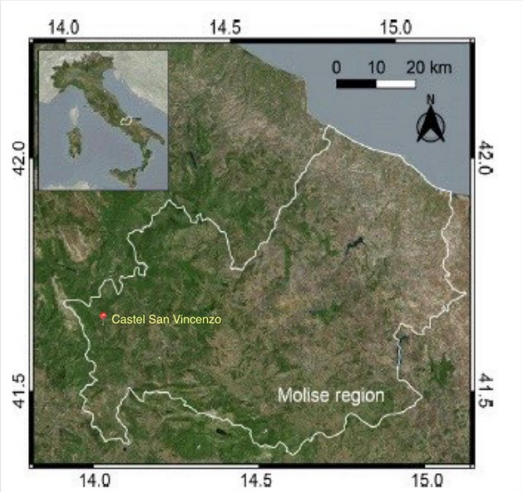


Fig. 2 The inset shows the location of Castel San Vincenzo Municipality

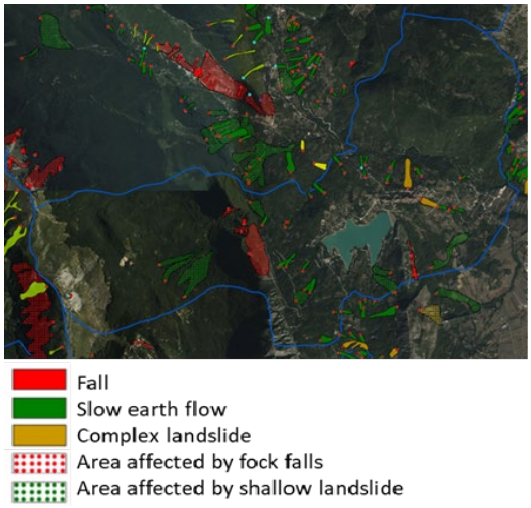


Fig. 3 Map of Castel San Vincenzo Municipality with indications of the main landslides according to the IFFI database (https://idrogeo.isprambiente.it/)

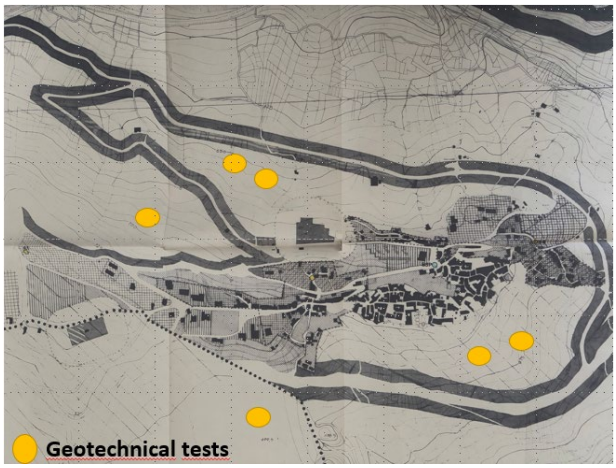


Fig. 4 Spatial distribution of available geotechnical tests in the area of Castel San Vincenzo.

Croatia

The municipalities of Štrigova and Sveti Martin na Muri have been selected as pilot areas in Međimurje, located in the northwestern part of Croatia. Štrigova is situated in the northern section of Međimurje County, near the border with Slovenia, while Sveti Martin na Muri lies in the northwestern part of Međimurje, directly along the Mura River, which forms the border between Croatia and Hungary. Both municipalities are positioned at relatively low altitudes, with gently rolling and hilly terrain interspersed with smaller hills. The lower, more level areas are found along the Mura River. In general, elevations do not exceed 200 meters, making the terrain largely accessible.

Flood Risk

Municipality of Sveti Martin na Muri

While there are not records of major floods directly impacting the municipality, the Mura River can cause local flooding, especially in the lower-lying areas near the river. The entire area periodically faces flood risks, primarily due to intense precipitation.

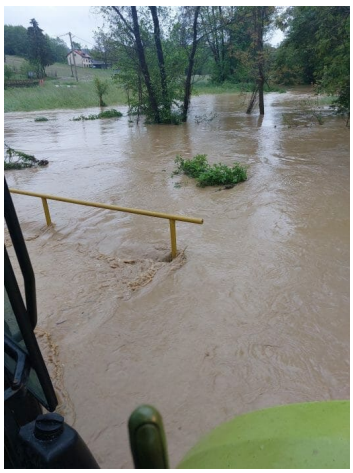


Fig. 5. Picture of the area exposed to flood risk.

Landslide Risk Areas

Municipality of Štrigova

This area is particularly prone to landslides. A significant number of landslides have been officially recorded which details conditions for land use, development, and protection.

Fig. 6. Picture of the area exposed to landslide risk.

The AI system will be applied and tested on the pilot municipalities of Štrigova and Sveti Martin na Muri. Representatives of Međimurje County are actively gathering information, data, statistical records, and photographs related to the selected pilot areas. Materials provided so far include geotechnical reports and laboratory tests, cartographic representations, data on embankments and riverbank fortifications, data on active or potential landslides, data on flood-prone areas.

Montenegro

In Montenegro, the Municipality of Nikšić was selected as the pilot case study. This municipality is located in the central and northwestern region of the country. It lies in the heart of the expansive Nikšić Field (Nikšićko polje), a karst plain covering an area of 48 km², at an elevation of 640 meters above mean sea level (AMSL). The plain is surrounded by rugged mountainous terrain, characteristic of the western Montenegrin landscape. The town itself is situated at the foot of Trebjesa Hill.The Zeta River originates in the Nikšić Field and flows near the town before becoming a subterranean river south of it. Historically, the river caused frequent flooding in the plain until the construction of the Perućica Hydroelectric Power Plant in 1960. The construction of the power plant resulted in the creation of three large artificial lakes near the town—the Krupac, Slano and Vrtac Lakes.

Flood Risk

Ozrinići, Kličevo, Straševina, and Štedim.

These areas have a high risk of flooding and were significantly affected during the flood events in 2010 and 2012.

Landslide Risk

Povija and Liverovići.

The Povija landslide was triggered by the heavy floods of December 2010. It is located on a steep slope near the Ostrog Monastery, where the terrain has a slope gradient ranging from 30–40°, reaching up to 45° in some areas. The landslide is developing in geologically complex terrain consisting of marls, clay slates, limestones, and partially breccias, with visible fracturing. The surface layers are heavily fragmented and saturated with water, further contributing to instability. Liverovići is situated about ten kilometers north of Nikšić, at an elevation between 730 and 770 meters, in a valley below the Liverovići Lake. This area is particularly prone to landslides, especially after heavy rainfall, due to its geological structure. A significant landslide occurred in November 2015, during which approximately 40 meters of road collapsed.

Fig. 7. Picture of the Liverovići landslide of 2015.

Representatives of the Ministry of Interior (MUP) are working on the collection of information, data, statistical records, and photographs related to the selected pilot areas. So far, the following materials have been provided, among others topographic map of Montenegro, geological and hydrogeological maps of Nikšić, an Annual Flow Overview of the

Hydroelectric Power Plant “HE Perućica” (Measuring Station: Duklov Bridge) for the period 2010–2023, graphic attachments (e.g. Nikšić–Ostrog wall), and geotechnical profile and soil mechanical parameters from geotechnical investigation for the area of Povija and Liverovići exposed to the landslide risk, along with photo and information about the sliding surface of the Liverovići landslide (2015).

Risk awareness

The web surveys created on Qualtrics for reference people - containing the research protocol, informed consent, and self-report questionnaires to identify individuals at risk of adverse psychological consequences and to assess the quality of flood and landslide risk perception - were translated in the reference languages of the pilot areas. For the data collection, each partner will disseminate the web survey through a QR link/code via e-mail and social media to the population of the pilot areas.

Task 6.2: Pilot studies: Testing of the tool in pilot areas

Activities of this task are planned to start after the current reporting period.

Activities of WP6 are, overall, currently on time and contribute to the WP6 objectives.

Lists of milestones attained in the reporting period

Milestone 2: Stakeholders & dissemination

Due date: M12

Lead participant: eCampus

Progress: Milestone 2 was successfully achieved on time.

Milestone 5: Hydrogeological risk assessment of RAs

Due date: M16

Lead participant: eCampus

Progress: Milestone 5 was achieved on time.

Lists of deliverables submitted in the reporting period

Deliverable D1.4: Progress report M9

Due date: M9

Lead participant: eCampus

Progress: Deliverable D1.4 was submitted on time.

Deliverable D2.1:Dissemination plan that includes an end user and stakeholder analysis

Due date: M12

Lead participant: eCampus

Progress: Deliverable D2.1 was submitted on time.

Deliverable D3.2: Hydrogeological risk assessment of reference areas

Due date: M16

Lead participant: eCampus

Progress: Deliverable D3.2 was submitted on time.

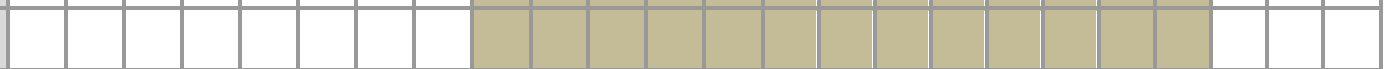
Timetable

Modifications with respect to the original timetable are marked in red.

Timetable (projects up to 2 years)

Fill in the planned implementation in beige and the deviations in red. Repeat lines/columns as necessary.

Starting date:	*[12/02/2024]*																							
ACTIVITY	**MONTHS**																							
	M 1	**M 2**	**M 3**	**M 4**	**M 5**	**M 6**	**M 7**	**M 8**	**M 9**	**M 10**	**M 11**	**M 12**	**M 13**	**M 14**	**M 15**	**M 16**	**M 17**	**M 18**	**M 19**	**M 20**	**M 21**	**M 22**	**M 23**	**M 24**
Task 1.1- Start-up activities																								
Task 1.2 - Coordination of activities and internal monitoring																								
Task 1.3 - Financial management																								
Task 2.1 - Project communication strategy																								
Task 3.1 - Definition of Reference Areas (RAs)																								
Task 3.2 - Definition of Reference Climate Events (RCEs)																								
Task 3.3 - Definition of Damage Parameters DPs)																								
Task 3.4 - Hydrogeological risk assessments of reference areas (RAs)																								

Task 3.5 - Guidelines on risk management plans and risk awareness	
Task 4.1 - Trustworthy AI to map areas (climate events) to RAs (RCEs)	
Task 4.2 - Trustworthy AI for hydrogeological risk assessment	
Task 4.3 - Trustworthy AI, psychology, neuropsychi-atry for risk awareness	
Task 4.4 - Trustworthy AI to estimate people's risk awareness levels	
Task. 4.5 - Implementation of the tool: risk assessment & awareness	
Task 5.1 - Identification of critical climate events end elements	
Task 5.2 - Guidelines on risk management planning for existing areas	
Task 5.3 - Guidelines on increasing risk awareness in existing areas	
Task 5.4 - Implementation of the tool: tailored guidelines	
Task 6.1 - Pilot studies: Data collection	
Task 6.2 - Pilot studies: Testing of the tool in pilot areas	

Delays

If there are delays, identify them, explain the reasons why and how you plan to manage those delays (catch-up with / avoid further delays, impact on timetable, etc.).

#§WRK-PLA-WP§#

3. BUDGET IMPLEMENTATION

Budget implementation — Use of resources

Provide information on whether the budget consumption is in line with the advancement of the activities. Identify and justify any divergences.

The budget implementation is in line with the activities implemented so far.

The eCampus University (**eCampus**) - Lead partner - had incurred the following expenses:

€ 258,771 for staff costs

€ 7,429 for Travel and subsistence

€ 14,854 for Equipment

€ 49,044 for Other goods, works and service

For a total of € 330,098, corresponding to approximately 73 % of the total budget (without indirect costs of 7%).

The time commitment of eCampus internal staff for WP2 and WP3 turned out higher than initially planned. This was partly due to the fact that the contracted researchers, Verre and Giomi, could not work from the beginning of the project, since they were respectively recruited in April and June 2024. In order to avoid delay in the implementation of the action, an extra work was therefore performed by the University internal staff (that have higher monthly rates).

Additionally, the results of the numerical simulations performed on the reference slopes (more than 23,000) required to be post-processed in such a way as to set up the domain to be used by the AI tool. This effort also required a slightly longer time than planned.
A similar effort in post-processing is expected for data collected in the pilot areas since the data related to all the selected areas in Italy, Croatia and Montenegro, need to be interpreted and post-processed before being used by the AI system. For this reason, we decided to extend the activities of Task 6.1 (data collection) on the Gantt chart by one month, including the data' interpretation and post-processing activities, without affecting the overall duration of the project.

Regarding equipment, as of month 17 the expenditure is still below the amount planned in the GA, since we have partly used already available hardware resources. Should it be needed, additional equipment will be purchased for field data collection, for processing data in pilot areas, and for validating the results of the analyses.

The University of Pisa (**UNIPI**) had incurred the following expenses:

€ 185,250 for staff costs

€ 11,506 for Travel and Subsistence

€ 9,700 for Equipment

€ 13,719 for Other goods, works and services

For a total of € 220,175 with a percentage of 60.1 % compared to the total budget (without indirect costs). Expenditures of UNIPI are substantially in line with the progress of the work packages, as reflected in the cost breakdown presented in the "*Consolidated costs per WP*" Table, on page 147 of the Grant Agreement. In particular, WPs 3, 4, and 5 still require three to four months of work to be completed. In the upcoming months, the staff effort is expected to increase, as this period will cover the intermediate and final phases of system implementation, setup, optimization and testing in preparation for its use in the pilot studies. In particular, these activities are critical as they deal with training, hyperparameter optimization, validation, testing, and implementation. Along with the following ones, related to deployment, final testing on the

use cases, and the application of the system in the pilot areas (WP 6), the current and next activities are the most delicate and demanding. This explains why the current personnel cost for UNIPI appears slightly behind schedule when compared to the Grant Agreement (for example, based on merely dividing the allocated personnel budget by the total number of work package months). Finally, the lower budget allocated to equipment compared to the Grant Agreement is due to the unexpected new availability of computing resources on the UNIPI cluster, which has so far made it unnecessary to purchase dedicated workstations. We have already planned to reallocate the unspent equipment budget to consumables (e.g., graphics cards, processors, memory) to scale up our computer capabilities, along with publications, dissemination-related travel for conferences dedicated to these publications. This budget transfer will involve cost items regarding the budget of the same partner (UNIPI) and will not imply any change to the description of the action in Annex 1 of the Grant. Summarizing, the budget implementation of UNIPI at month 17 is aligned with the financial plan outlined in the Grant Agreement, and no critical deviations are currently reported.

The Medjimurje County (**MED**) had incurred the following expenses:

€ 44,164 for staff costs

€ 2,740 for Travel and subsistence

€ 2,996 for Equipment

For a total of € 49,900 with a percentage equal to 40 % comparing the total budget (without indirect costs).

MED's costs related to “Other goods, works and service” have been reallocated according to the reschedule of dissemination events, initially planned for May–June and now postponed to October 2025.

The Ministarstvo Unutrasnjih Poslova (**MUP**) had incurred the following expenses:

€ 24,372 for staff costs

€ 3,575 for Travel and subsistence

€ 5,476 for Equipment

€ 42,580 EUR for Other goods, works and services (procurement of the office material, meeting material, publications, brochures, leaflets, visibility activities, campaigns, dissemination, promotive gadgets, promotive material (USB, notebooks, pens…), and EFDRR marketplace visibility.

For a total of € 76,003 with a percentage equal to 59 % comparing the total budget (without indirect costs).

Finally, the total expenses incurred as of 11 July 2025 are equal to € 676,176 (approximately 63% of the total budget without the indirect costs).

It is important to highlight that, although some partners are slightly overperforming while others are slightly underperforming, which can be considered normal in projects of the complexity of SAFE-LAND, we expect to fully accomplish all the commitments according to the contractual obligation.

ANNEXES

LIST OF ANNEXES

Annex 1: I Technical Meeting minutes – December 5, 2024 - online

Annex 2: Technical Meeting minutes - February 25, 2025 - online

Annex 3: Technical and Steering Committee Meeting minutes - April 17, 2025 - online

Annex 4: Technical Meeting minutes - May 23, 2025 - online

Annex 5: Report from Campaign on Nikšić - 15 May 2025

Annex 6: Report from Campaign on Šavnik, Berane, and Herceg Novi - 20 May, 4 June, and 5 June 2025

Annex 7: Report from Campaign on Plužine - 13 June 2025

HISTORY OF CHANGES		
VERSION	PUBLICATION DATE	CHANGE
1.0	23.07.2025	Initial version (new MFF).

SAFE-LAND

Mitigating the risk of flooding and landslides via artificial intelligence with a view to extreme climate events

Annex 1. Technical Meeting minutes

December 5th, 2024 -online

MITIGATING THE RISK OF FLOODING AND LANDSLIDES VIA ARTIFICIAL INTELLIGENCE WITH A VIEW TO EXTREME CLIMATE EVENTS

Co-funded by the European Union

Agenda items Technical Meeting

The agenda of the technical meeting was the following:

Overview: description of the next deliverables and primary activities to perform

Discussion on the technical parameters needed to select real areas

Selection of real areas

Research protocol – ethical commission

Attendants

The people who attend in video conference to the meeting in representation of each institution are shown in the next list:

NAME	INSTITUTIONS
Elisabetta Cattoni	e-Campus
Francesco Pistolesi	Pisa University
Ida Kovac	Medjimurje County
Irena Novak Vabec	Medjimurje County
Nada Srdanovic	Ministarstvo Unutrasnjih Poslova
Elena Camisasca	Pisa University
Stefano Pagliara	e-Campus
Cristal Sirotich	e-Campus
Evelina Volpe	e-Campus
Ignacio Giomi	e-Campus
Michele Palermo	Pisa University
Salvatore Verre	e-Campus
Yaser Peiro	e-Campus

Co-funded by the European Union

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Minutes of the technical meeting

The technical online meeting took place on December 5 at 10:00 to the following link Meet - muq-xqsf-yvd

Overview: description of the next deliverables and primary activities to perform

Elisabetta Cattoni gave an overview of the next activities and deadlines: Deliverables D2.1, D3.2, D1.5, and D3.3.

D2.1 (M12 – February 11, 2025): This report defines rules, means, and recommendation for an effective communication to stakeholders and target groups. It includes an end user and stakeholder analysis.

Elisabetta Cattoni asked everyone to follow the social pages:

Facebook page link: https://www.facebook.com/safeland2023

LinkedIn page link: https://www.linkedin.com/in/safe-land-project-ucpm-7a318b33b/

Instagram page link: https://www.instagram.com/safe_land_p/

and to invite as people as possible to follow them.

She said that in January (before the deadline of D2.1) the dissemination events in Italy, Croatia and Montenegro have to be planned: e.g. national dissemination events (in presence and online), workshops on the first results, with invited speakers expert in the hydrogeological risk assessment and risk awareness, or meeting dedicated to civil protection and risk management institutions …

*D3.2 (M16 – 11 June, 2025):*Hydrogeological risk assessment of reference areas:

The report describes the DP values of RAs elements and the hydrogeological risk assessment of RAs.

Elisabetta Cattoni highlighted that in the next months the DP values of all the elements of the RAs and the level of risk evaluation for each of them due to the climate events have to be completed. By May 2025, all the results (concerning “reference” rivers, slopes and people) have to be presented and the writing of D3.2 has to be started.

Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union. Neither the European Union nor the granting authority can be held responsible for them.

D1.5 (M17 – July 11, 2025): Progress report M17

This report will describe the progress of the activities according to the timetable.

The project coordinator suggested to describe during these months step by step all the performed activities.

D3.3 (M18- August 11, 2025): Reference guidelines

The report describes the guidelines on risk management planning and those aimed at personalizing risk awareness training.

The project coordinator highlighted that eCampus and UNIPI teams have to start writing this report from now. Each team has to build its own report (one for risk management planning of river element, one for risk management planning of slope element and one for the risk awareness training on people). Considering the deadline for this submission, Elisabetta Cattoni suggested that by the end of July the D3.3 has to be finished.

Discussion on the technical parameters needed to select real areas

At the end of the description of the next primary activities, the project coordinator asked to the partners if there were questions about the draft she sent them on November 21 2024, containing the EPs parameters that have to be known to select a real element (slope, river, people), and the parameters characterizing the climate events.

No questions about these parameters.

Selection of real areas

Elisabetta Cattoni highlighted the importance to work in order to select the real elements (areas) from now, based on the document sent on November 21 with the description of EPs and climate events. Francesco Pistolesi remembered that the deadline of the milestone M11 (*Data collection completed*) is due in M20 (first days of October 2025).

In this regard, the project coordinator asked to the hydraulic group of university of Pisa to show during the next technical meeting the areas selected in Italy for the element “river”, describing all parameters used to characterize the rivers elements of these areas.

She proposed to plan the next technical meeting for the second-third week of January 2025. She will send a Doodle to choose the date. Participants agreed

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Research protocol – ethical commission

Elena Camisasca showed Power Point slides containing the research protocol for the ethical commission and asked to MED and MUP partners to translate the document in their languages by January 2025. She sent the document to all the partners at the end of the technical meeting.

The meeting finished at 11:00.

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SAFE-LAND

Mitigating the risk of flooding and landslides via artificial intelligence with a view to extreme climate events

Annex 2. Technical Meeting minutes - February 25, 2025 - online

MITIGATING THE RISK OF FLOODING AND LANDSLIDES VIA ARTIFICIAL INTELLIGENCE WITH A VIEW TO EXTREME CLIMATE EVENTS

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General information of the meeting

In compliance with the WP 1 of the project SAFE LAND, Task 1.2 - Coordination of activities-and internal monitoring- the coordinator sent a doodle to all the project consortium members to find a date and a time slot to have the third technical meeting on line. The agenda includes describing the activities performed by each team member, planning high-priority tasks, discussing questions and results, and planning the activities on pilot areas.

The technical meeting took place on Tuesday, February 25 at 10:00 am at the following link https://meet.google.com/nwg-occb-kcn.

Agenda items Kick -Off Meeting

Attendants

The people who attend on line to the third technical meeting in representation of each institution are shown in the next list:

NAME	INSTITUTIONS
Elisabetta Cattoni	e-Campus
Evelina Volpe	e-Campus
Milena Rosa	e-Campus
Zorica Markovic	Ministarstvo Unutrasnjih Poslova
Elena Camisasca	e-Campus
Ignacio Giomi	e-Campus
Michele Palermo	Università di Pisa
Nada Srdanovic	Ministarstvo Unutrasnjih Poslova
Stefano Pagliara	Università di Pisa
Yaser Peiro	e-Campus
Francesco Pistolesi	Università di Pisa
Alberto Dusi	e-Campus
Cristal Sirotich	e-Campus
Marija Stankovic	Medjimurje County
Ida Kovac	Medjimurje County

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Minutes

Elisabetta Cattoni, SAFE-LAND Project Coordinator, eCampus University, introduced the third technical meeting and ask for the approval of the second technical meeting. All the participants approved it.

Milena Rosa, external experts from eCampus University remember the main reporting obligations that all the project partner have to respect, she illustrated all the budget lines as per grant agreement and focus the attention of the main errors to avoid.

Elisabetta Cattoni provides participants with an overview of what has been done and what the next technical activities are, reminding them of the deadlines for technical deliverables, and drawing their attention to the partners responsible for the individual activities.

A specific focus is made on the work that is being done on reference elements (slopes-rivers-people) and the need to have reference guidelines for slopes, rivers and people.

The representatives of the University of Pisa bring their contribution to the discussion with a specific focus on the necessary data that need to be acquired to implement the activities to respect the GANTT About the climate events, data regarding intensity and duration of the rainfall are needed (rainfall hyetograph). Francesco Pistolesi explains how all the parameters for the “element” need to be written in a general form for AI.

The need to identify hypothetical case studies also emerges from the discussion, while there are some suggestion for Italian area: Basin close to the city of Livorno – moderate river slope (Tuscany, Italy); mountain basin in the area of Versilia – (Tuscany, Italy) and floodplain in the city of Pisa (Tuscany, Italy); Castel San Vincenzo Municipality (Molise, Italy) the Montenegrin and Croatian partner should identify national case studies.

All the presentations used during the third technical meeting are in the project google folder at the following link:

https://drive.google.com/drive/u/0/folders/1SY0XKVSynCVjEMVLO72IE4e6_aPxdcNM

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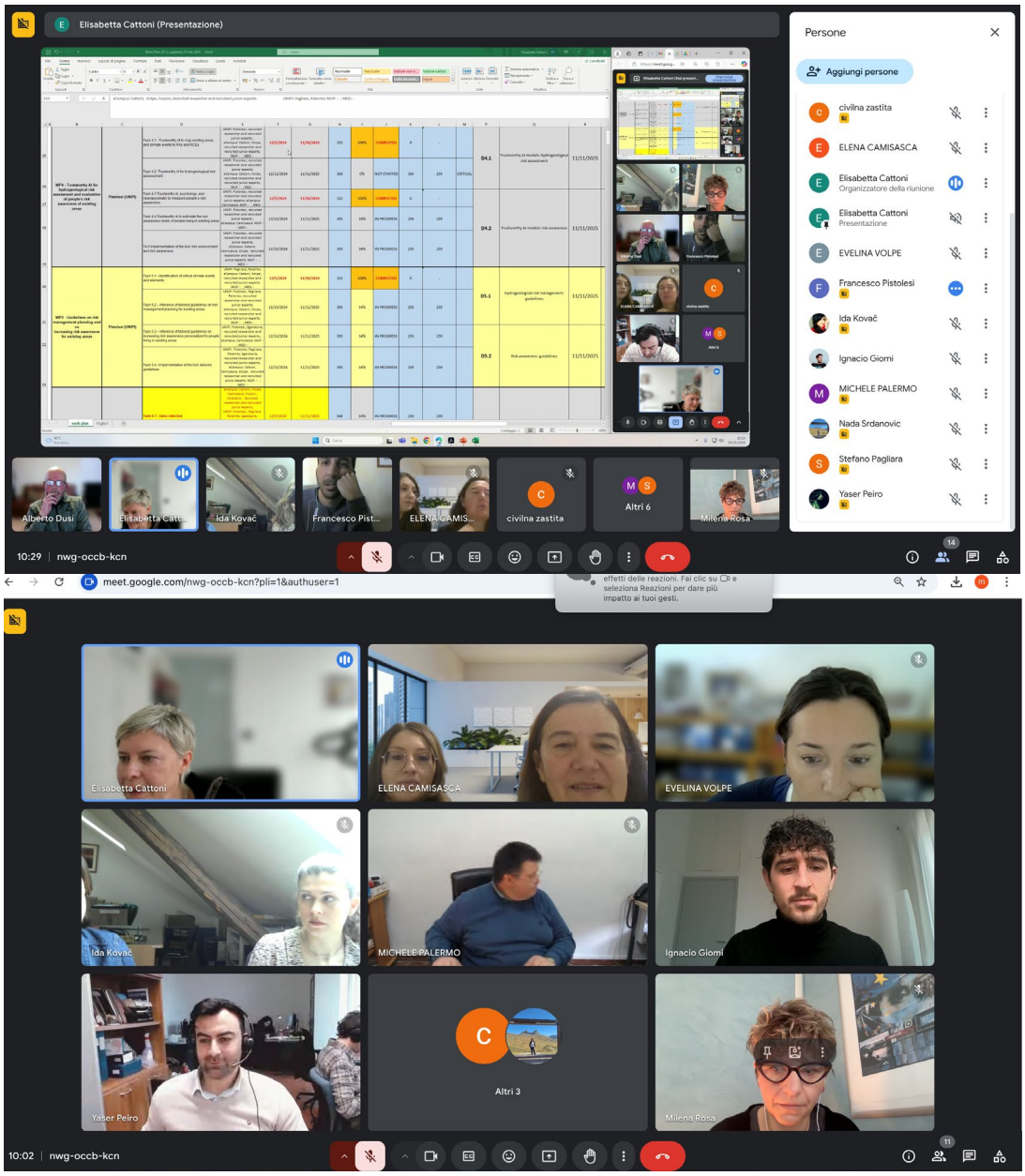
Pictures of the on - line meeting



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SAFE-LAND

Mitigating the risk of flooding and landslides via artificial intelligence with a view to extreme climate events

Annex 3. Technical Meeting and Steering Committee

Meeting minutes April 17th, 2025 -online

MITIGATING THE RISK OF FLOODING AND LANDSLIDES VIA ARTIFICIAL INTELLIGENCE WITH A VIEW TO EXTREME CLIMATE EVENTS

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Items Technical Meeting

1. Overview of the project activities

2. Index D3.2 and D3.3 shared on GDrive (draft documents deadline: 15 May 2025)

3. Description of case studies:

- Italy

- Croatia

- Montenegro

4. Communication and dissemination activities:

- Social media and website

- Events organization

Agenda SC Meeting

1. **Work plan**
2. **Financial communication –**
3. **Monitoring financial tool (deadline 30 April)**

Attendants

The people who attend in video conference to the meeting in representation of each institution are shown in the next list:

NAME	INSTITUTIONS
Elisabetta Cattoni	e-Campus
Francesco Focacci	e-Campus
Milena Rosa	e-Campus
Alberto Dusi	e-Campus
Francesco Pistolesi	Pisa University
Ida Kovac	Medjimurje County
Marija Stankovic	Medjimurje County
Irena Novak Vabec	Medjimurje County

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Zorica Markovic	Ministarstvo Unutrasnjih Poslova
Nada Srdanovic	Ministarstvo Unutrasnjih Poslova
Elena Camisasca	e-Campus
Stefano Pagliara	Pisa University
Cristal Sirotich	e-Campus
Evelina Volpe	e-Campus
Ignacio Giomi	e-Campus
Michele Palermo	Pisa University
Salvatore Verre	e-Campus
Yaser Peiro	e-Campus

Minutes of the technical meeting

The technical online meeting took place on April 17 at 9:00 to the following link https://meet.google.com/djv-gnpe-vup

Overview of the project activities - Index D3.2 and D3.3 shared on GDrive (draft documents deadline: 15 May 2025)

Elisabetta Cattoni gives an overview of the next activities and deadlines, with particular reference to Deliverables D3.2 and D3.3.

The coordinator reminds everyone of the deadlines for the upcoming deliverables and announces that the indexes of documents D3.2 and D3.3 have been shared on GDrive. In particular:

- eCampus (Cattoni, Dusi, Giomi, Verre, and Volpe) will work on the section related to the "slope" element in D3.2 and D3.3;
- UNIPI (Pagliara and Palermo) will be responsible for drafting the section related to the "river" element in D3.2 and D3.3;
- eCampus (Camisasca and Sirotich) will work on the section related to the "people" element in D3.2 and D3.3.

The deadline for submitting these sections in draft version is set for May 15th. Elisabetta Cattoni explains that the deadline is set for May 15th because time is needed afterward to make the various parts coherent with each other, before the submission deadline for the deliverables (the first of which

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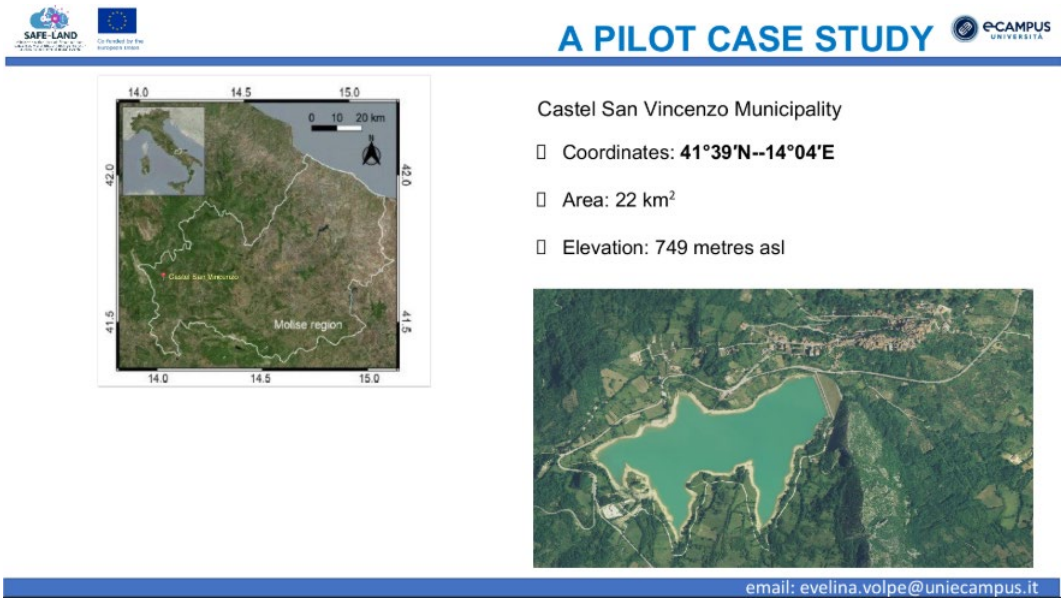
is June 11th).

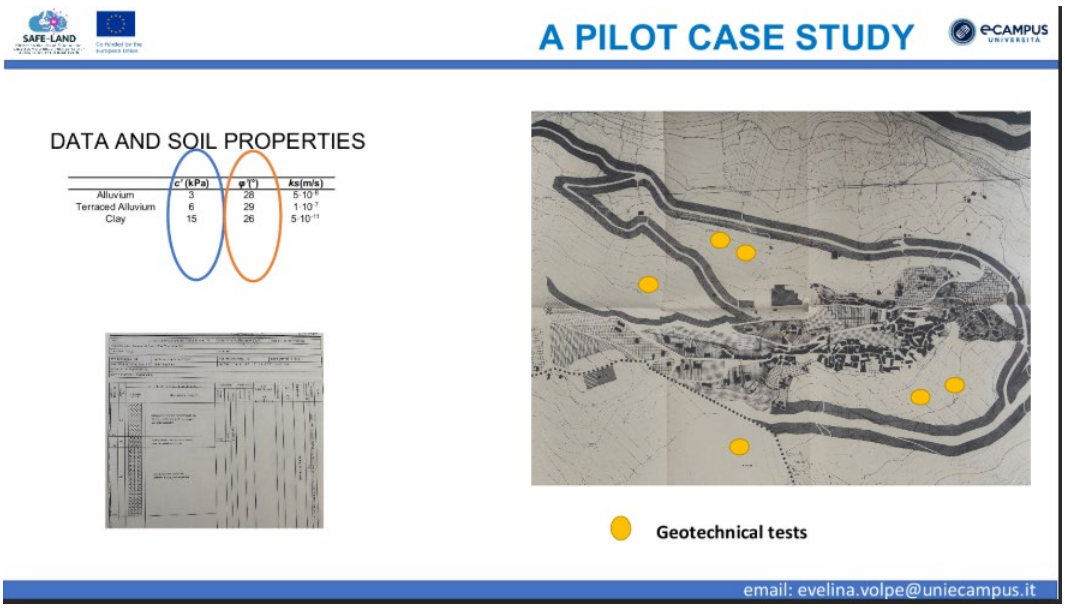
In addition, Elisabetta Cattoni states that, after the internal submission of the documents (May 15th), a technical meeting will be held to discuss the drafts of the two deliverables.

The date for the next meeting is set by the participants for May 23rd.

Description of case studies:

- Italy: Evelina Volpe shows the slides with a description of the case study in Italy.





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- Croatia: Irena Novak Vabec communicates that she will share the data related to the case study on Gdrive

- Montenegro: Zorica Markovic has already shared some documents on Gdrive, other data will be added.

Communication and dissemination activities:

- Social media and website: Evelina Volpe shows slides with the presentation of the social media and dissemination activities. She asks all participants to follow the social media accounts and to contact her for publishing posts and news related to the project.

- Events organization: Ida Kovac and Zorica Markovic confirm that they are organizing the E4 (Floods and landslides in Medjimurje –new approaches to rescue. Čakovec, Croatia, 1 day) and E5 (Campaigns. Nikšić, Herceg Novi and Berane, Montenegro, 1 day) events, which will take place in June. As soon as they have organizational details, they will share them with all the partners.

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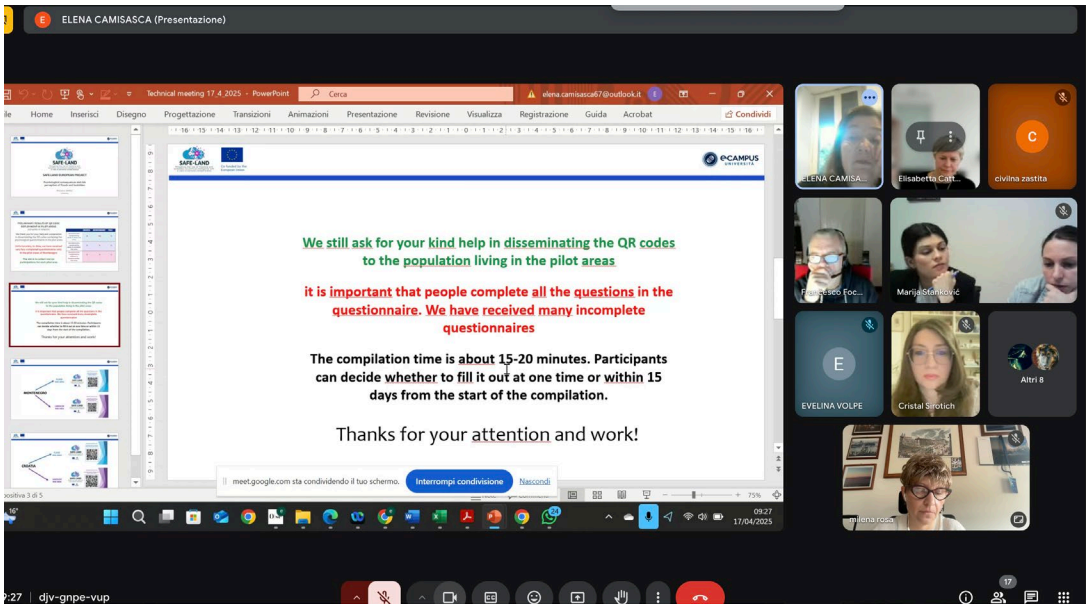
Other

Elena Camisasca (eCampus University) asks for collaboration in disseminating the questionnaires to the population in all three countries involved.



Ida Kovac, the representative of Medimurie County, announces that she will soon be on maternity leave and will inform everyone of the name of the person who will officially replace her.

The date for the next technical meeting is set for May 23rd at 10:00.

The meeting finished at 10:00.

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Minutes of the Steering Committee meeting

Attendants

The people who attend in video conference to the meeting in representation of each institution are shown in the next list:

NAME	INSTITUTIONS
Elisabetta Cattoni	e-Campus
Francesco Focacci	e-Campus
Milena Rosa	e-Campus
Francesco Pistolesi	Pisa University
Ida Kovac	Medjimurje County
Marija Stankovic	Medjimurje County
Zorica Markovic	Ministarstvo Unutrasnjih Poslova

After an update on the work plan, Elisabetta Cattoni gives the floor to Milena Rosa for economic communications. She describes the Excel file shared on GDrive for expense monitoring and asks all representatives of each partner of the Steering Committee to fill it out by April 30th, in order to have a complete overview of all expenses incurred up to this point.

The date for the next Steering Committee meeting is set for May 23rd at the end of the technical meeting. During the next Steering Committee meeting, after reviewing each partner's budgets, there will be a discussion on the projection of expected expenses and a possible request for budget reallocation among the participants.

The meeting finished at 10:30.

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SAFE-LAND

Mitigating the risk of flooding and landslides via artificial intelligence with a view to extreme climate events

Annex 4. Technical Meeting minutes

May 23th, 2025 -online

MITIGATING THE RISK OF FLOODING AND LANDSLIDES VIA ARTIFICIAL INTELLIGENCE WITH A VIEW TO EXTREME CLIMATE EVENTS

Co-funded by the European Union

Agenda Technical Meeting

1. MONITORING FINANCIAL TOOL AND COMMUNICATION (deadline 30 April)

2. DELIVERABLES:

D3.2: slopes-rivers-people (final version - last deadline 31 May)
D3.3: slopes-rivers-people (final version - last deadline 7 July)

3. EVENTS:

- E4. May 2025 Floods and landslides in Medjimurje –new approaches to rescue. Čakovec (Croatia)
- E5. May and June 2025. Campaigns. Nikšić, Herceg Novi and Berane (Montenegro)

4. REPORT OF THE ACTIVITIES OF EACH PARTNER - D1.5 - (deadline 15 June).

Attendants

The people who attend in video conference to the meeting in representation of each institution are shown in the next list:

NAME	INSTITUTIONS
Elisabetta Cattoni	e-Campus
Milena Rosa	e-Campus
Evelina Volpe	e-Campus
Cristal Sirotich	e-Campus
Ignacio Giomi	e-Campus
Salvatore Verre	e-Campus
Yaser Peiro	e-Campus
Francesco Pistolesi	Pisa University
Stefano Pagliara	Pisa University
Michele Palermo	Pisa University
Marija Marciuš	Medjimurje County
Irena Novak Vabec	Medjimurje County
Alan Resman	Medjimurje County
Zorica Markovic	Ministarstvo Unutrasnjih Poslova
Nada Srdanovic	Ministarstvo Unutrasnjih Poslova

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Minutes of the technical meeting

The technical online meeting took place on May 23 at 11:00 to the following link https://meet.google.com/fnw-fszu-omd.

MED partner introduces the new representative of the institution, Maria Marciuš, which now officially replaces Ida Kovac.

1. MONITORING FINANCIAL TOOL AND COMMUNICATION (deadline 30 April)

Milena Rosa (eCampus) takes the floor and describes the economic situation. She shows an Excel file monitoring the expenses of eCampus, MED, and MUP compared to the GA budget forecast. Francesco Pistolesi communicates that UNIPI's expenses are not updated due to a malfunction in UNIPI's email system and that in the next days he will share its updated budget file.

Milena Rosa proposes that each partner hold separate bilateral meetings with her and the coordinator to address economic issues, identify discrepancies, and explore possible solutions, including a redistribution of cost items within the limits set by the GA.

Irena Novak Vabec (MED) says that MED had issues uploading documents to the project's shared Google Drive, but they should have resolved them with a new account and new Gmail addresses that will be sent to the coordinator.

2. DELIVERABLES:

D3.2: slopes-rivers-people (final version - last deadline 31 May)
D3.3: slopes-rivers-people (final version - last deadline 7 July)

Elisabetta Cattoni (eCampus) gives an overview of the next activities and deadlines, with reference to Deliverables D3.2 and D3.3.

The deadline for submitting the final version of the deliverables on the GDrive folder is set as indicated in the agenda of the meeting:

- May 31st for D3.2;
- July 7th for D3.3.

Elisabetta Cattoni shows a presentation about the procedures followed to assess the landslide risk (D3.2) and to evaluate the best slopes stabilization measures to suggest on the Guidelines, based on the results of the geotechnical analyses (D3.3).

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Stefano Pagliara (UNIPI) shows a presentation on the procedures followed to assess the flood risk (D3.2) and a list of stabilization measure for the reference rivers. He shows a list of structural and non-structural measures. He also says UNIPI team is still working on evaluating the mitigation measure to be suggested in the guidelines based on the type of basin/analyses, and UNIPI will finalize also this part of D3.3 by the deadline of July 7 (D3.3).

Cristal Sirotich (eCampus) shows a presentation on the procedures followed to assess the risk of psychological vulnerability in the case of floods and landslides, and the risk perception (D3.2) and to evaluate the effective mitigation measures to promote risk communication and adequate risk perception (D3.3).

3. EVENTS:

- **E4. May 2025 Floods and landslides in Medjimurje –new approaches to rescue. Čakovec (Croatia)**
- **E5. May and June 2025. Campaigns. Nikšić, Herceg Novi and Berane (Montenegro)**

Irena Novak Vabec (MED) states that the event E4 (Floods and landslides in Medjimurje –new approaches to rescue. Čakovec, Croatia, 1 day) will take place in June. As soon as they have organizational details, they will share them with all the partners.

Zorica Markovic (MUP) confirms that the first event E5 (Campaign in Nikšić) took place over two days (May 15 and 16, 2025). During this event the SAFE-LAND project was presented to first and second-grade students, teaching staff, and school management from the First Secondary School in Nikšić. She sent a report on the event to the coordinator.

4. REPORT OF THE ACTIVITIES OF EACH PARTNER - D1.5 - (deadline 15 June).

Elisabetta Cattoni asks all partner representatives to write a detailed report on all activities carried out from each partner from month 9 to month 17. The reports have to be sent to the project coordinator by June 15, 2025 and they will be used for the submission of the D1.5 (Progress Report M17).

The meeting finished at 12:15.

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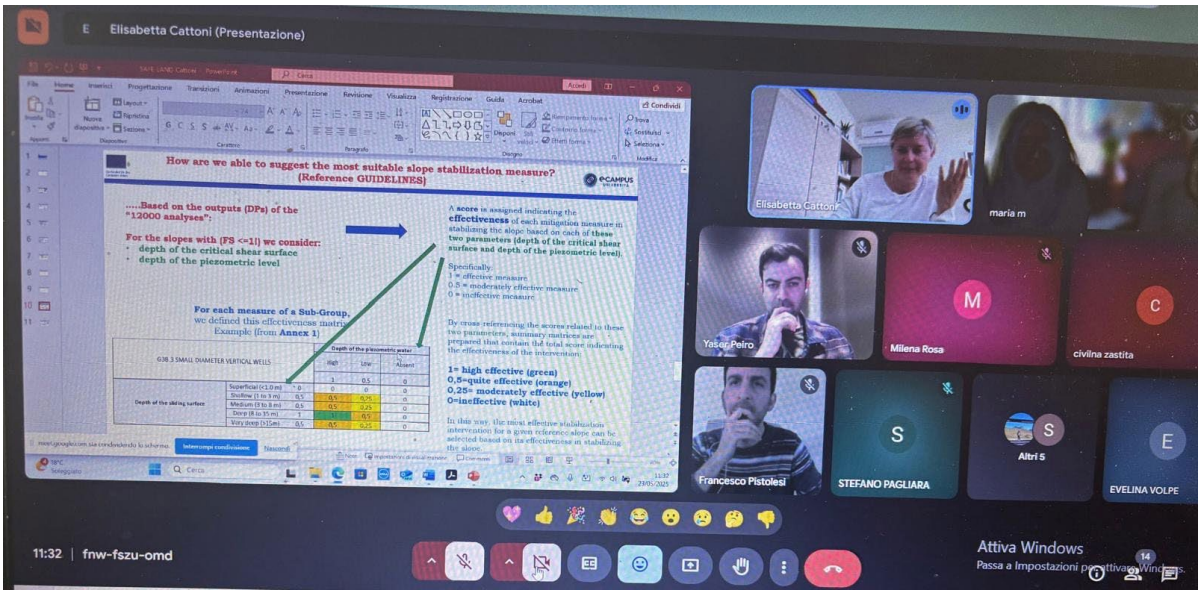
Pisctures of the meeting.



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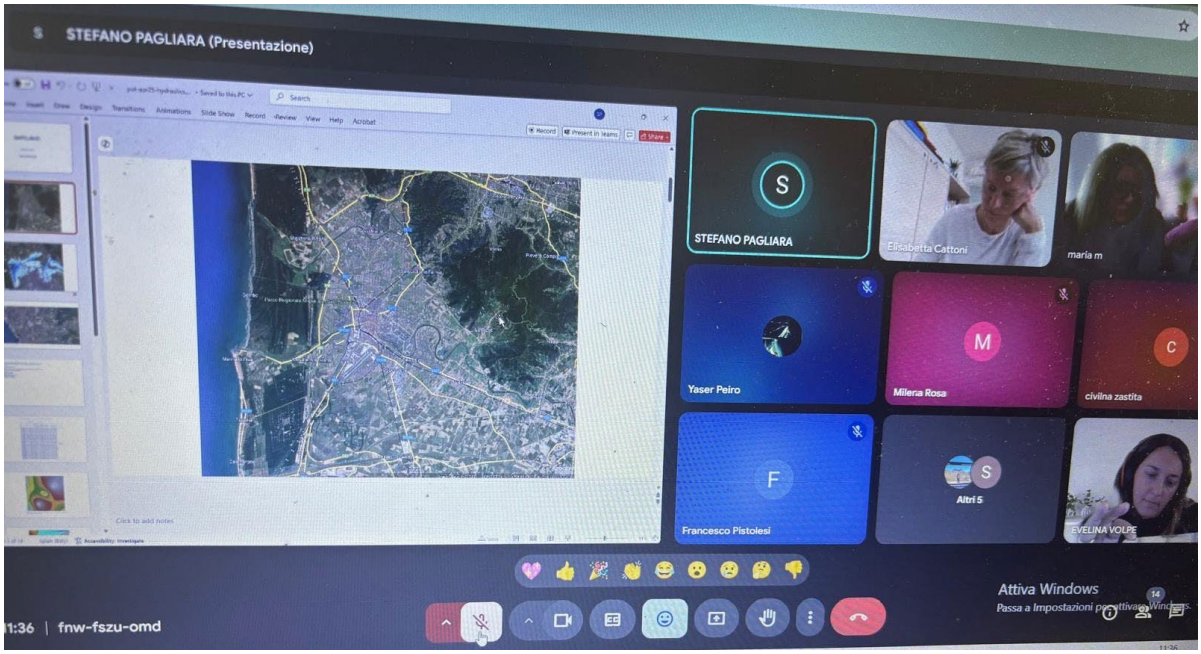

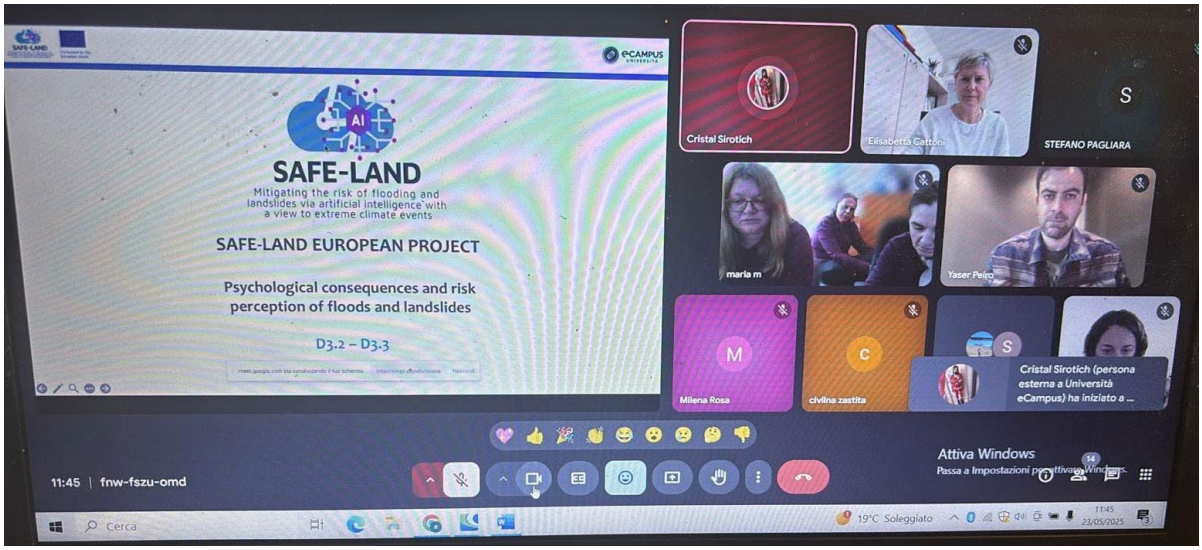

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SAFE-LAND

Mitigating the risk of flooding and landslides via artificial intelligence with a view to extreme climate events

Annex 5. Report from Campaign in Nikšić

15 and 16 May 2025

MITIGATING THE RISK OF FLOODING AND LANDSLIDES VIA ARTIFICIAL INTELLIGENCE WITH A VIEW TO EXTREME CLIMATE EVENTS

Co-funded by the European Union

eCAMPUS UNIVERSITÀ

UNIVERSITÀ DI PISA

MONTENEGRO

MEĐIMURSKA ŽUPANIJA

SAFE-LAND Events							
Event	Date	Description					Attendees (*)
		Name	Type	Area	Location	Duration	Total
1.	15 and 16 May 2025	Campaign	Campaign (dissemination)	Presentation of the SAFE-LAND Project, aims, activities and expected results to Montenegrin stakeholders	Nikšić (Montenegro)	2 days	PT: 3 ST1: 2 ST2: - ST3: 5 ST4: 80

15 May 2025, presentation of SAFE LAND project in the First Secondary School in Nikšić

Representatives of the Ministry of Interior, Rescue and Protection Directorate, Territorial Unit of Nikšić presented the SAFE LAND project to the first and second grade students, teaching staff and school management from the First Secondary School in Nikšić, on 15 May 2025.

The students, teaching staff and school management staff were reminded regarding the devastating floods that affected the territory of the Municipality of Nikšić in 2010 and in 2012 as well as the occurrence and risks of landslides. Attendees were informed about the importance of the SAFE-LAND project, which deals with flood and landslide risk reduction using artificial intelligence, which quickly and accurately assesses hydrological risks, including floods and landslides, and provides guidelines for risk management planning, even when hydrogeological and demographic data are incomplete. During the presentation pointed out that the project uses a knowledge base that contains data on reference areas and climatic events associated with hydrogeological risk and recognizes similarities between new areas and events, and provides customized guidelines for risk reduction, paying special attention to vulnerable categories of people. In addition, attendees were informed that the project would contribute to enhancing disaster community resilience and development of prevention measures to reduce flood and landslide risks together with activities to raise awareness of the population.

The students showed interest in the project because it involves artificial intelligence, and it is the first time they have encountered such a project.

Promotion material that was prepared and produced under the project distributed to students, teaching staff and school management staff (leaflets, brochures, USBs, notebooks, pens, gadgets…).

Number of students: 60

Teaching staff – professors: 5

School management staff: 2

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Pictures of staff and students at the First Secondary School in Nikšić (15 May 2025)

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16 May 2025, local community of Nikšić, areas of Staševina, Kličevo and Ozrinići

The SAFE LAND project was presented to the local population in the area(s) with high risk of the flooding in the Municipality of Nikšić, which were threatened during the floods in 2010 and in 2012. On this occasion, together with the locals, there was an organized study visit to the flooded areas.

Locals were informed about the importance of the project, which can help local communities to increase disaster resilience, to protect, adapt and recover from floods in a timely and efficient manner. In addition, special attention was paid to vulnerable groups of people (persons with disabilities, elderly..) in case of flood and landslide.

Promotion material that was prepared and produced under the project distributed to locals (leaflets, brochures, USBs, notebooks, pens, gadgets…).

Number of locals: 20

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Pictures during the visit to the flooded areas (15 May 2025).

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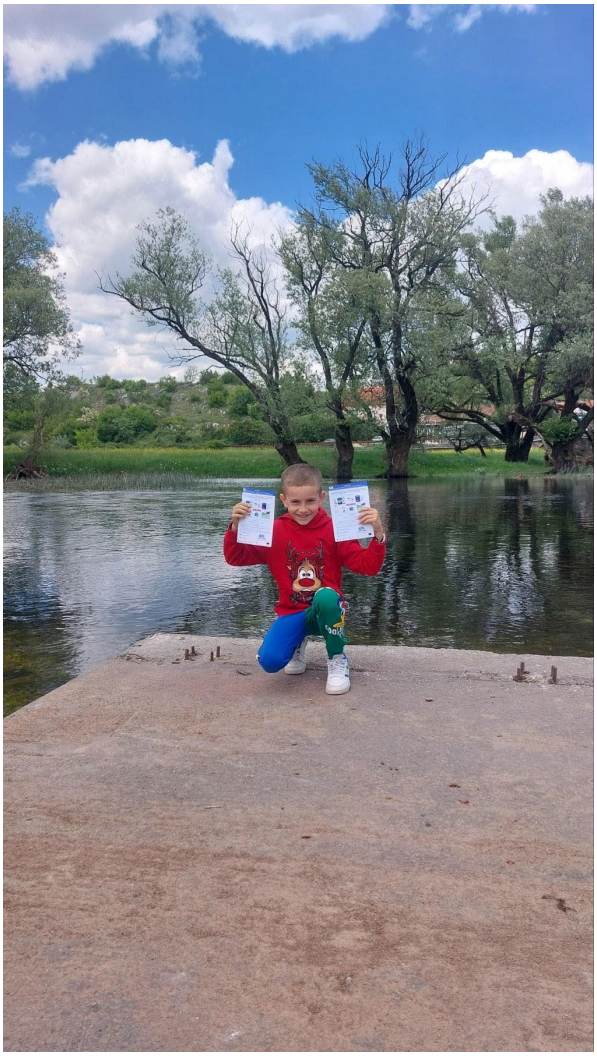

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SAFE-LAND

Mitigating the risk of flooding and landslides via artificial intelligence with a view to extreme climate events

Annex 6. Report from Campaigns in Šavnik, Berane and Herceg Novi

20 May – 4 June – 5 June 2025

MITIGATING THE RISK OF FLOODING AND LANDSLIDES VIA ARTIFICIAL INTELLIGENCE WITH A VIEW TO EXTREME CLIMATE EVENTS

Co-funded by the European Union

eCAMPUS UNIVERSITÀ

UNIVERSITÀ DI PISA

CRNA GORA MONTENEGRO

MEĐIMURSKA ŽUPANIJA

SAFE-LAND Events							
Event	**Date**	**Description**					**Attendees (*)**
		Name	**Type**	**Area**	**Location**	**Duration**	**Total**
1.	20 May 2025	Campaign	Campaign (dissemination)	Presentation of the SAFE-LAND Project, aims, activities and expected results to Montenegrin stakeholders	Šavnik (Montenegro)	1 day	PT: 3 ST1: - ST2: - ST3: - ST4: 20
2.	4 June 2025	Campaign	Campaign (dissemination)	Presentation of the SAFE-LAND Project, aims, activities and expected results to Montenegrin stakeholders	Berane (Montenegro)	1 day	PT: 3 ST1: - ST2: - ST3: ST4: 125
3.	5 June 2025	Campaign	Campaign (dissemination)	Presentation of the SAFE-LAND Project, aims, activities and expected results to Montenegrin stakeholders	Herceg Novi (Montenegro)	1 day	PT: 3 ST1: - ST2: - ST3: ST4: 150

May 20, 2025 – Presentation of the SAFE LAND Project in the Municipality of Šavnik

Representatives of the Ministry of Interior, Rescue and Protection Directorate, Territorial Unit of Nikšić presented the SAFE LAND project to the citizens of Šavnik on May 20, 2025, at the town square.

Residents were reminded of the floods that impacted the municipality in October 2024. Given that three rivers pass through Šavnik, the area is particularly vulnerable to flooding. The project team shared information about ongoing activities, achievements, and the objectives of the SAFE LAND project. Promotional materials developed within the project were distributed to citizens, including leaflets, brochures, USB drives, notebooks, pens, and other branded items.

The event was held as part of the celebration of the Municipality Day.

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Picture of staff and citizens in Šavnik on May 20, 2025, at the town square

June 4, 2025 – Presentation of the SAFE LAND Project in the Municipality of Berane

Representatives of the Ministry of Interior, Rescue and Protection Directorate, Territorial Unit of Nikšić and Territorial Unit of Berane presented the SAFE LAND project to the citizens of Berane on June 4, 2025.

The campaign took place at the main town square (in the form of an information point) and in the Riverside-Talum refugee settlement, which is home to 33 families (205 residents), displaced persons from Kosovo. The settlement experienced severe flooding in 2010. This event served as an opportunity to remind citizens of past flood events and to inform them about flood prevention measures and the benefits of the SAFE LAND project.

Promotional materials were distributed to attendees, including leaflets, brochures, USB drives, notebooks, pens, and other gadgets.

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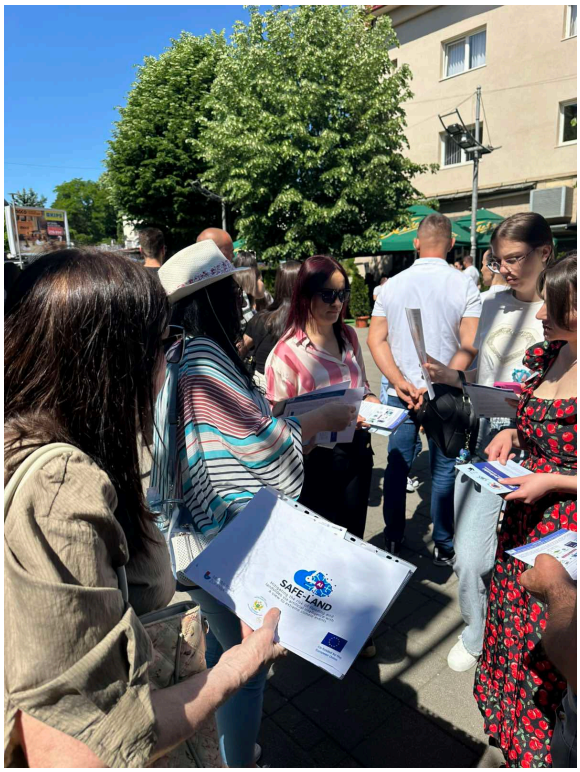
Pictures from the informational point in Berane (4 June 2025).



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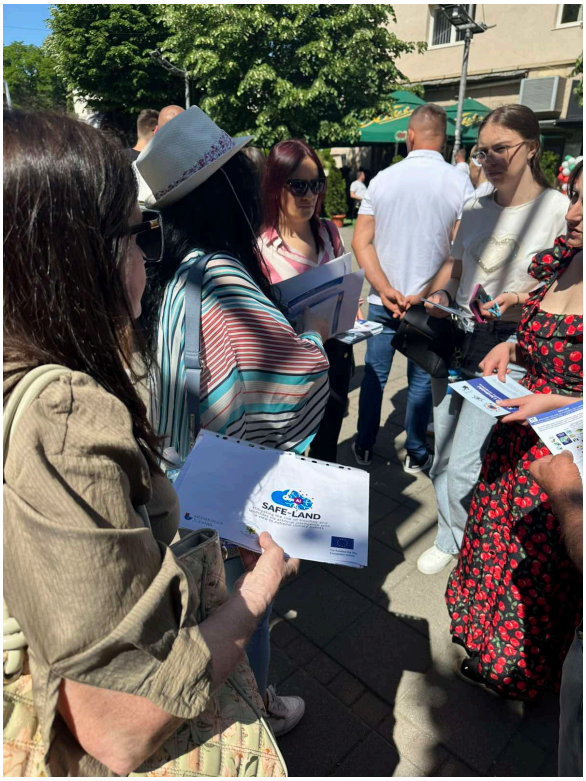

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June 5, 2025 – Presentation of the SAFE LAND Project in the Municipality of Herceg Novi

On June 5, 2025, representatives of the Ministry of Interior, Rescue and Protection Directorate, Territorial Unit of Nikšić and Territorial Unit of Herceg Novi presented the SAFE LAND project to the public in Herceg Novi.

The campaign was conducted at the main town square in the form of an information point. In addition to local citizens, two sixth-grade classes from the “Ilija Kišić” Elementary School, accompanied by their teachers, participated in the event.

Project promotional materials were distributed to citizens, students, and teachers, including leaflets, brochures, USB drives, notebooks, pens, and various branded items.

The event was covered by local media.

Media links:
https://www.youtube.com/watch?v=LwjskmpkexU
https://novski.me/prevencija-i-vjestacka-inteligencija-za-manje-posljedice-od-klizista-potresa-

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poplava-pozara/
https://rthn.co.me/u-herceg-novom-predstavljen-projekat-zastite-od-klizista-i-poplava-pomocu-vjestacke-inteligencije/

Pictures from the informational point in Herceg Novi (5 June 2025).

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SAFE-LAND

Mitigating the risk of flooding and landslides via artificial intelligence with a view to extreme climate events

Annex 7. Report from Campaign in Plužine

13 June 2025

MITIGATING THE RISK OF FLOODING AND LANDSLIDES VIA ARTIFICIAL INTELLIGENCE WITH A VIEW TO EXTREME CLIMATE EVENTS

Co-funded by the European Union

eCAMPUS UNIVERSITÀ
UNIVERSITÀ DI PISA
MONTENEGRO
MEĐIMURSKA ŽUPANIJA

SAFE-LAND Events							
Event	**Date**	**Description**					**Attendees (*)**
		Name	**Type**	**Area**	**Location**	**Duration**	**Total**
1.	13 June 2025	Campaign	Campaign (dissemination)	Presentation of the SAFE-LAND Project, aims, activities and expected results to Montenegrin stakeholders	Plužine (Montenegro)	1 day	PT: 3 ST1: - 1 ST2: - ST3: - ST4: 59

June 13, 2025 – Presentation of the SAFE LAND Project in the Municipality of Plužine

As part of the continued activities aimed at promoting the SAFE LAND project, representatives of the Ministry of Interior, Rescue and Protection Directorate, Territorial Unit of Nikšić conducted an outreach campaign on June 13, 2025, in the Municipality of Plužine. The Public Institution Education Center Plužine was informed in advance about the campaign, ensuring the participation of students from the first shift, as well as teaching staff and school management.

During the event, students, teaching staff and school management as well as local residents were informed about the importance of the SAFE LAND project, which focuses on reducing the risks of floods and landslides through the application of artificial intelligence.

Attendees expressed a strong interest in the project, particularly due to its innovative use of artificial intelligence.

The campaign was carried out through an informational booth set up near the aforementioned educational institution.

Promotional materials developed within the project were distributed to students, teaching staff, school management and citizens, including leaflets, brochures, USB drives, notebooks, pens, and other branded items.

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Pictures of staff and students of the Public Institution Education Center Plužine, 13 June, 2025

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