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STRENgthening resilience of **C**ultural **H**eritage at risk in a changing environment through proactive transnational cooperation

NEWSLETTER #2

JANUARY-APRIL 2021

The EU Interreg Central Europe project **STRENCH** develops ready to use solutions for assessing climate change effects and protecting cultural heritage & cultural landscapes.

Dear Reader,
we are pleased to provide you with the 2nd STRENCH newsletter covering the project duration January-April 2021 presenting the following topics to you:

- **Project Progress Q2 2021**
  Visit our Webpage: https://www.interreg-central.eu/Content.Node/STRENCH.html
  And follow us on Facebook: https://www.facebook.com/Strench.InterregCE/

- **STRENCH Summer School held from June 7th to June 11th 2021 (Online)**
  - Online, hosted via Zoom
  - No course fee
  - In English language
  - 6 ECTS points may be granted for full participation in the program

  Register via: https://www.donau-uni.ac.at/dbu/summerschool

- **STRENCH Conference held on June 10th 2021 (Online)**
  - 0900 to 1300 hrs CEST
  - No participation fee
  - Online, hosted via Zoom
  - In English language

  Register via: www.donau-uni.ac.at/dbu/strench-conference

- **Spotlight Criticalities of Cultural Heritage Landscapes**
  - **Flash Floods, Wind Storm ,Landslides, Fire**

- **Cultural Landscape Categories and the specific dangers they face**
  - **Terraced landscapes, hamlets in mountains, parks & gardens**

- **Sustainable risk management strategies for cultural heritage protection**

- **STRENCH Local Working Tables (GER, HUN, ITA, CZ, SLO, HR)**

STRENCH Summer School & Conference

Summer School from June 07th to 11th 2021 join a one-week program focusing on climate change related challenges to landscapes and historic parks, vulnerability assessment and preventive conservation measures for natural and cultural heritage as well as risk management and protection strategies for cultural heritage.

- Online hosted via Zoom, no course fee, in English language.
- 6 ECTS points may be granted for full participation in the program.

Register via: https://www.donau-uni.ac.at/dbu/summerschool

STRENCH Conference on June 10th 2021 will bring together distinguished experts on climate modelling, climate change related threats to cultural and natural heritage, vulnerability ranking and criticalities for cultural heritage protection as well as the use of 21st century technology for defining priorities for action and preparing disaster response mechanisms for cultural heritage protection.

- June 10th 2021, 0900 to 1300 hrs CEST, Online, hosted via Zoom, in English language

Register via: www.donau-uni.ac.at/dbu/strench-conference

Spotlight: Criticalities of CH landscapes for landslides, flash floods, wind storms and fire

(Miloš Drdácký, Riccardo Cacciotti, Jakub Novotný, Barbora Prechova & contribution of all partners)

Cultural landscapes include a wide range of historical, geomorphological, hydrological, climatic and biotope characteristics, which together with management and use determine their sensitivity to natural and man-made dangers. Therefore, different categories of objects with varying features decisive for protection planning can be found. In STRENCH, the following cultural heritage typologies have been selected for detailed investigation: terraced (coastal) landscapes, hamlets in mountain areas, (i.e. small rural mountainous villages), parks & gardens. Hamlets frequently include ruined or partly ruined buildings. The project attempts to widen the scope of previous research in climate change induced disasters (e.g. ProteCHt2save), with the consideration of other selected important hazards, namely windstorms, flash floods, landslides and fire due to drought. Similarly, man-made dangers are also included in the study, due to their prevailing impact on the occurrence of heavy failures as well as on defects initiating loss of cultural heritage assets in longer time prospects.

One of the goals of the STRENCH is to review physical and managerial aspects which make the cultural heritage (CH) landscape categories investigated susceptible to the selected hazards landslides, flash floods, wind storms and fire (STRENCH deliverable *D.T2.1.1 "Criticalities of CH landscapes for landslides, flash floods, wind storms and fire")*. Such aspects are identified and evaluated following the 'criticality approach' introduced in ProteCHt2save project. Here, a criticality is defined as an adjustable/changeable factor or aspect of a cultureal heritage (CH) system, intended as the ensemble of its physical and managerial characteristics, which proves to be crucial for the determination of its resilience against natural disasters and climate change actions. Critical elements therefore set the priorities which resilience and risk management policies should address. Nevertheless, not all criticalities are ready for a feasible treatment: only those that are controllable through appropriate resilience measures are considered.

The document *"Criticalities of CH landscapes for landslides, flash floods, wind storms and fire"* is composed of four paragraphs describing natural and man-made dangers for cultural landscapes, natural hazards in cultural landscapes associated with selected natural dangers, risk of damage of cultural landscapes due to natural or man-made hazards and the main identified criticalities of CH landscapes for landslides, flash floods, wind storms, wild fires and man-made hazards. Criticalities are listed in dedicated tables. They are identified on the basis of personal experience of the authors as well as on literature review. Within the scope of this Newsletter the four criticalities categorized are presented to the reader in a compressed manner as brief articles.

STRENCH endorses the involvement of stakeholders in the process of improvement of cultural landscape resilience, providing also illustrative examples of damages.

Finally, it should be underlined that cultural landscapes can also contain built or moveable heritage objects sensitive to the analyzed hazards. Having already analyzed such objects and their predisposition to damage in the Interreg CE project ProteCHt2Ssave, these are omitted in STRENCH.

Water: focused on flash floods

In all its physical states, water represents the most harmful and dangerous enemy to historic materials and buildings. In synergy with other factors, water damage can progress very quickly. Water acts in its solid phase as ice or snow, and in the fluid phase as rain, condensation or water trapped in depressions as well as underground water. For example, erosion of soil under foundations represents a very dangerous water-related phenomenon. In the gaseous state, water increases the relative humidity of the air and subsequently the moisture content of materials creating suitable conditions for the proliferation of biotic agents.

Did you know?

In many cases, a relatively high but stable moisture content in materials is less harmful than a fluctuating although lower moisture content. In some cases, drying of permanently humid materials may be very dangerous.

Image above: Flash flood in the pilot site of Prague Troja – August 14, 2020. Water flow transported sand, gravel and stones in the neighbourhood under the hill, the traffic was blocked due to high water. Source: ITAM archive ©ITAM

Why does it happen?

Flash floods typically occur in a rather limited catching basin drained with a rather small river or creek during intensive rainfall. The effect is stronger after long term rainy periods when the soil is saturated with water and has no capacity to further absorb the rain water. Another contributing factor can result also from insensitive agricultural activities or extensive pavements. In such cases a very heavy rain may initiate a flash flood even in narrow steep valleys without any brook nearby and without previous long term rain.

What can be done?

There is a EC Directive from 2007 regulating the production of risk maps concerning river floods, which should include position of important cultural heritage objects but not cultural landscapes. It gives and opportunity for transnational amendments. There are no maps available for flash floods. However, the danger can be estimated based on the data from the European Flood Awareness System (part of the Copernicus Emergency Management Service). Their flash flood indicators are based on high-resolution numerical weather predictions and radar-based precipitation monitoring.

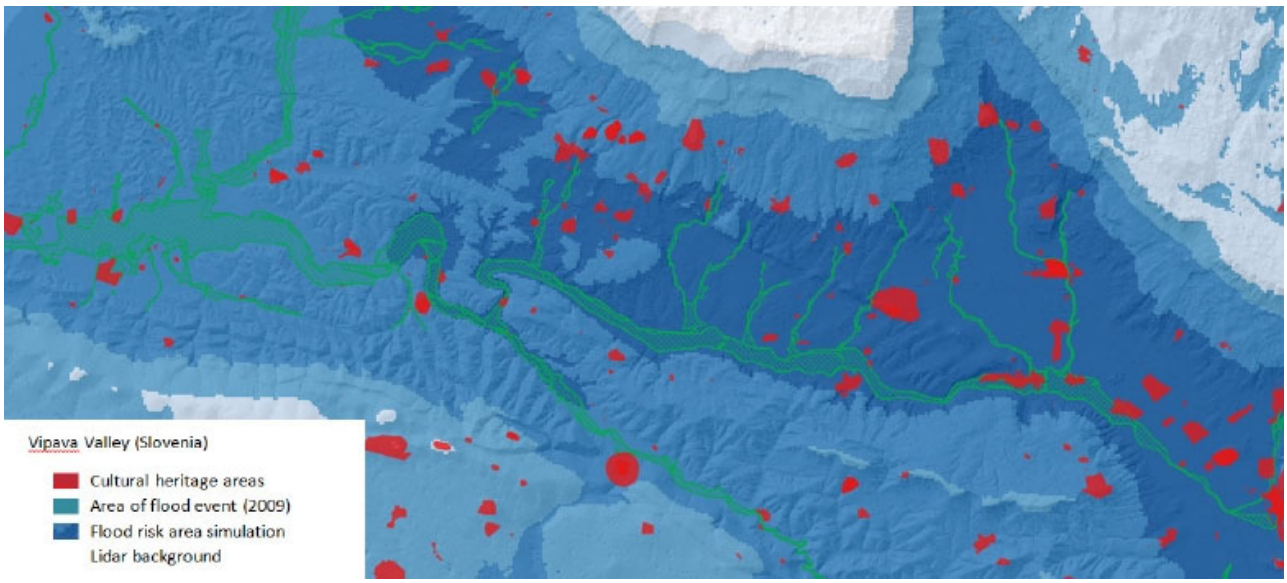

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Image above: Flash flood map of the Vipava valley, Slovenia, incorporating flood risk areas, past flood event and cultural heritage areas. Source: Urban Planning Institute of the Republic of Slovenia

Wind: focused on windstorms

Wind primarily causes loading and mechanical damage of structures; nevertheless, it also increases or decreases the chemical action of water and gases on cultural heritage objects. The flow around monuments substantially influences the deposition of pollutants, biological colonization, cycles of drying and wetting, as well as mechanical wear of the attacked surfaces. Wind transports water, salts, dust and gases to the object or building or can carry them away.

©ykaiavu

Image above right: Uprooted tree as an aftermaths of a windstorm. Source: ykaiavu, https://pixabay.com/photos/tree-uprooted-storm-rain-earth-3309057/

Why does it happen?

Windstorms result mainly from global atmospheric phenomena and, therefore, are predictable from atmospheric conditions (atmospheric pressure, temperature etc.). Some regional events may occur in sudden situations influenced by a combination of geomorphological features (plants and large water areas with cooling effect, urban areas generating heat). Windstorms are dependent on climate conditions and their occurrence is expected to change due to climate development.

Did you know?

There is a difference between synoptic winds which typically lose their force due to contact with barriers and thermal winds which may increase after contacts with barriers.

What can be done?

There are attempts to predict the windstorm danger and impact from statistical analysis of historical data on wind storms and the generated insurance claims. There is also a newly developed wind storm index based on the wind index studied over a longer period than damage data. Similar approach could be applied for cultural heritage risks from wind storms provided the data on damage are available.

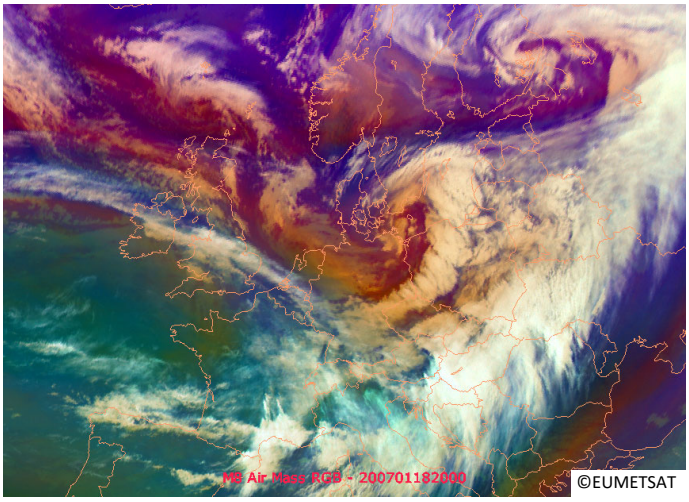

Image above right: Hurricane Kyrill, 18.01.2007, Source: EUMETSAT, http://oiswww.eumetsat.org/WEBOPS/iotm/iotm/20070118_kyrill/20070118_kyrill.html#

Soil instability: focused on landslides

Subsoil instability is strongly related to water saturation in some soils. It can set in motion large mass of soil generating landslides or excessive settlement. Change of subsoil conditions causes loss of support for buildings and structures, which initiate structural damage or even failures. Moving soil mass may also load or even bury other buildings or structures. The forces are usually so large that any effective strengthening of existing buildings is impossible at reasonably acceptable costs. Similar dangers may be created by various types of avalanches – snow, debris or mud flows.

Why does it happen?

Landslides are usually caused by a combination of different factors. The most important of them are material properties (more susceptible to failure are fine-grained soils), geological composition (typical unfavourable example are interchanging layers of sandstone and clay stone), rainfall and water saturation (one of the most important aspects, especially problematic during strong rainfalls or quick snow-melting in spring), slope inclination (slopes with medium inclination of 15°-30° are the most problematic) or technical disturbance of the slope (e.g. cuts in the slope toe or loading of the crest).

Did you know?

Statistically, the slopes with higher inclination than about 35° are usually also stable. If such a slope was susceptible to failure, it would have already failed in the geological history.

What can be done?

To predict the danger of slope collapses, individual countries develop maps of the landslide danger based on the slope inclination, geological characteristics and historic experience, which should be published and compared to maps of cultural heritage assets. The current danger is then estimated according to the current rainfall. Studies of landslide activities show that the trigger factors are the rainfall amount at the day of landslide as well as the total rainfall for previous two weeks.

© Lake Balaton Development Coordination

<u>Image above</u> Balaton, Hungary. An eroded high cliff made of loess near Fonyod. The slow landslide in 2015-2017 was a danger (among others) to the lookout tower beyond the cliff (a cultural heritage site). ***Source: Lake Balaton Development Coordination Agency***

Fire: focused on wild fire

Climate change, by inducing long dry periods and high temperatures, increases the danger of fires. Fires were historically more dangerous in settlements than nowadays, however, every year there are still losses of important monuments due to fire. In fire, the combustible materials, objects and structures may be totally destroyed in the range of minutes. Therefore, the inflammability of cultural heritage assets is their most critical characteristics. Specific problems occur during wild fires over large territories when forests are burning. Here the danger of rapid and uncontrolled spread of fire exists and increases a danger for historic buildings and structures in both the countryside and settlements as well as for the historic gardens and parks.

© Lake Balaton Development Coordination

<u>Image above left:</u> Balaton, HU. Reedfire at Balaton boglar (2017), on a Natura 2000 nature protection area (2017). ***Source: Lake Balaton Development Coordination Agency***

Why does it happen?

Wild fires areusually of natural origin, caused by lightning or self-ignition, usually during long term dry periods and relatively high temperatures, and in forests with highly flammable plants or their leaves, e.g. eucalyptus or pine trees. Many wild forest fires are, however, a result of arson´s activities, which has been experienced e.g. in Bulgaria in recent decades.

What can be done?

As wildfires are strongly dependent on the winds, rain/drought and on the land surface conditions, the danger can be forecasted from climatic data in combination with land surface data describing forest and bush flammability in wildfire prone areas. In this case, involvement of public can help to prevent or respond early. In Europe, the service gathering various data on the forest and wild fires is European Forest Fire Information System (EFFIS), which also supports wildfire management in the EU member states. The Copernicus EMS On Demand Mapping provides detailed information for selected emergency situations that arise from natural or man-made disasters anywhere in the world.

<u>Image above right</u> Balaton, HU. Reedfire in the so called "Little Balaton" area, on a Natura 2000 nature protection area (2020). Source: Lake Balaton Development Coordination Agency

Cultural landscapes categories and the specific dangers they face

Terraced landscapes

Terraced landscapes are typical in hilly or mountain regions or in some coastal areas. They may suffer from all four types of natural hazards i.e. water action, wind, unstable soil and fire, with some extensions involving mud or debris flow and rock fall. Of course human (in)activity can greatly affect the situation too.

What is the danger?

Terraced landscapes may be endangered in many ways and on different levels depending on their many characteristics. Landscapes prone to loss of biological cover (trees, bushes, plants) are sensitive to windstorms, wild fires, drought or frost. Another danger they face is the erosion of soil, mostly due to unsuitable agricultural exploitation. Harm can be made to areas with topsoil unstable in heavy rains or places exposed to mechanical damage (by movement of cattle or human visitors). Among the landscapes susceptible to partial structural damage are those in danger of local flash floods, mud or debris flow or rock fall. The most endangered terraced landscapes ar those built on slopes at risk of landslides.

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Image to the right: A hilly terrain prone to damage in the network of paths and in the regulation of surface water during heavy rains. Source: Fondazione Villa Ghigi

Hamlets in mountain areas

Hamlets in mountain areas mainly suffer from the risks caused by flash floods, landslides, wind storms and avalanches as far as the natural hazards are concerned. However, their sustainability is considerably influenced by man-made hazards, namely the tendency to abandon such places and leave them unmaintained, which creates specific damaging conditions. From the cultural heritage point of view, hamlets may be built on territories with important archaeological remains – buried or standing as ruins.

What is the danger?

Hamlets which are losing their inhabitants face greater socio-political and economic instability which in turn makes them more sensitive to natural disasters. The erosion of soil, flash floods and man-made interventions can lead to loss of buried archaeological remains. Flash floods, together with avalanches, mud or debris flow or rock fall can cause also structural damage to buildings in the hamlets. The same can be said for mass tourism. Even more devastating damage can be caused by landslides.

© Bartolozzi, C. Novelli, F., Resti

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<u>Above Left</u>: Sordinesca Tower (ruins) in Rocca Borromea Park, Arona (Novara, Italy) suffering from loss of functional, landscape and historic context which may cause gradual loss of cultural heritage value due to a lack of management and vandalism. Source: Bartolozzi, C. and Novelli, F., Resti

<u>Above Right</u>: Ekenštajn castle ruins, Slovenia. The ruins lay on the top of the narrow hill, above the Velenje town. No potential of the place is exploited, the ruins are unprotected and endangered.Because of the destabilization of large portionsof walls (vandalism) visiting the site is potentially dangerous. Source: http://kraji.eu/slovenija/grad_ekenstajn/slo

© Jakub Hałun

<u>Above both</u>: Bobolice Castle, Poland. A historical ruin before and after reconstruction. An example of inappropriate intervention for commercial exploitation causing an unacceptable degradation of Cultural heritage values. Source: https://upload.wikimedia.orgwikipediacommonsffaBobolice%28js%29_1.jpg and https://pl.wikipedia.org/wiki/Zamek_w_Bobolicach#/media/File:20140619_Zamek_Bobolice_3877.jpg

Parks & gardens

Parks and gardens in mountain regions suffer from the problems similar to the terraced landscapes. In flat country sites they are usually not affected by landslides. Next to the abiotic factors, there are also biotic ones, both strongly influenced by climate conditions and weather situations, as well as by the quality of management. Together, they can generate devastating synergies.

What is the danger?

Parks and gardens are influenced by climate change in the most significant way. Extreme weather effects may multiply other factors. For example, long term increase of temperature may impact spread of pathological organisms and cause shift of species composition, their quantity, size etc. The temperatures above 35°C in the Central Europe latitudes decrease efficiency of CO2 fixing. Many plants suffer photo-destruction effects and are dehydrated. Long term drought decreases resilience of vegetation against other stress factors, e.g. pests, air pollution etc. It also changes resilience of environment, ability of its appropriate reaction and adaptation.

On the other side of spectrum, floods, high underground water table and heavy rain periods decrease physiology of root activity. Water flow initiate erosion or transport of sediments and trash in gardens as well as harmful organisms. High water may mobilize landslides. (Not only) during winter months, extreme snow precipitation and icing can overload trees and cause mechanical damage. "Out of season" snowfalls are particularly damaging on deciduous wood species, if they occur in late autumn or earlyspring, due to the presence of leaves. These are only a few example of abiotic agents endangering the sustainability of parks and gardens.

The biotic agents caused enormous damage on parks and gardens in recent years and are more and more considered in relation to the observed climate change. The most common and damaging are pests deteriorating branches and trunks of coniferous trees (bark beetle) or leaves and fungicide diseases. Parasitic plants (mistletoe) may gradually kill their host and invasive plants may supplant native species. A category of its own is the increasingly widespread presence of wildlife such as wild boar, roe deer, hare or badger. The consequences are debarking and removal of shoots in shrubs and young trees, damage to lawns, fences etc.

Image to the right: Weak "off-season" snowfall in mid-November 2017 which heavily damaged manydeciduous plants with nipping and crashing of trees in the Villa Ghigi park in Bologna, Italy. Source: Fondazione Villa Ghigi.

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Image to the left: A monumental specimens of oak (Quercus pubescens) inside the Villa Ghigi Park in Bologna (STRENCH pilot site), subject to a progressive decline that led to its drying up. The decay phase of the plant lasted for about ten years but, despite the analyses and treatments undertaken, the oak dried up in 2018. Source: Fondazione Villa Ghigi.

<u>Image to the right</u>: The small beech wood (Fagus sylvatica) in the Villa Ghigi park in Bologna, was planted in the late nineteenth century. In recent times, its conditions are very critical: several trees have dried up and crashed to the ground. The beech, a mesophilic species that grows in the mountain range of the Apennines, no longer finds the environmental conditions suitable for its growth at the lowest altitudes near the plain. Source: Fondazione Villa Ghigi.

<u>Image to the left</u>: A majestic exotic tree Calocedrus decurrens *planted at the end of the nineteenth century in the Villa Ghigi park in Bologna that have reached senescence and have extensive drying of the foliage. Source: Fondazione Villa Ghigi.*

Sustainable risk management strategies for CH protection

(Miloš Drdácký, Riccardo Cacciotti, Jakub Novotný, Barbora Prechova & contribution of all partners)

STRENCH focuses primarily on the implementation of plans at local/regional/national level for disasters risk reduction and management. This requires, the identification of sustainable strategies and measures specifically tailored for the protection of several pilot cases selected in the project. The aim is to upstream measures available locally to higher management levels including regional, national and international ones. Additionally, transnational experience is exploited for the formulation of appropriate regional plans. The measures recommended (taking advantage of outcomes from 7FP Noah's Ark and DG-EAC "Safeguarding CH from Natural and Man-Made Disasters") are in line with the four Priorities of the Sendai Framework 2015-2030 and take into consideration the preparedness, emergency and recovery phases.

The STRENCH deliverable *D.T2.1.2 "Sustainable risk management strategies for CH protection"* outlines the proposals for improvement of management strategies at each pilot site, with particular insights on the potential integration of results from INTERREG, FP and H2020 projects capitalized in STRENCH. The proposals are developed taking into account their feasibility in the context of the selected case studies in order to better tailor them in view of a consequent implementation in risk reduction plans at local level.

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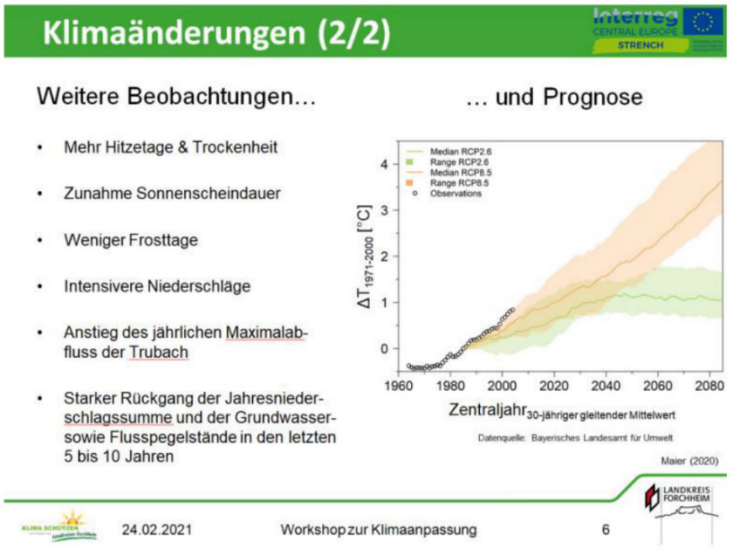
This output relates to *A.T2.1 "Strength- weakness in managing cultural heritage at risk due to climate change and natural hazards"* and *A.T.2.3 "Cooperation among stakeholders involved in the decision making for cultural heritage protection"*. The proposals here presented are elaborated in relation to the criticalities present at each site, as determined in *D.T2.1.1 "Criticalities of CH landscapes for landslides, flash floods, wind storms and fire"*.

The aforementioned document is composed of seven sections which present the sites involved in the pilot study. Each section includes a site description, an overview of current management strategies implemented at the site and finally a proposal of possible improvements with insight on challenges and opportunities which may arise from their integration into local risk reduction plans. The entire document will be viewable on the STRENCH website.

STRENCH Local Working Tables - Year 1 (GER,HUN,ITA,CZ,SLO,HR)

The District of Forchheim (DoF), Germany

Held on February 24th the focus of the local working table (LWT) of the District of Forchheim lay on the protection of its unique and invaluable cultural landscape. The LWT was structured into two major parts, the first describing climate related and natural hazards facing the District of Forchheim while the second part aimed for elaborating climate adaption measures.



The expected effects of the Local Working Table 1 are i) an increased awareness of local stakeholders with respect to climate related and natural hazards and ii) modifications of local risk management strategies.

Additional effects and follow-up actions:

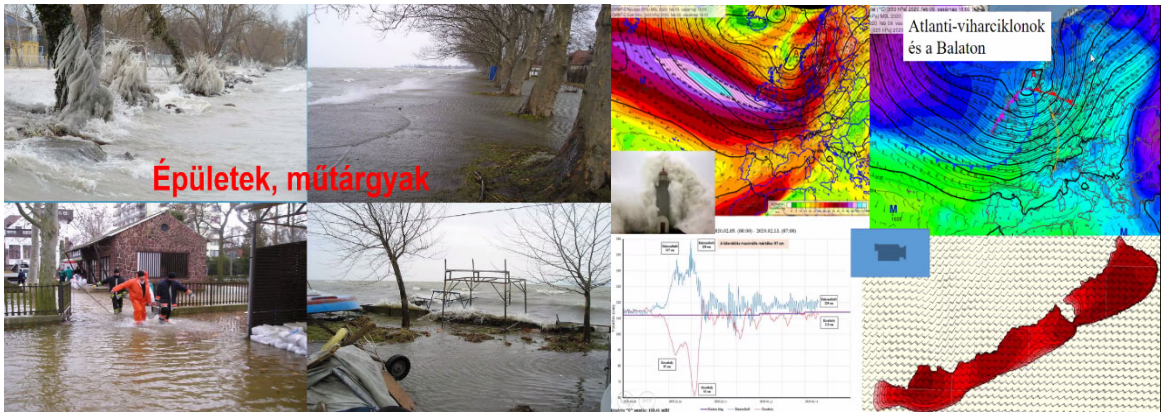
- Awareness of sustainable and implementable climate adaption measures mitigating climate change related hazards
- Creation of a climate adaption strategy making use of the ideas, suggestions and opinions elaborated in the LWT
- Planning and organizing the second local working table discussing the suggestions proposed in the climate adaption strategy
- Planning and organizing the awareness raising event, which will be held in 10/2021 as a major contribution to the climate action week in Forchheim (www.klimawoche-forchheim.de).

Lake Balaton Development Coordination Agency (LBDCA), Hungary

On February 16th 2021, the first working table event took place at Lake Balaton within the STRENCH project. The aim of the event was to present the disasters that have occurred at Lake Balaton and their impact on the natural and cultural heritage.

Invited experts from disaster management and meteorology presented the impacts of extreme and exceptional events related to climate change, highlighting their frequency, dangers and protection options. Unfortunately, due to the pandemic situation, the event could only be held online but still attracted more than 60 participants. Local decision-makers, NGOs, professional organizations and the general public from the region were represented, and foreign visitors also joined the event.

The high-level presentations provided useful information for the participants, which they use during their work and daily lives in the future.



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Villa Ghigi Foundation (FVG) & Institute of Atmospheric Sciences and Climate (ISAC), Italy

On February 17th 2021 the Villa Ghigi Foundation (FVG) and the Institute of Atmospheric Sciences and Climate (ISAC) hosted the first STRENCH local working table at the Villa Ghigi Park in Bologna, Italy with 20 attendees from 12 different institutions. The focus of the Local Working Table lay on the importance of the forecasting systems for climate change for the protection of cultural landscape in the town of Bologna, and more generally in the Emilia-Romagna Region.

The attending stakeholders were composed from local authorities, as: the officers of the Environment and Green Sector and of Urban Planning and Construction Sector of the Municipality of Bologna; the staff of agencies providing environmental services; an expert specialized in Protected Areas, Forests and Mountains Development Service of the Emilia-Romagna Region; the coordinator of the Management Body for Eastern Emilia Parks; a representative of the Cultural Heritage Service of the Emilia-Romagna Region; technicians of Hydro-Meteo-Climate Service of the Emilia-Romagna Region; a technician of the Agency for Territorial Security and Civil Protection; and the coordinators of the local Reclamation Consortium.


© Fondiazone Villa Ghigi

The LWT was structured into three parts: a first walk in the pilot site (Villa Ghigi Park) focused on places subject to environmental/landscape vulnerabilities, including historic buildings (D.T1.2.2 Definition of a methodology for ranking vulnerability of cultural heritage - Manual); the second part was dedicated to the presentations of the features of the project, of the pilot site and the Web GIS Tool for risk mapping (D.T.1.3.2 Finalization of the WebGIS tool for decision making in the management of heritage at risk), the third and last part consisted of a round table about the protection of the cultural and natural heritage from extreme events, the prevention tools and warning systems. During the round table, the participants were invited to reflect on an array of questions.

The conclusion of the round table was that the ability to anticipate different scenarios and collect useful data for the sustainable and shared management of cultural and landscape resources, imply the use of modern and increasingly performing forecasting tools (D.T2.1.2 Sustainable risk management Strategies for CH protection). The Web GIS Tool could be used by various entities and infrastructures for programming and could provide scenarios based on pilot cases to be directly usable by those who face similar risks (A.T1.3 Development of a WebGIs tool for Management of cultural heritage at risk). More generally, the participants identified that a stable data collection and mapping service - addressing various sectors, with coverage at regional (or local) scale, which makes updated maps of the most significant indices available at different resolutions for the various users on a regular basis - is a necessity. Currently, this creates difficulties in: 1) managing and storing the huge amount of data produced, 2) effectively querying the database, 3) extracting useful information (D.T1.1 Development of hazard maps linked to extreme climates for short and long term risk assessment).


© Fondiazone Villa Ghigi

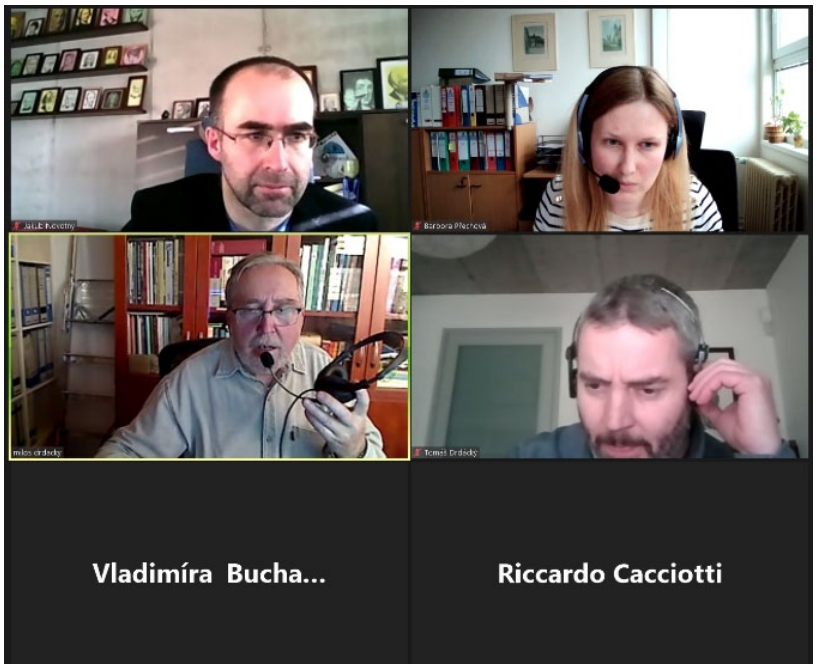
The expected effects of the LWT consist of:

-implementing local working tables for a better coordination with the local authorities, agencies providing environmental services, technicians, and experts.

-implementing a Web GIS Tool for local authorities in the field of green, environmental and urban planning management, for agencies for protection of natural landscape and biodiversity, cultural heritage protectors and emergency response organization.

Institute of Theoretical and Applied Mechanics (ITAM), Czech Republic

At the end of February 2021, the Czech STRENCH project partner organized an online meeting of the Local Working Table with the ITAM team and Municipality Prague-Troja representatives being present. Besides the provision of general information on the project and its deliverables, important topics were covered. One of them was the possibility to include in the pilot site a nearby park Stromovka. It is a historical park located on the opposite side of the Vltava River than the Troja hamlet and is endangered by floods, instable soil, biotic agents etc. Besides that, it would make the Czech pilot site more comparable with other sites in terms of its size. The participants also discussed the communication with local natural heritage managers, methodology of the pilot site(s) assessment as well as the sustainable management strategies for cultural heritage protection.



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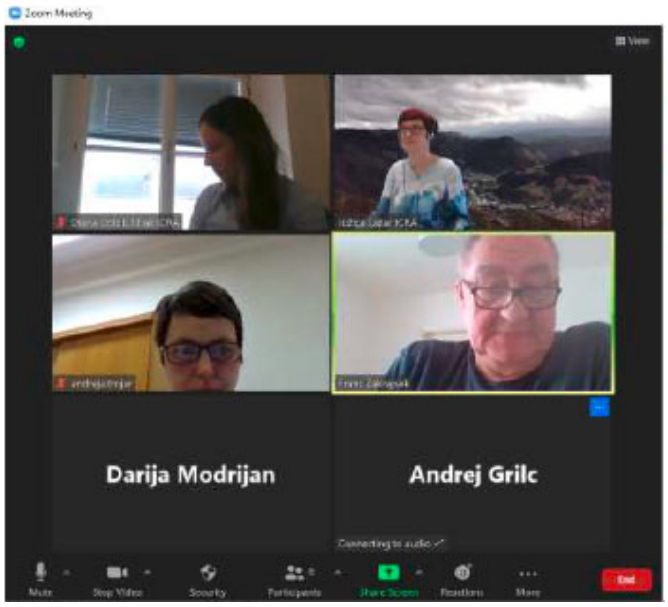
Riccardo Cacciotti (ITAM) introduced a vulnerability assessment, giving the Troja Chateau as an example, and received a valuable feedback. In the end, R. Cacciotti summarized the challenges in the future work on the project. He mentioned the complexity of pilot sites with multiple objects, concept of multi-risk and their synergies or standardization of the results.

Urban Planning Institute of the Republic of Slovenia (URIS), Slovenia

Held online on February 19th 2021 the Urban Planning Institute of the Republic of Slovenia hosted their first STRENCH local working table

In the first part of the workshop participants introduced themselves and their work in the pilot area. UIRS representative Franc Zakrajsek presented the Strench project. The presentation included the presentation of project partners, the objective, and the scope of the project. Zakrajsek outlined the role of the Development agency of Idrija and Cerkno, Grangeo, and local stakeholders. Special emphasis was laid on the STRENCH pilot site “Vipavska dolina / Vipava valley”. Participants discussed stakeholders that should be involved and how to actively engage them. Franc Zakrajšek presented

the STRENCH Web-GIS Tool for Central Europe and continued with the presentation of spatial analyses done in Vipava Valley.



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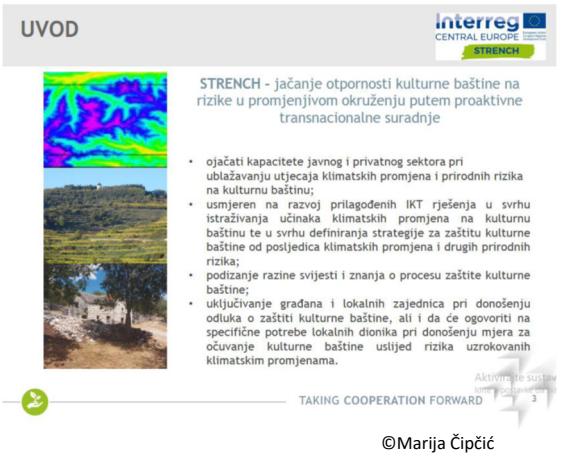
Discussion at the Local Working Table was mostly concentrated on the organizational issues. Participants discussed stakeholders that should be involved and how to actively engage them. It was agreed that Vipava Valley spatial analyses are effective visualization of identifying the need to include climate change issues in the cultural heritage protection area. Such online visualizations are means for effective promotion and awareness-raising and also to support decision-making processes on the local level. GIS visualization of climate change - flooding impacts on cultural heritage (CH) can facilitate decision-making processes, stakeholder's communication, and public participation. Participants agreed that special attention must be given to the involvement of local stakeholders, municipalities, and Agencies to achieve effective and sustainable CH management. In this way, GIS is one of the means to attract and involve different target groups.

Municipality of Dugopolje, Croatia

On January 26th 2021 the municipality of Dugopolje welcomed 21 participants to their local working table.



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At the beginning of the event, the participants were introduced to the STRETCH project, its main ideas and planned results. The presented content included the structure, timetable, project partners, work packages, capitalized projects, as well as the channelling of these resources into cultural property protection and disaster management in accordance with the Sendai-Framework. Given the different areas of activity of the participants and the different knowledge on the topic, a brief overview of research on the visible effects of climate change on cultural and natural heritage is given. A professor from the Faculty of Geology, University of Zagreb, whose specialty is the impact of climate change on building materials and cultural heritage, gave her contribution on the topic. Participants were then presented with the results of the delivery of D.T1.1.1. Stakeholder consultation and user requirement identification, with thanks to all who participated in the survey in order to collect required data. Further emphasis was laid on the STRENCH pilot site Kolići in context with climate modelling and the Web-GIS Tool.

Given that most of the registered participants of the Local Working Table are planners and representatives of local authorities, the emphasis of the discussion was on Sustainable risk management strategies for CH protection. Monitoring and evaluation of integrated WebGIS tool for decision support at local level. Participants recognize the advantages of WebGIS tools and express interest in further training in the implementation of modern planning tools and capitalization of the results of successful projects. However, they acknowledge that they have not used such tools to a significant extent so far, which is why they consider the STRENCH project useful in order to strengthen the professional capacity of local authorities and other stakeholders. Representatives of the City of Kaštela shared their experience of participating in the ProteCHt2save project. They recommend, especially to planners and local authorities, to use WebGIS tools in their daily work given the quality of the data provided and the benefits of the interoperability.

The aim of the workshop was also to present the functionalities of the online tool developed through the ProteCHt2save project, which will be improved through the STRENCH project. Participants therefore participated in a brief presentation of possible spatial analyzes that can be performed based on the available data of this WebGIS tool. This was an introduction to the Local Working Table 2 activities that will take place once the deliveries of A.T1.3 (Development of a WebGIS tool) are finalized. Participants emphasize that it would be useful to have an insight into the future tutorial for user friendly transfer of the WebGIS on line tool (D.T1.3.3.).

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The participants unanimously agree that a citizen involved application would benefit the overall goals of STRENCH and CH protection greatly. Also, they agree that effective CH protection and climate change observation for building resilience require modern technology as a basis for effective decision making and awareness raising.

Expected effects and follow-up

Further networking of the STRENCH Local Working Table participants with the aim to create sustainable risk management strategies for CH protection. Further know-how exchange with the stakeholders who participated in the ProteCHt2save. Capitalization of the Web-GIS Tool for heritage protectors, emergency response organizations, local decision makers and other stakeholders.

Interreg CENTRAL EUROPE
European Union
European Regional Development Fund

STRENCH

STRENgthening Resilience of Cultural Heritage at Risk

READY-TO-USE SOLUTIONS

» WebGIS tool for multi-risk assessment on cultural heritage in Central Europe
» hazard maps of extreme events in Central Europe for decision making in disaster risk reduction
» methodology for vulnerability assessment of cultural heritage at risk
» sustainable risk management strategies for cultural heritage

CULTURAL HERITAGE CATEGORIES

» cultural landscapes
» ruined villages
» historic parks
» archaeological sites in mountain and coastal areas

HAZARDS

» heavy rain
» (large basin) floods
» flash floods
» landslides
» fire due to drought
» windstorm

PROJECTS CAPITALISED

» Interreg Central Europe – BhENEFIT
» Interreg Central Europe – RUINS
» Interreg Central Europe – ProteCHt2save
» Interreg Central Europe- HICAPS
» H2020 – HERACLES
» H2020 – SHELTER
» FP6 – Noah's Ark
» FP7 – Climate for Culture
» DG-EAC – Safeguarding Cultural Heritage from Natural and Man-Made Disasters

PROJECT DURATION

01.03.2020 – 28.02.2022

€ ERDF co-financing 1.064.956,62 €

total eligible budget 1.301.712,50 €

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