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#EUmissions #HorizonEU #MissionClimateAdaptation



EUROPEAN UNION

Igniting Awareness: Strategies for Wildfire Resilience and Readiness

July 3rd, 14:00h CEST



Welcome

Guido Schmidt, MIP4Adapt – Fresh Thoughts Consulting GmbH, Austria

Duration (min)	Agenda item
5	Welcome
20	Opening remarks
45	Showcasing experiences
25	Q&A
10	Closing remarks

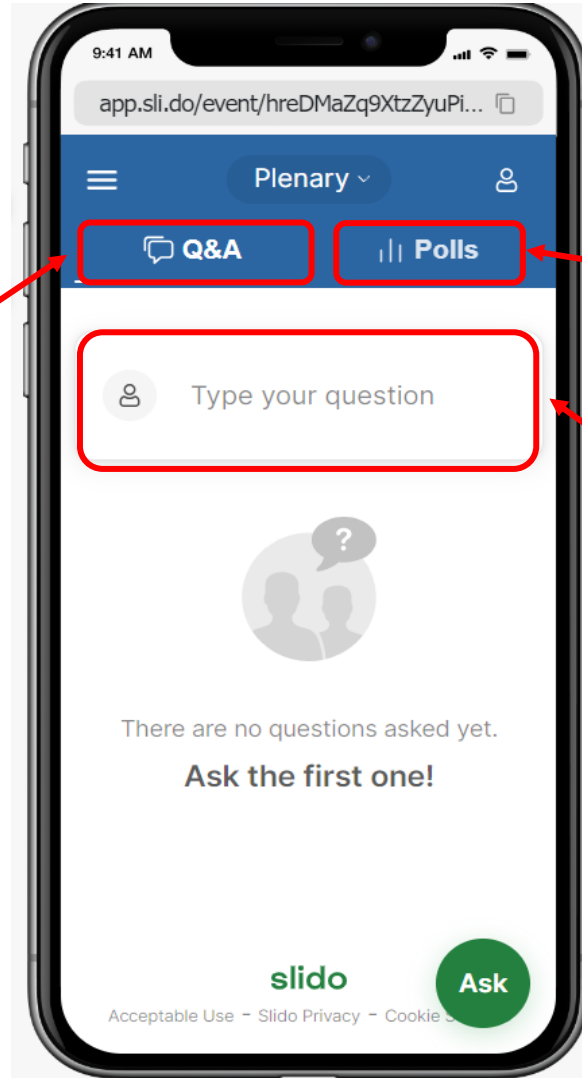


Housekeeping

- The working language of the meeting is **English**.
- Please note that the **meeting is being recorded**.
The recordings will be available at a later stage after processing.
- Please keep your **microphone muted unless you are speaking**.
- If you wish to speak, use the raise your hand option.
- Select "Gallery view" in the top right corner so that you can see the presentation and the main speaker. For this to work, all other **cameras** and mics must be off, except for the speaker(s).



Slido



Click here to ask a question.

Click here for accessing the polls.

Type your questions here.





Slido Question 1

Who is in the room?





Opening remarks: Why this webinar?

Peter Löffler

DG CLIMA, Policy Officer

Climate adaptation in EU forest, biodiversity, nature conservation and health policies



Opening remarks

Wildfires in the EU and their impact in the past decade

Jesús San-Miguel-Ayanz (European Forest Fire Information System-EFFIS/JRC, Italy)

Wildfire risk projections

Andrea Trucchia (CLIMAAX, CIMA Foundation, Italy)

Q&A

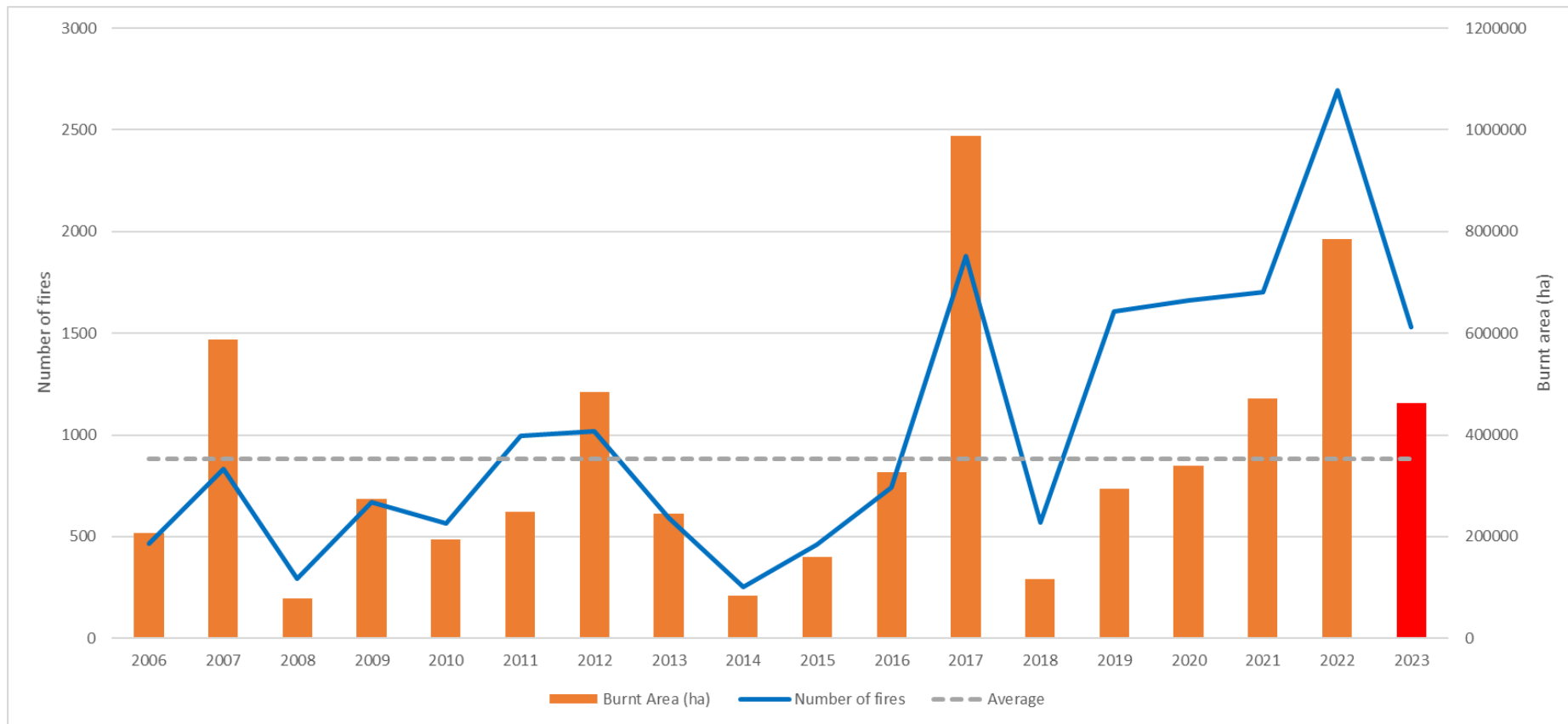
Wildfires in the European Union and impacts in the last decades

Jesús San-Miguel & EFFIS/GWIS Team

Outline

1. General trends of burnt areas and number of fires
2. Trends of fires by fire size and contribution to the total burnt area
3. Wildfire seasonality
4. Economic losses by wildfires
5. Wildfire danger projections
6. Summary

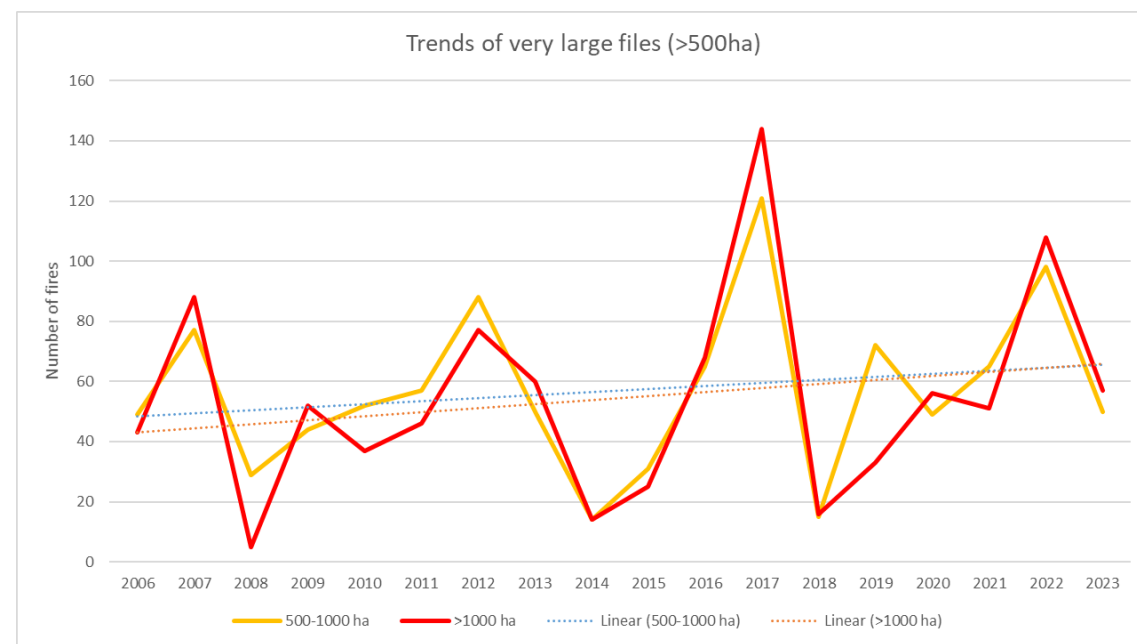
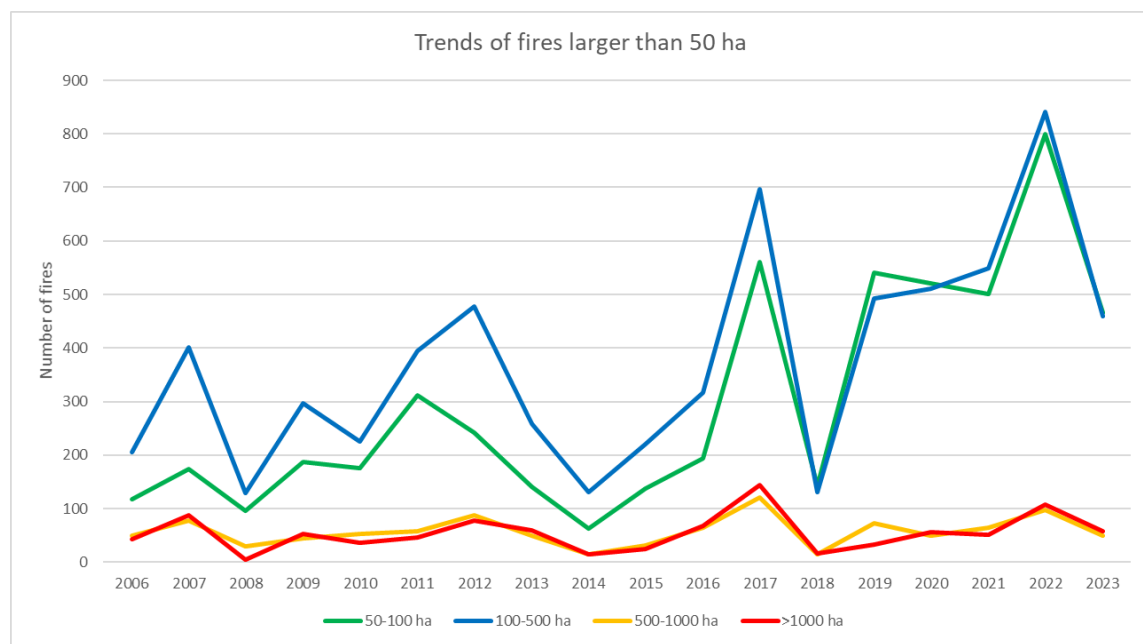
General trends in the period 2006-2023



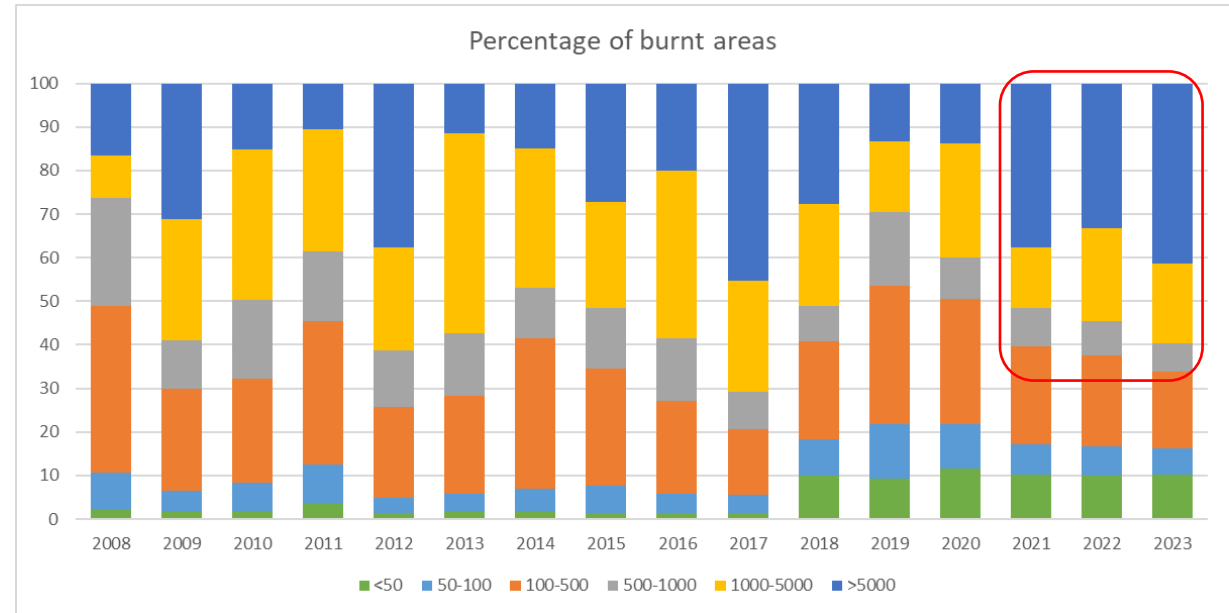
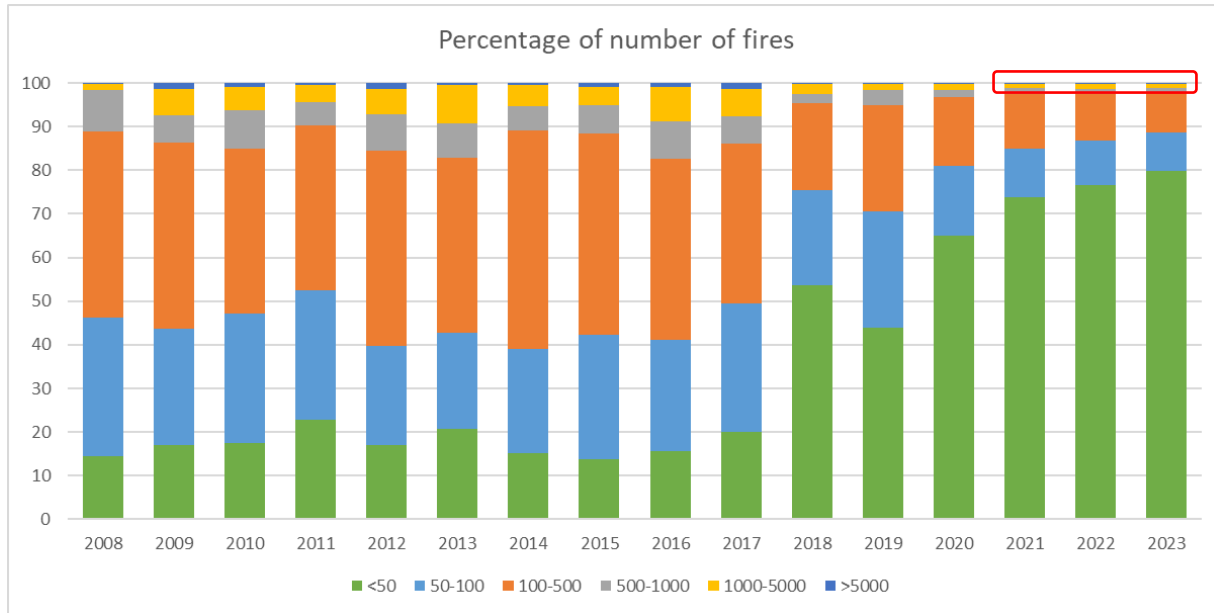
Source: Joint Research Center (JRC) / European Forest Fire Information System (EFFIS)

Igniting Awareness, 03 July 2024

General trends in the period 2006-2023 – number of fires per fire size class

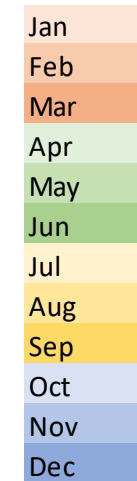


Wildfire by size in the period 2008-2023



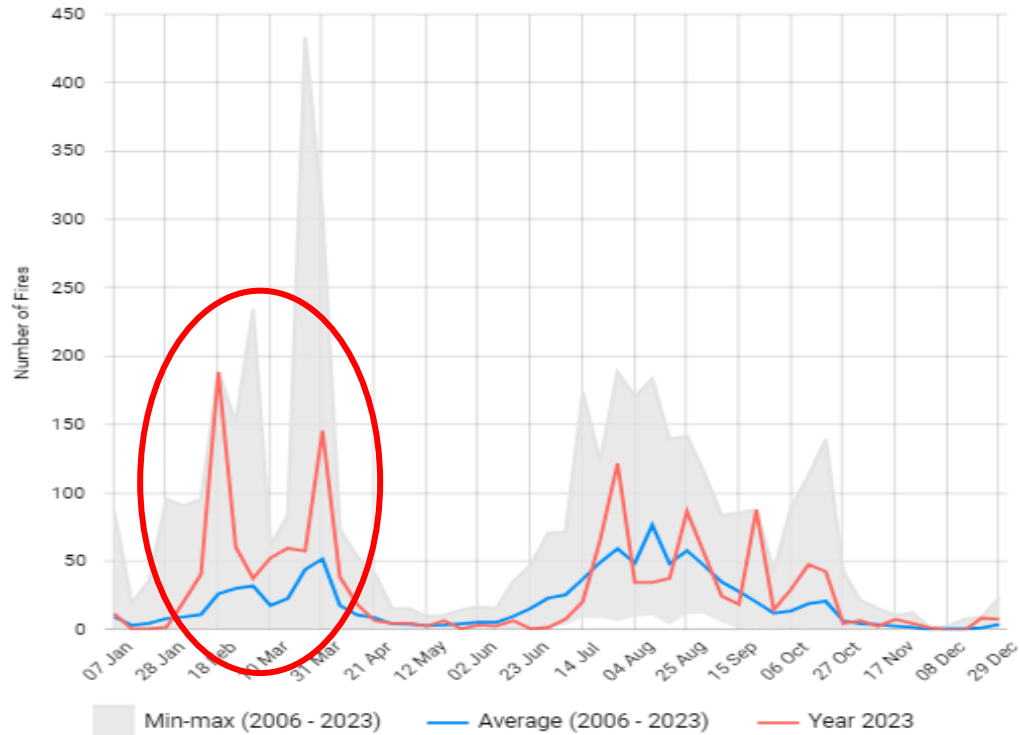
10 largest wildfires in the EU since 2000

Year	Burnt area	Country	Region	Province
2023	96610	Greece	Eastern Macedonia, Thrace	Evros
2017	67521	Portugal	Centro (PT)	Viseu Dão Lafões
2017	64321	Portugal	Centro (PT)	Região de Coimbra
2003	59156	Portugal	Centro (PT)	Beira Baixa/Oleiros
2003	53568	Portugal	Centro (PT)	Médio Tejo/Macao
2003	52233	Portugal	Algarve	Algarve/Monchique
2021	51881	Greece	Central Greece	Evros
2007	45809	Greece	West Greece	Ilia
2007	42652	Greece	West Greece	Ilia
2007	42350	Greece	Peloponnese	Argolis, Arcadia

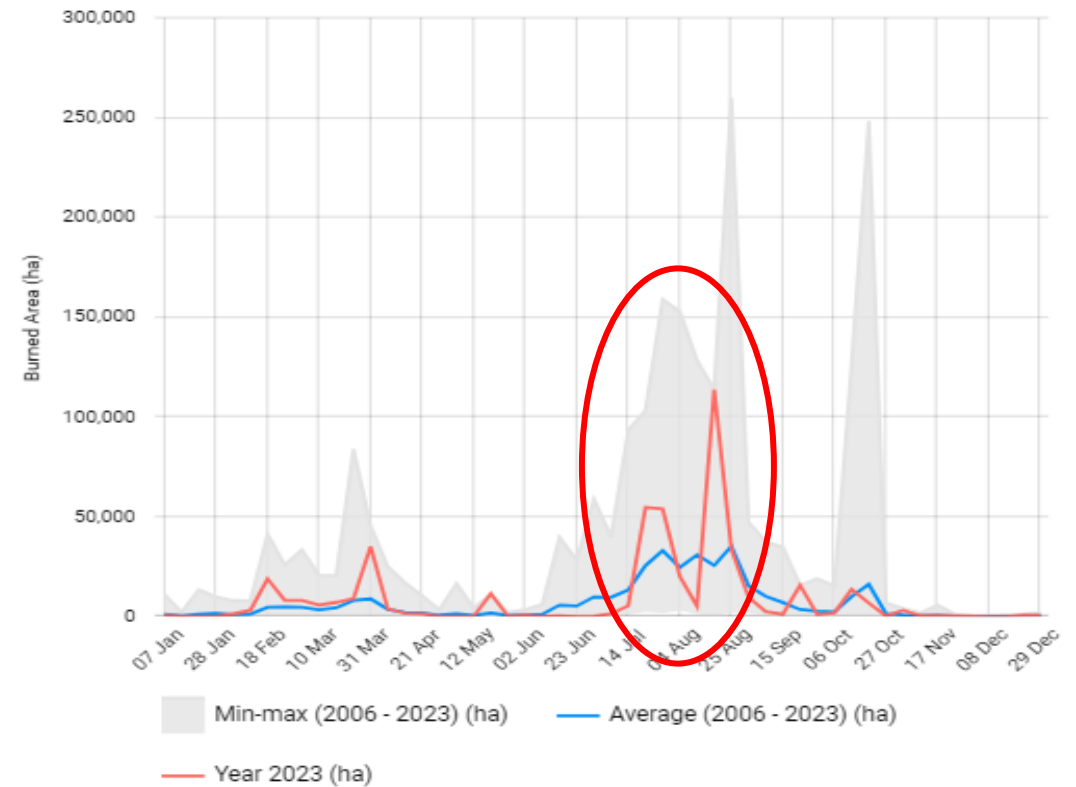


Weekly trends in 2023

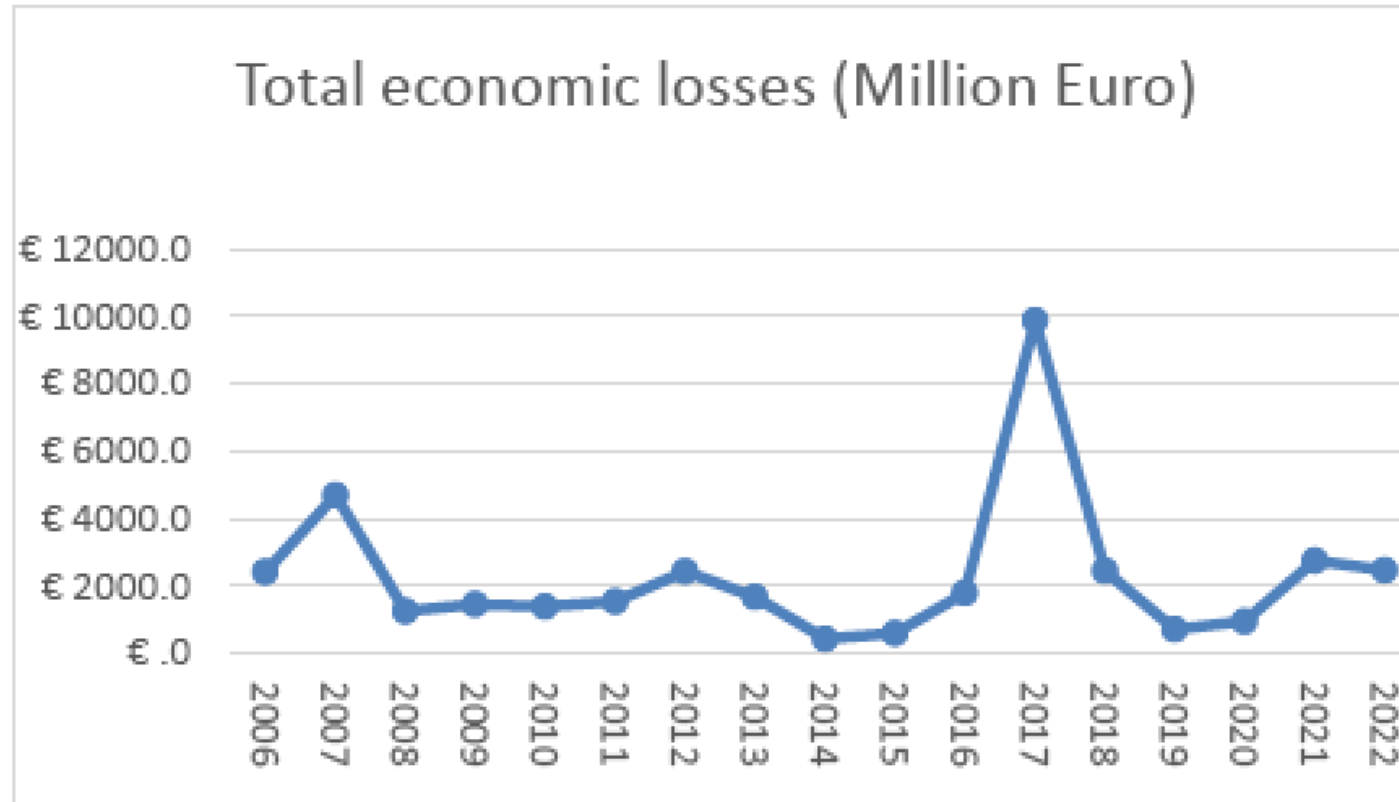
EFFIS Weekly Number of Fires 



EFFIS Weekly Burnt Areas 



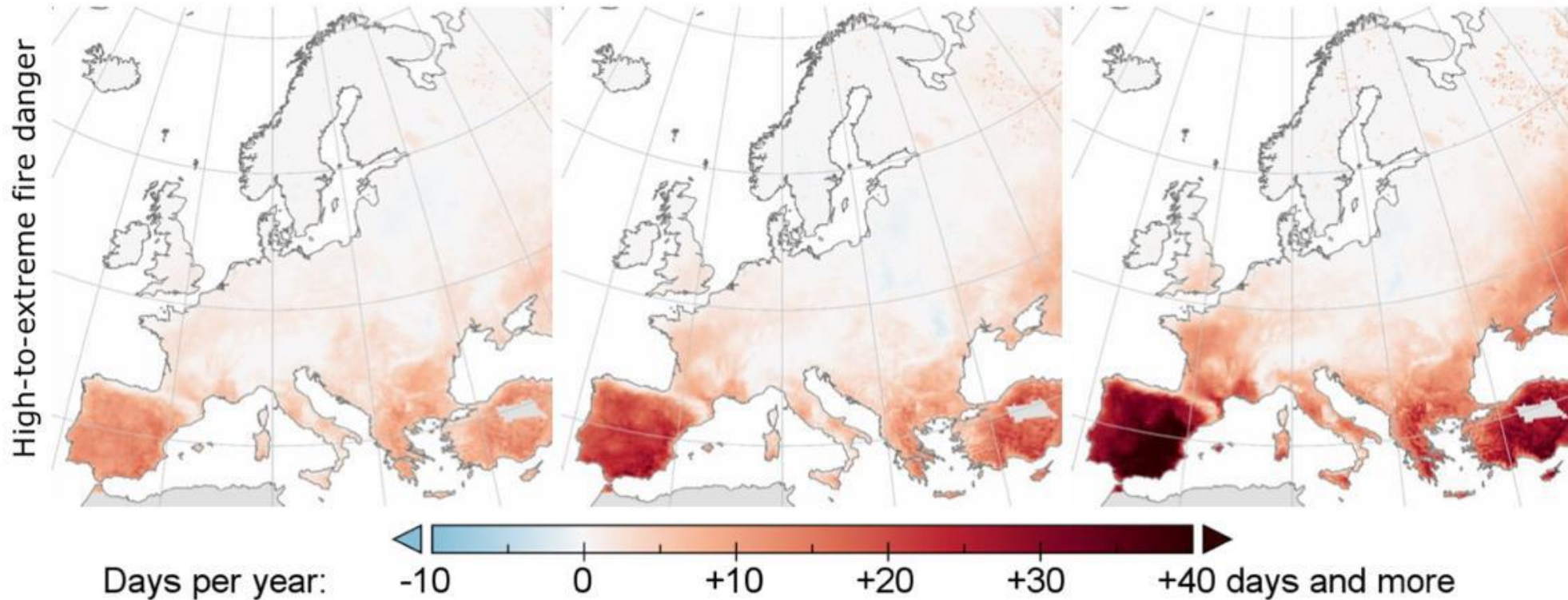
Estimated economic losses from wildfires in the period 2006-2022



- The economic losses due to wildfires in **2023** were above 2.5 billion Euro

Fire Danger and Climate Change

1.5 degrees 2 degrees 3 degrees
 (additional days/year – compared with present – with high-to-extreme fire danger)



Peseta IV report - Costa, H., de Rigo, D., Libertà, G., Houston Durrant, T., San-Miguel-Ayanz, J., *European wildfire danger and vulnerability in a changing climate: towards integrating risk dimensions*, EUR 30116 EN, Publications Office of the European Union, Luxembourg, 2020, ISBN: 978-92-76-16898-0, doi:10.2760/46951, JRC119980

Source: Joint Research Center (JRC) / European Forest Fire Information System (EFFIS)

SUMMARY

- Since 2006, there is a general increasing trend in the number of fires and burnt areas in the EU, with recent critical years such as 2017, 2021, 2022 and 2023.
- Extreme fires have a larger contribution to the total burnt areas. 2023 saw the largest fire episode in the EU, since 2000, with critical fires in several Mediterranean countries
- The length of the fire season has increased beyond the traditional months of July, August and September, with many wildfires and critical events outside that period.
- The annual economic losses due to wildfires in 2023 are above 2.5 billion Euro.
- Future climatic projections indicate higher fire danger levels in Europe; higher fire danger values will likely lead to more intense fires and larger burnt areas.



Additional information at:

<https://effis.jrc.ec.europa.eu>

<https://gwis.jrc.ec.europa.eu>

[**jrc-effis@ec.europa.eu**](mailto:jrc-effis@ec.europa.eu)



CLIMAAX
climate ready regions

Wildfire risk projections

Andrea Trucchia (CIMA Foundation, Italy – CLIMAAX project)

www.cimafoundation.org

CLIMAt risk and vulnerability Assessment framework and **toolboX** (CLIMAAX) is a 4-year Horizon Europe project (2023-26) that is providing financial, analytical, and practical support to improve regional climate and emergency risk management plans. CLIMAAX is designed to contribute to the harmonization and consolidation of the practice of climate risk assessment, leaving a legacy for upcoming European initiatives.



CLIMAAX
climate ready regions

In a nutshell

The European landscape of disaster risk management and climate adaptation is far from uniform.

CLIMAAX builds upon existing risk assessment frameworks, methods and tools, and promotes the use of datasets and service platforms for local and regional scale deployment. It will develop a robust and coordinated framework of consistent, harmonised and comparable risk assessments.

The project brings the existing tools and services beyond state-of-the-art by prioritizing the further development of accessibility, guidance, tuning to local contexts, interpretation and uptake by representative Disaster Risk Management and Civil Protection authorities.





Outcomes

CLIMAAX is designed to significantly contribute to the harmonization and consolidation of the practice of climate risk assessment (CRA), leaving a substantial legacy for upcoming European initiatives. The project will deliver:

01.

A standardized CRA framework CRA built on current community experience and best-practices

02.

A Toolbox with data, models and utilities to provide access to European and global open data archives integrated with local data and procedures

03.

Five European pilot regional CRAs to shape the framework and toolset

04.

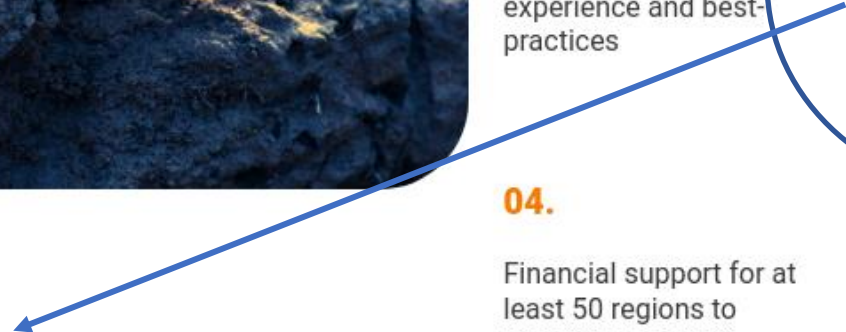
Financial support for at least 50 regions to execute a context specific CRA

05.

CRA guidance material and online helpdesk for other European regions

06.

A proposal to upscale results into the future operationalization of the regional CRA support function



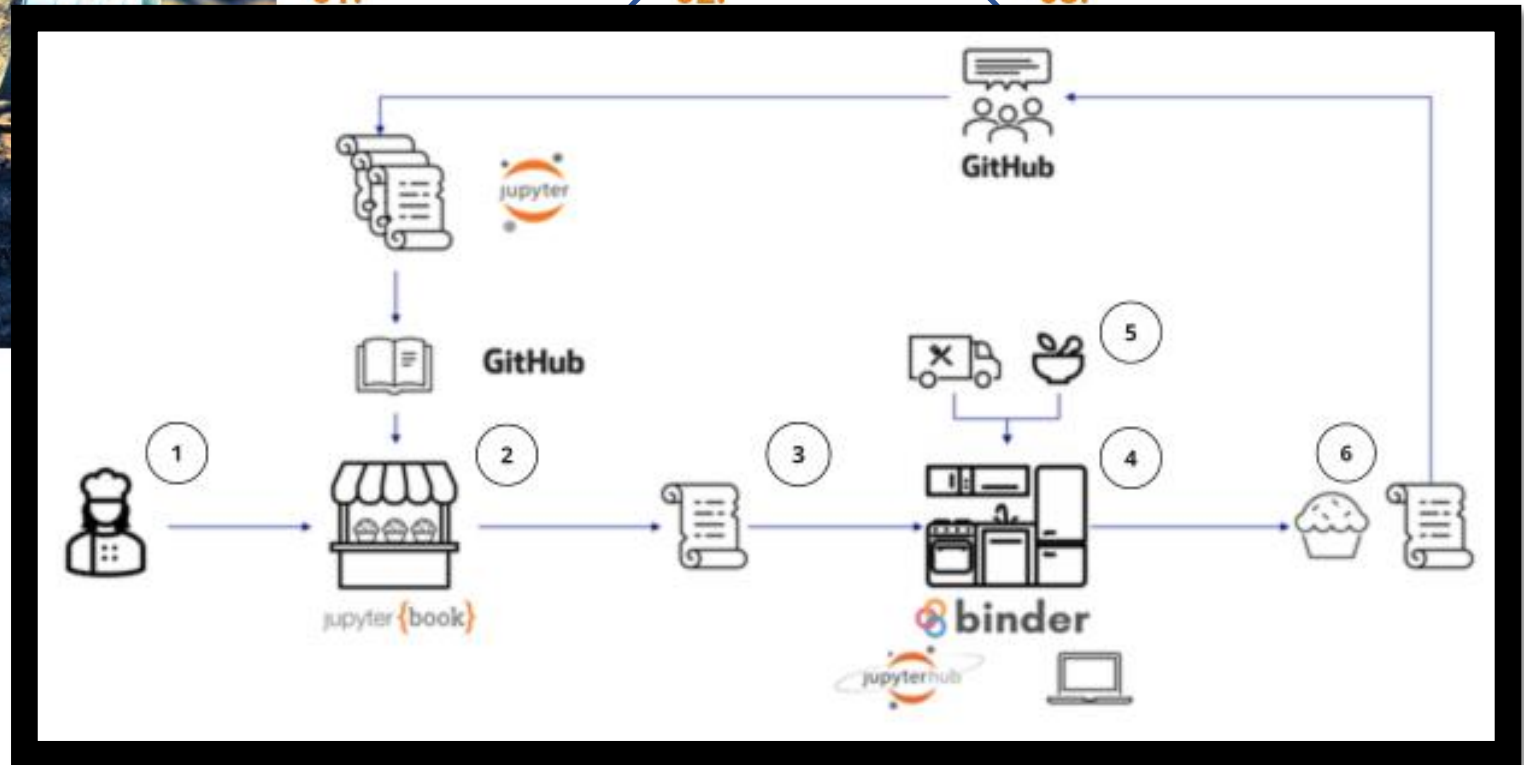
Wildfire hazard and risk workflow, made by the use of open data and Jupyter Notebooks



Outcomes

CLIMAAX is designed to significantly contribute to the harmonization and consolidation of the practice of climate risk assessment (CRA), leaving a substantial legacy for upcoming European initiatives. The project will deliver:

01. 02. 03.



Wildfire hazard and risk workflow, made by the use of open data and **Jupyter Notebooks**

CLIMATE RISK ASSESSMENTS FOR EVERY EUROPEAN REGION

Open Call

The second Open Call for regions and communities has been launched on the 1st of July and it will run until the 15th of October 2024. Applicants who were not selected in our first Open Call are welcome to participate again.

Learn More

<https://www.climaax.eu/>

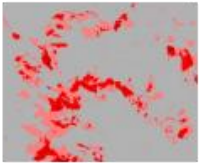
APPLY BEFORE
15 OCTOBER 2024

WHO CAN APPLY
PUBLIC BODIES
NON-PROFIT ORGANISATIONS

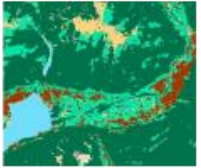
FUNDING
UP TO €300.000

Wildfire Susceptibility

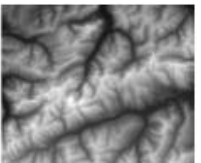
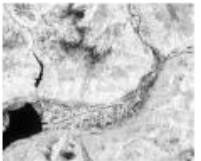
Observations



+

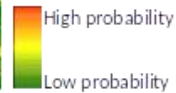
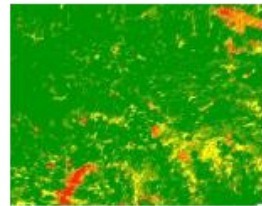


Input variables



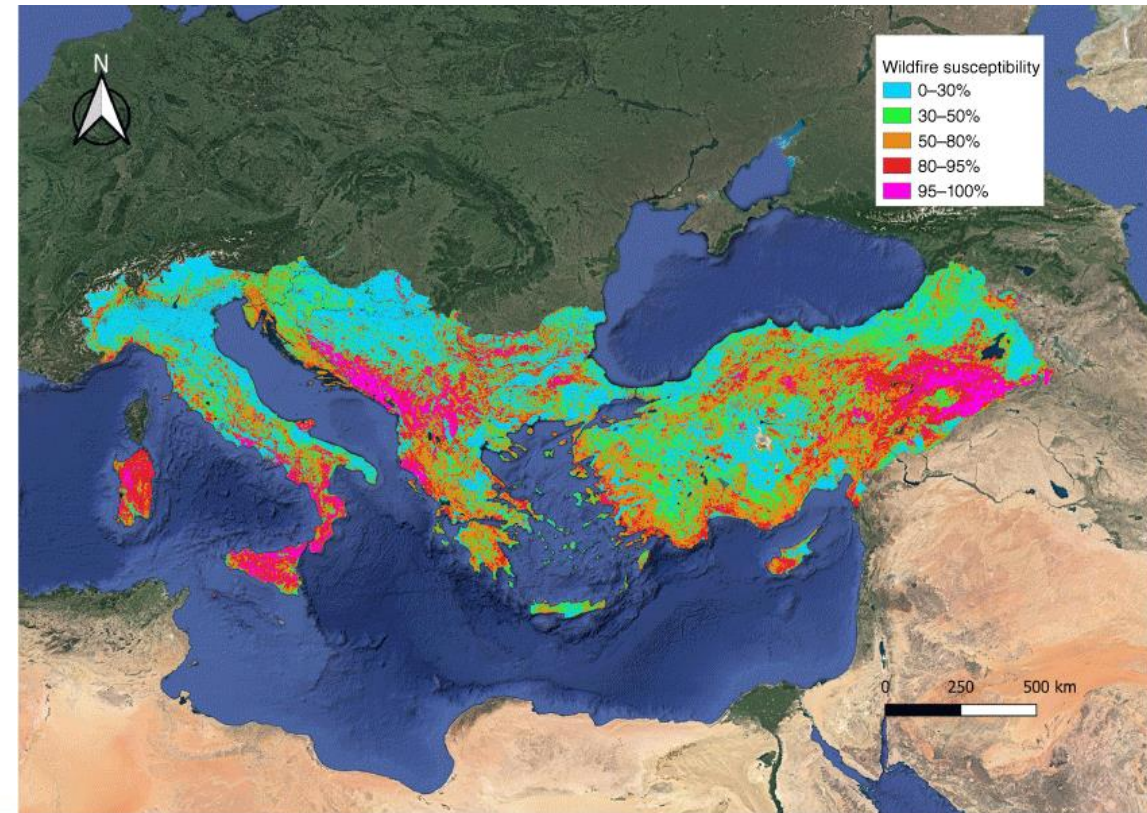
Ensemble of decision trees

Output
(susceptibility map)



Propensity of an area of experiencing wildfires given the intrinsic characteristic of territory

Now given by an AI informed approach using past wildfire history and GIS tools.



- Trucchia, A.; Meschi, G.; Fiorucci, P.; Provenzale, A.; Tonini, M.; Pernice, U. Wildfire hazard mapping in the eastern Mediterranean landscape. *International Journal of Wildland Fire* 2023, 32, 417-434. (<https://doi.org/10.1071/WF22138>)

The predisposing factors



- Elevation
- Slope
- Aspect (Northing and Easting)
- Vegetation cover: fuzzy filtering [% of vegetation neighbour type]

- Temperature aggregates
- Precipitation aggregates
- Continentality...
- Climatic Köppen-Geiger areas

Topographic factors

Source: CORINE / Land cover, MERIT DEM

Climatic factors *High-resolution gridded climate data for Europe based on bias-corrected EURO-CORDEX: the ECLIPS-2.0 dataset. (European CLimate Index ProjectionS) 80 annual, seasonal, and monthly climate variables for two past (1961-1990, 1991-2010) and five future periods (2011-2020, 2021-2140, 2041-2060, 2061-2080, 2081-2100). 5 Regional Climate Models (RCMs), RCP 4.5 and 8.5.*

The observed variable

Burned area (94- 2022) from local datasets of wildfires

Burned area from 2008 to present date - EFFIS



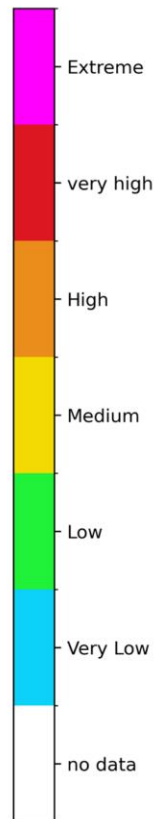
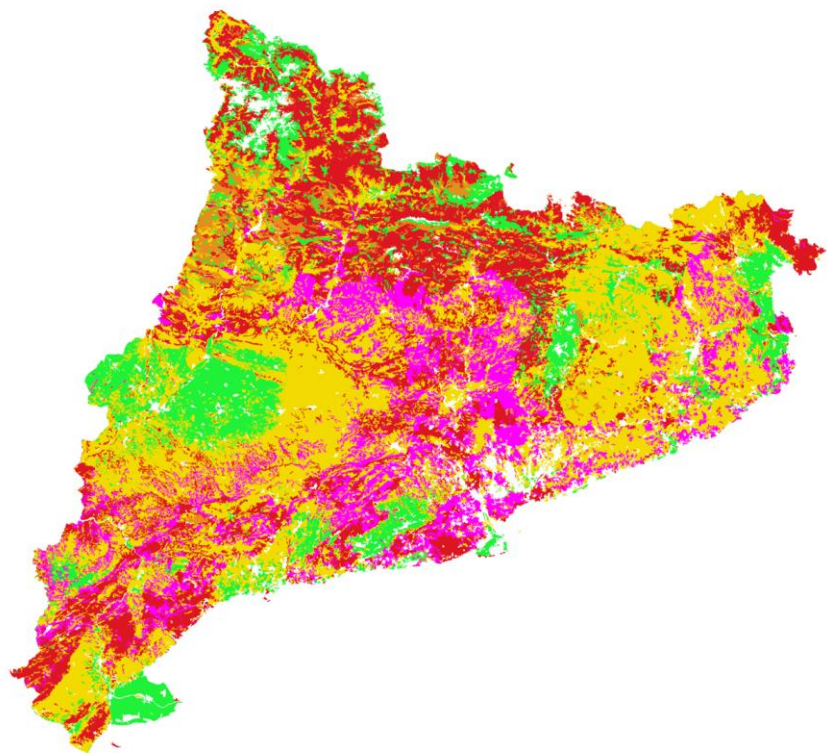
From Susceptibility to Hazard

Inferring plant functional type via
CORINE classification: crops vs
shrubs vs conifers...

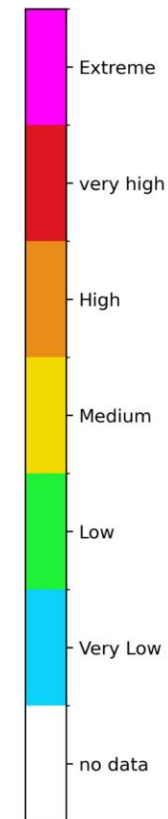
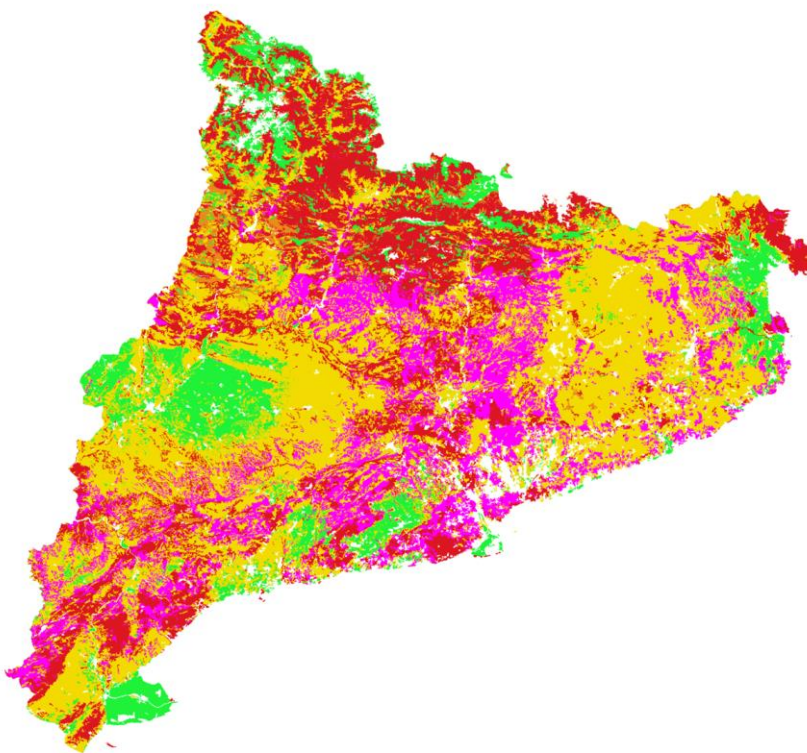
Susceptibility/ intensity	Low intensity	Medium intensity	High intensity	Very high intensity
Low susceptibility	1	2	3	4
Medium susceptibility	2	3	4	5
High susceptibility	3	4	5	6

Easy to implement, expeditionary, easy to replicate

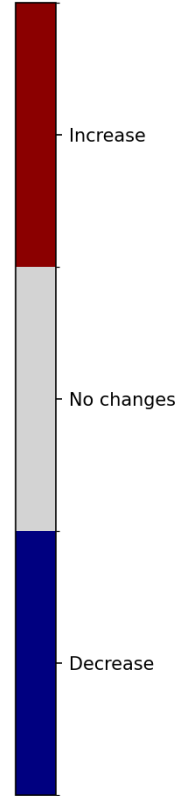
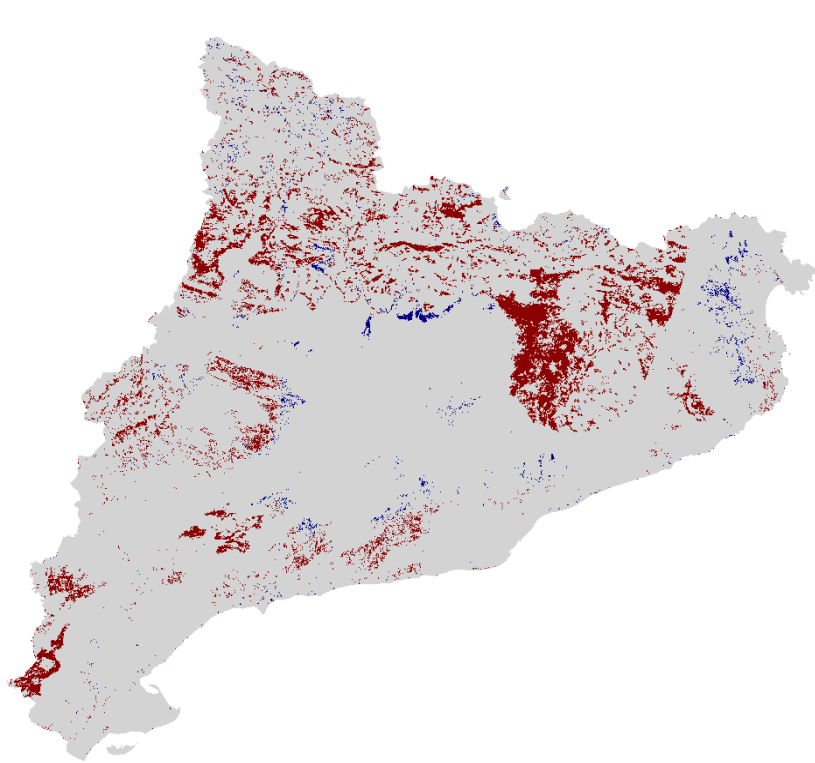
Hazard present present



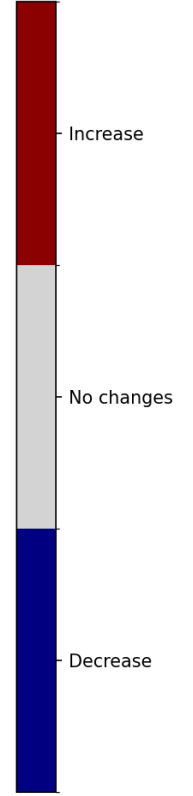
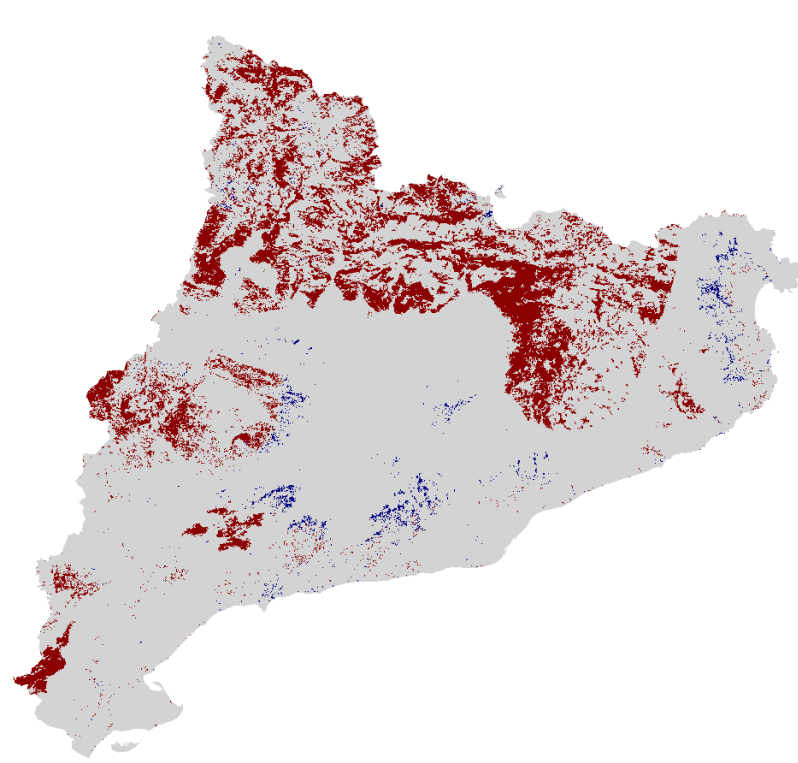
Hazard 4p5_2021_2040 present



Degree of Hazard change RCP45 2021-2040



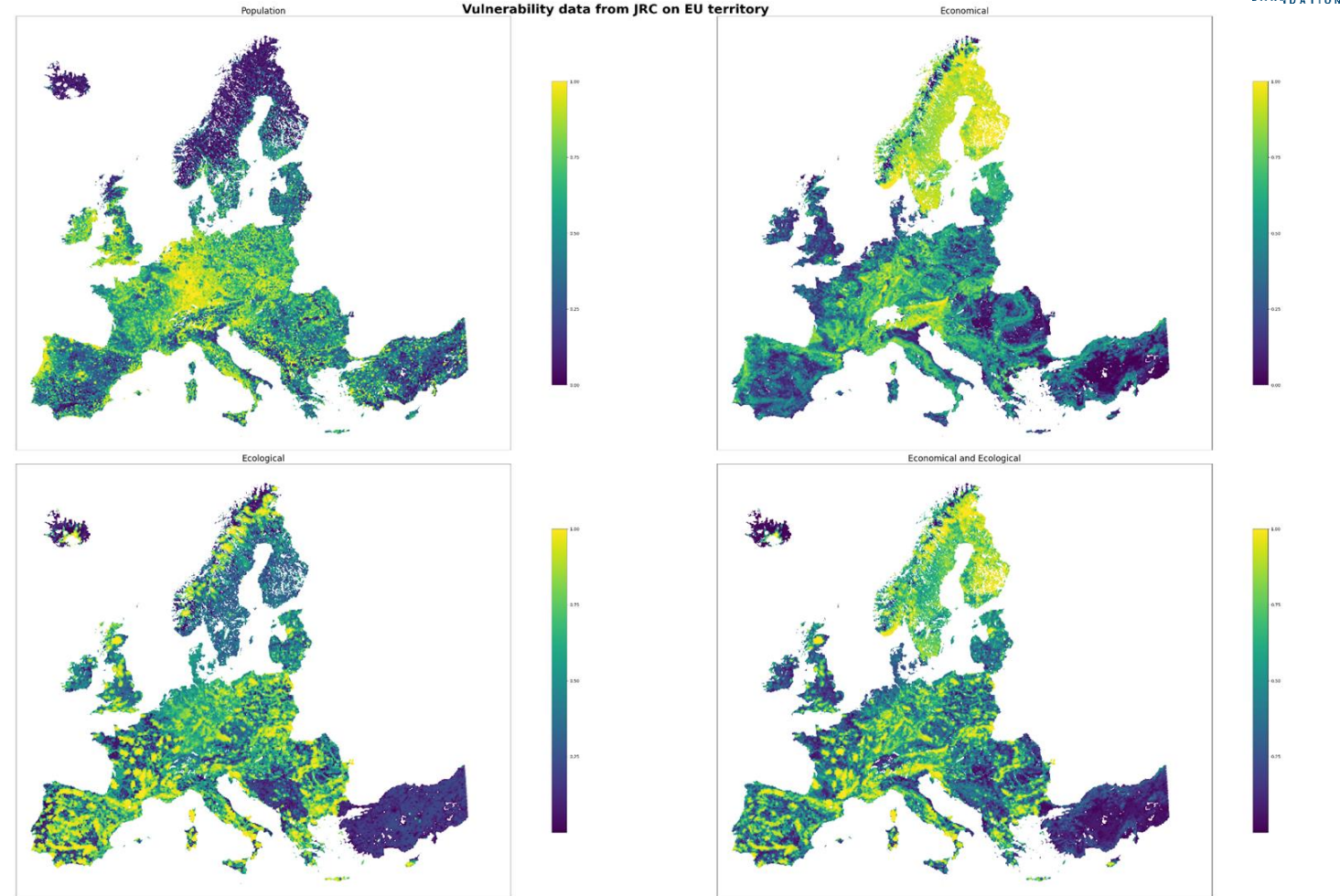
Degree of Hazard change RCP85 2041-2060



From Hazard to Risk

Vulnerabilities from JRC:

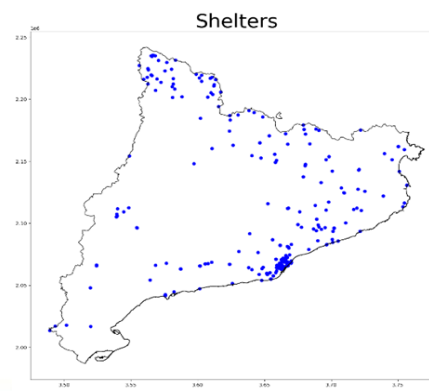
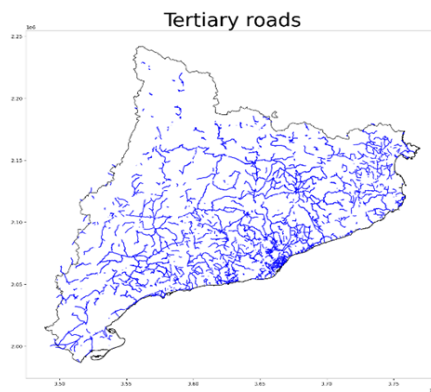
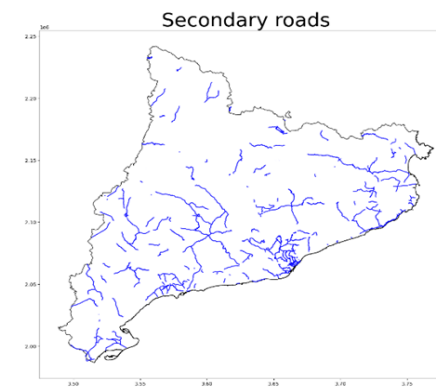
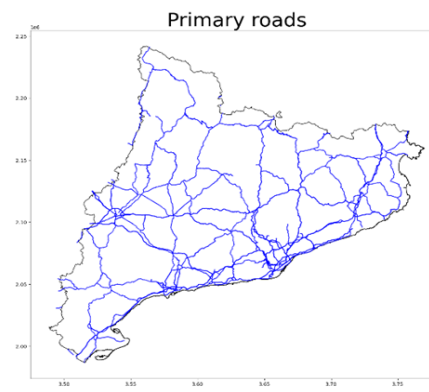
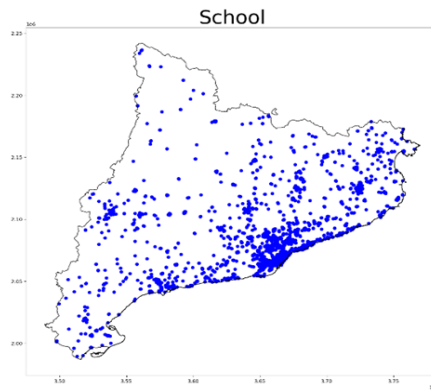
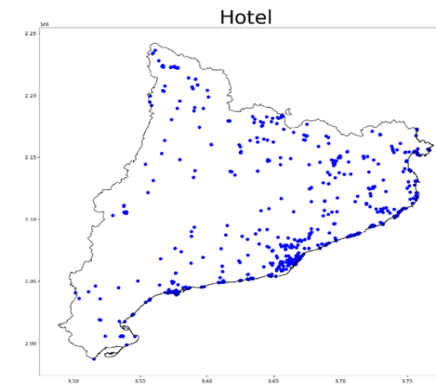
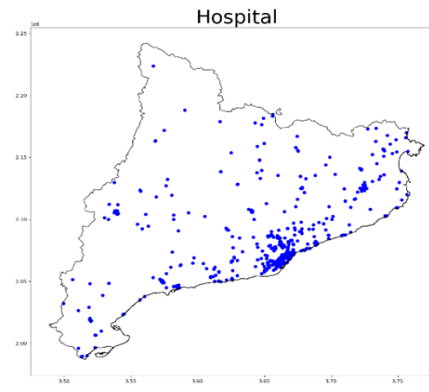
- Ecological
- Population
- Economical



European Commission, Joint Research Centre, Costa, H., De Rigo, D., Libertà, G. et al., *European wildfire danger and vulnerability in a changing climate – Towards integrating risk dimensions – JRC PESETA IV project – Task 9 - forest fires*, Publications Office of the European Union, 2020, <https://data.europa.eu/doi/10.2760/46951>

Exposed elements from Open Street Map:

- Hospitals
- Schools
- Streets
- ...



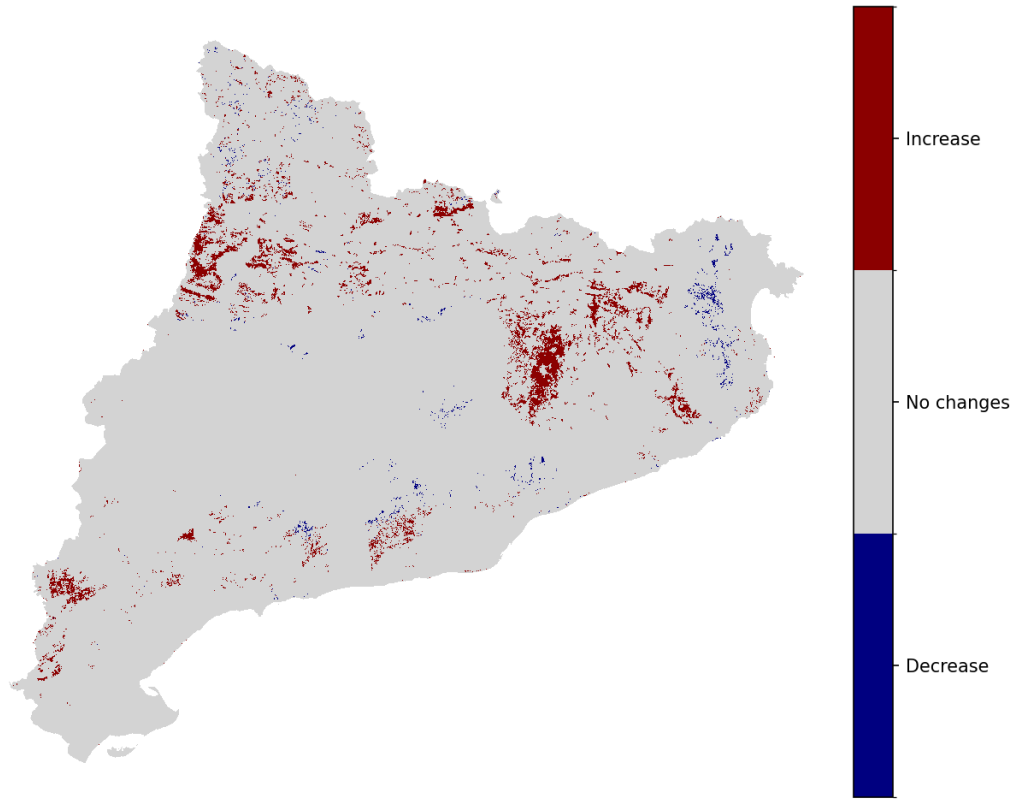
Several risk assessment strategies for different exposed elements:

- Degree of damage (vulnerability curves -> roads)
- Hazard x Classes of vulnerabilities
- Hazard x Population vulnerability x population exposure (categorized population density)

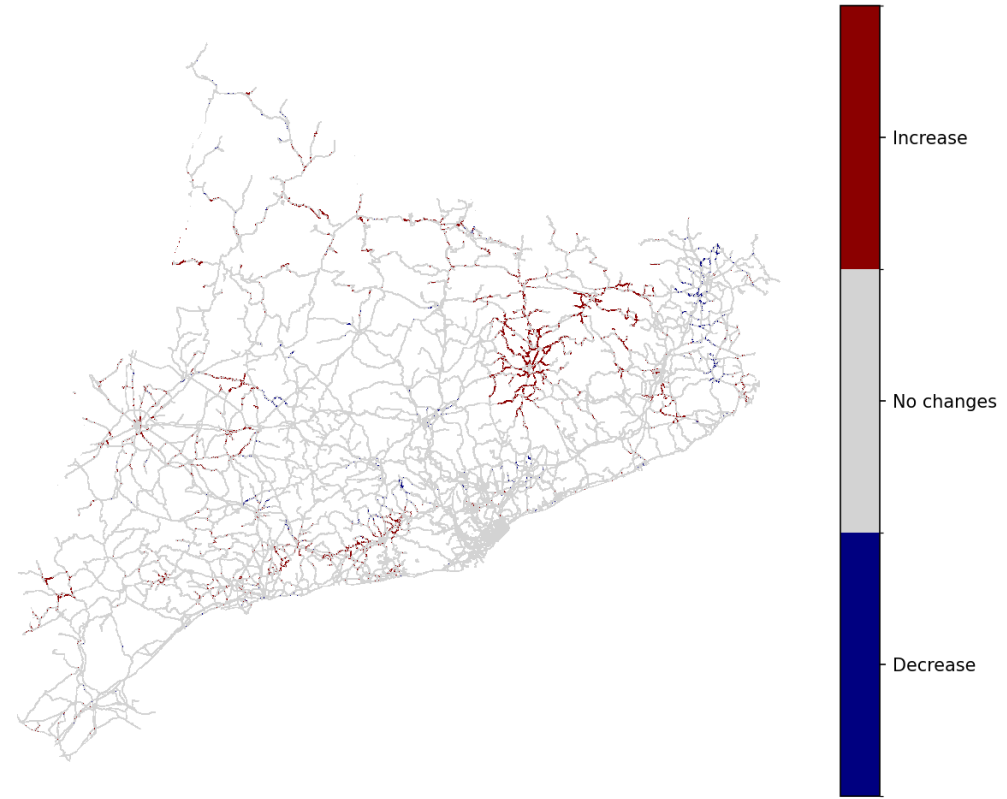
Contingency table

Hazard level / Damage level	1	2	3	4	5	6	Risk
Low	1	1	1	2	3	4	Moderate - low
Moderate	1	1	2	3	4	4	Moderate - high
High	1	2	3	4	4	4	High

Risk change in economy RCP45 2021-2040

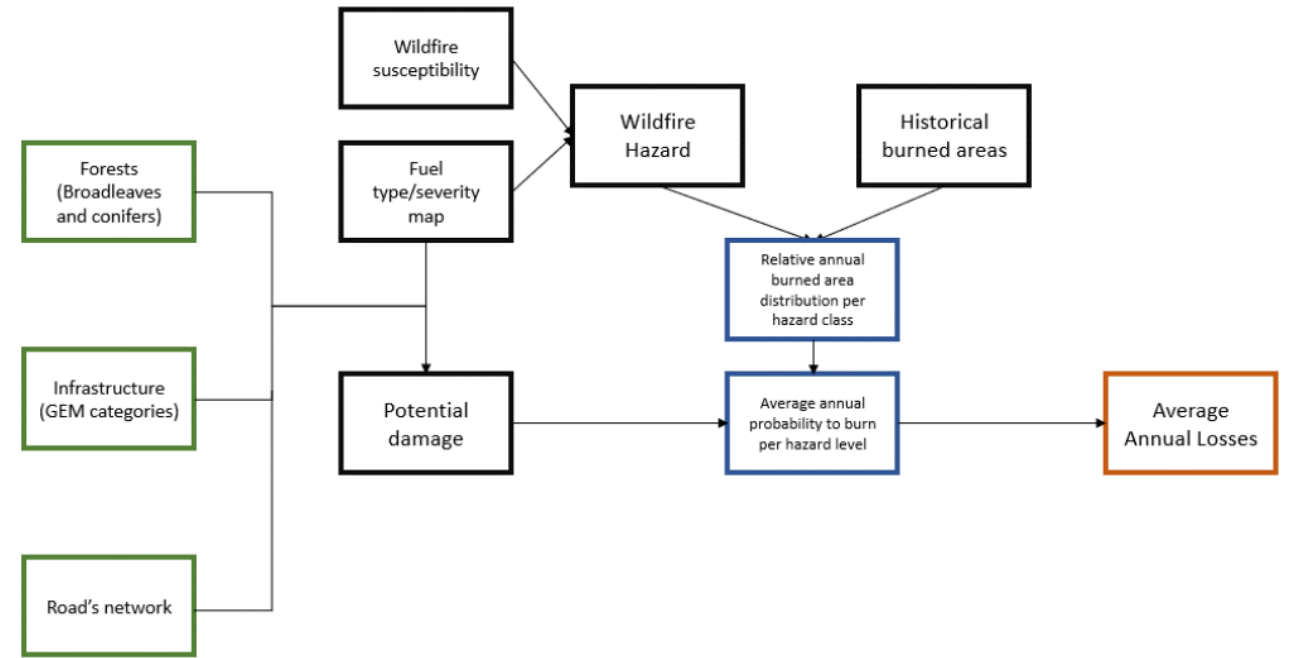
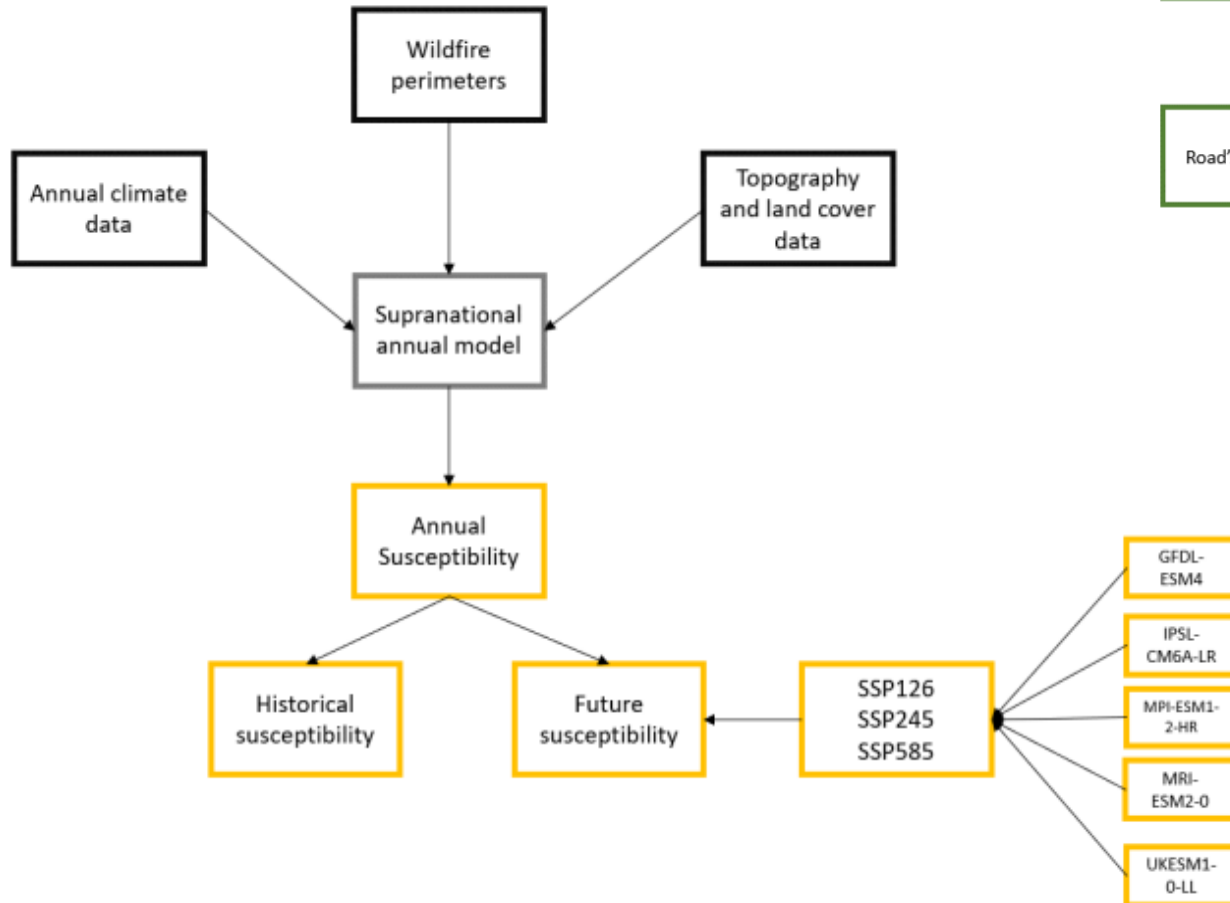


Risk change in roads RCP45 2021-2040



Recent CRA with World Bank:

- DG-ECHO project "Economics for Disaster Prevention and Preparedness"
- **Full scale analysis:** susceptibility, hazard, risk, Average Annual Losses at **National Scale** for Bulgaria, Romania, Croatia and Greece
- Spatial resolution is **100m** and an annual temporal resolution for climate forcing

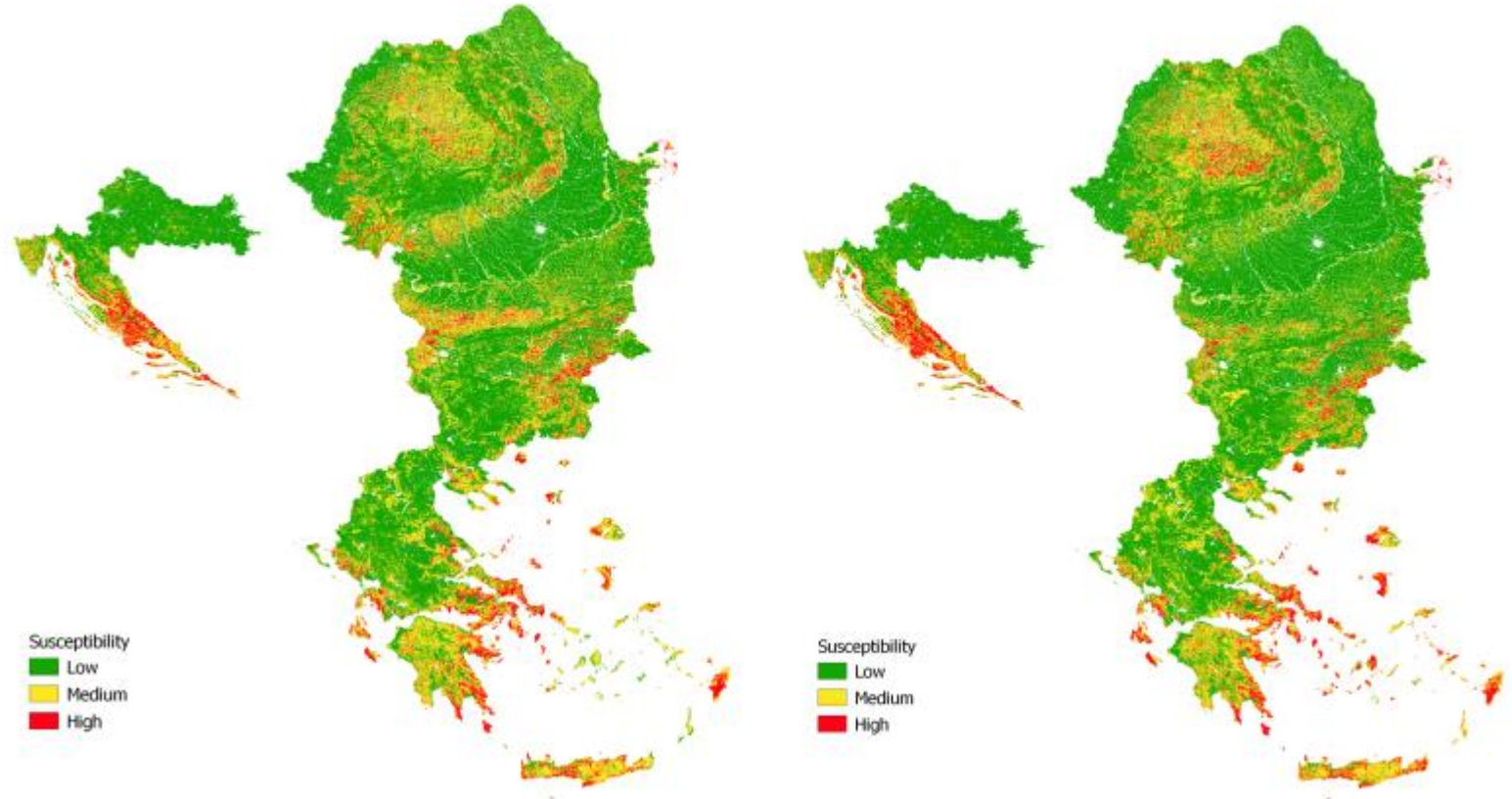


Deep integrated analysis leveraging on ISIMIP climate data, national and global datasets, and both averaged and probabilistic models

Recent CRA with World Bank:

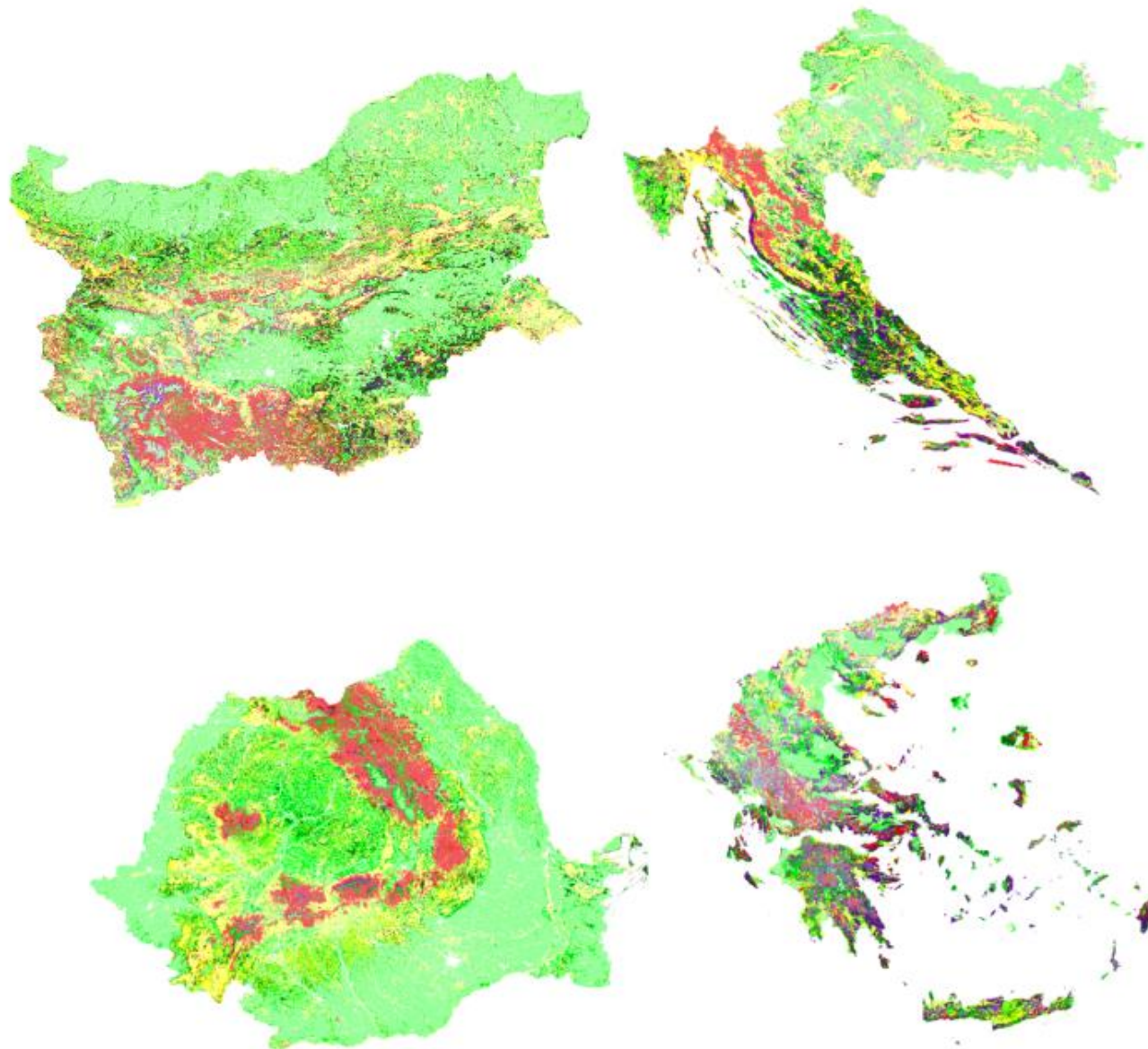
- DG-ECHO project "Economics for Disaster Prevention and Preparedness"
- **Full scale analysis:** susceptibility, hazard, risk, Average Annual Losses at **National Scale** for Bulgaria, Romania, Croatia and Greece
- Spatial resolution is **100m** and an annual temporal resolution for climate forcing.

Yearly variability
for susceptibility: historical
and projected



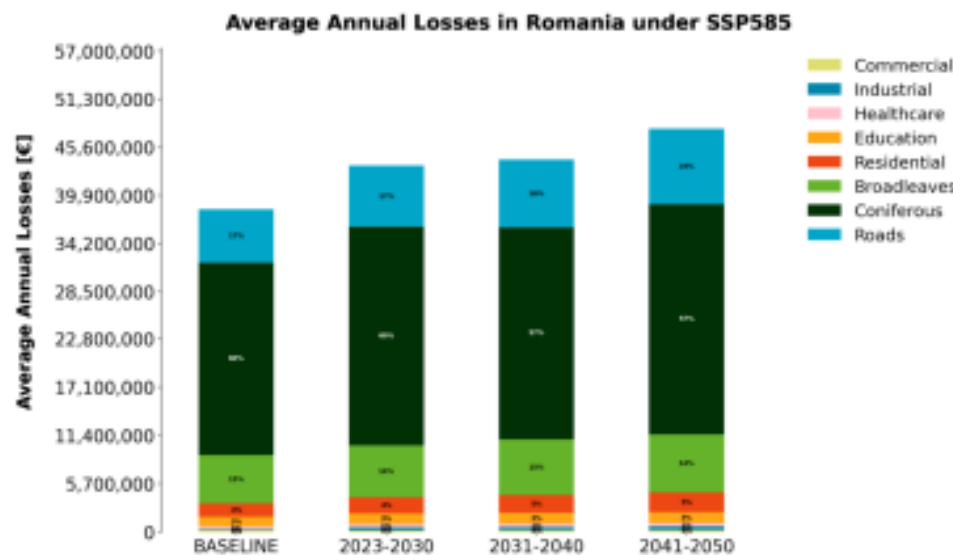
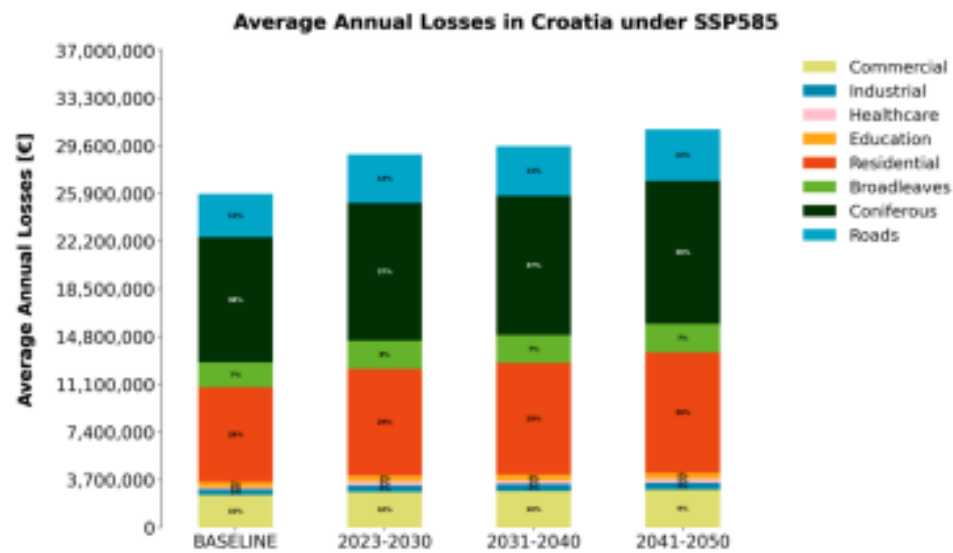
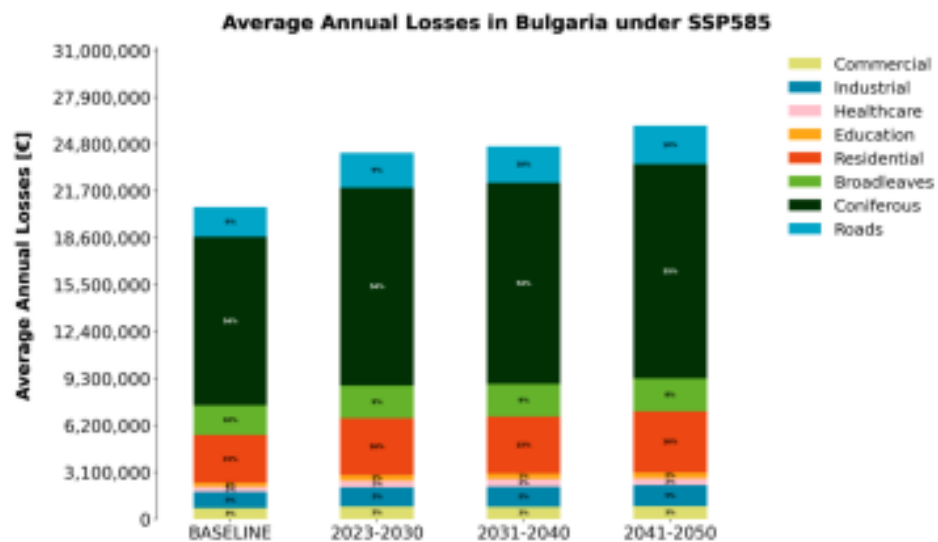
12 - classes hazard / fuel models (susceptibility vs Plant Functional Type)

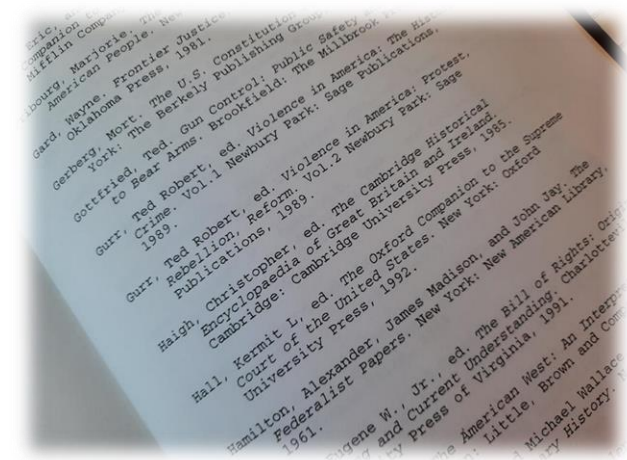
HAZARD MATRIX		FUEL TYPES			
		1 grassland and croplands	2 low flammable forest	3 shrublands	4 high flammable forest
SUSCEPTIBILITY	1 Low	1 low intensity surface fires with low likelihood	4 medium intensity forest fires with low likelihood (broadleaves forests)	7 High intensity bushfire with low likelihood	10 High intensity forest fires with low likelihood (coniferous forests)
	2 Medium	2 low intensity surface fires with medium likelihood	5 medium intensity forest fires with medium likelihood (broadleaves forests)	8 High intensity bushfire with medium likelihood	11 High intensity forest fires with medium likelihood (coniferous forests)
	3 High	3 low intensity surface fires with high likelihood	6 medium intensity forest fires with high likelihood (broadleaves forests)	9 High intensity bushfire with high likelihood	12 High intensity forest fires with high likelihood (coniferous forests)



From Hazard to Risk:

- Exposed assets (according to data availability)
- Vulnerability aggregated at NUTS2/3
- Coping Capacity (no of Fire Stations, road density, ruggedness...)





Bibliography

- Tonini, M.; D'Andrea, M.; Biondi, G.; Degli Esposti, S.; Trucchia, A.; Fiorucci, P. A Machine Learning-Based Approach for Wildfire Susceptibility Mapping. The Case Study of the Liguria Region in Italy. *Geosciences* 2020, 10, 105.
<https://doi.org/10.3390/geosciences10030105>
- Trucchia, A.; Meschi, G.; Fiorucci, P.; Gollini, A.; Negro, D. Defining Wildfire Susceptibility Maps in Italy for Understanding Seasonal Wildfire Regimes at the National Level. *Fire* 2022, 5, 30.
[<https://doi.org/10.1071/WF22138>](<https://doi.org/10.3390/fire5010030>)
- Trucchia, A.; Meschi, G.; Fiorucci, P.; Provenzale, A.; Tonini, M.; Pernice, U. Wildfire hazard mapping in the eastern Mediterranean landscape. *International Journal of Wildland Fire* 2023, 32, 417-434.
<https://doi.org/10.1071/WF22138>
- Chakraborty Debojyoti, Dobor Laura, Zolles Anita, Hlásny Tomáš, & Schueler Silvio. (2020). High-resolution gridded climate data for Europe based on bias-corrected EURO-CORDEX: the ECLIPS-2.0 dataset [Data set]. Zenodo. [<https://doi.org/10.5281/zenodo.3952159>]
(<https://doi.org/10.5281/zenodo.3952159>)



Q&A session

Moderated by **Guido Schmidt**, MIP4Adapt

Supported by **Erlend Hansen**, MIP4Adapt, Ricardo Ltd.



Showcasing experiences

Moderated by **Claudia Berchtold**

Fraunhofer Institute for Technological Trend Analysis, Germany
FIRELOGUE - <https://firelogue.eu/>





TREEADS technologies:

- (1) Seedball technology for replanting
- (2) Virtual reality for firefighter training



Ragni Fjellgaard Mikalsen
RISE Fire Research, Norway
TREEADS <https://treeads-project.eu/>

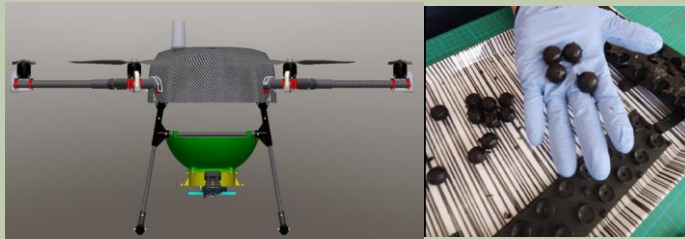
supported for QA by **Dorotėja Vaitiekūnaitė** (LAMMC)
and **Razvan Purcarea** (SIMAVI)

TREADS Seeding Systems

TREADS seeding systems will be a key element for successful reforestation.

The seedballs contain all the components that a tree seedling may need to survive – microorganisms most importantly, as well as nutrient rich soil, gelling agent and of course seeds. The seeding capsules are engineered to contain a space for fertilizers and be manufactured with a special material composition to provide the seedling with the right nutrients.

Seedballs



Seeding Capsules



May 2024 - Progress on
T6.2 Reforestation / Drones for Agriculture
Using Drones for aerial mass release of seedballs



Task 6.2: Treads Artificial Intelligent Seedpods and Bioclip adaptation

Demonstration

Yannic Transier
Project Task Coordination and
Management
GBD; Global Biodesign Scomm
transier@globalbiodesign.com



TREADS has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 101036926.



LITHUANIAN
RESEARCH CENTRE
FOR AGRICULTURE
AND FORESTRY



Slido Question 2

Do you foresee any challenges in adopting the replanting technologies presented by TREEADS?



TREEADS VR Tool

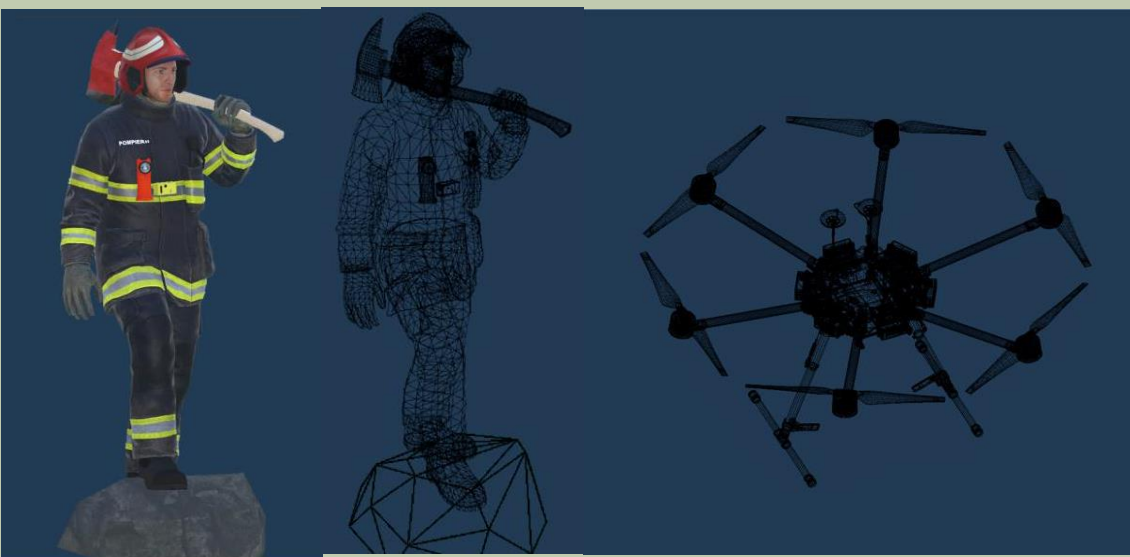


TREEADS develops AR/VR training systems necessary for the training and development of firefighters' skills.

- Reduce the response time of firefighters in case of fire hazards.
- Familiarize them with new technologies and increase situational awareness.

TREEADS VR tool will be used in three Pilots.

- Romania
- Germany
- Austria





Slido Question 3

Do you foresee any challenges in adopting the virtual reality training technology presented by TREEADS?





FIRE-RES Solutions: Light machinery for preventive silviculture

Gianni Picchi
National Research Council, Italy
FIRE-RES <https://fire-res.eu/>

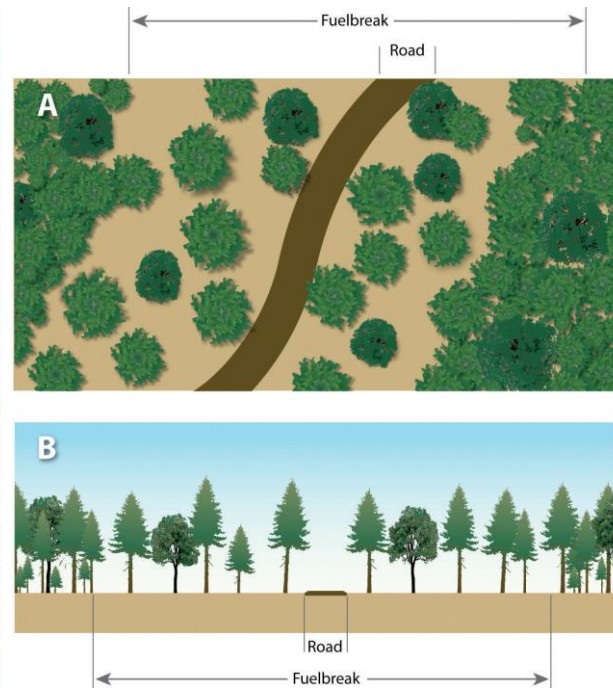
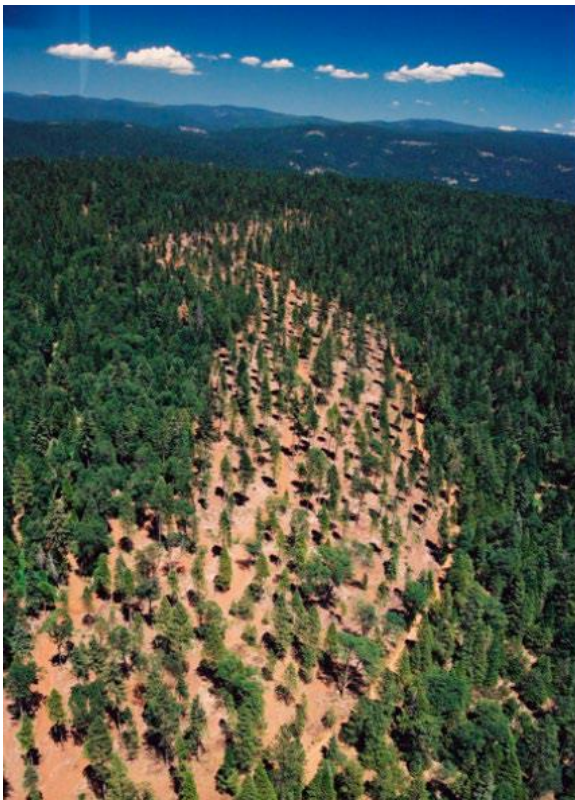


FIRE-RES



Wildfire prevention infrastructure maintenance

Maintenance and recovery of fire and fuelbreaks



Images source USDA and Ascoli

Living Lab Sardinia (Italy)

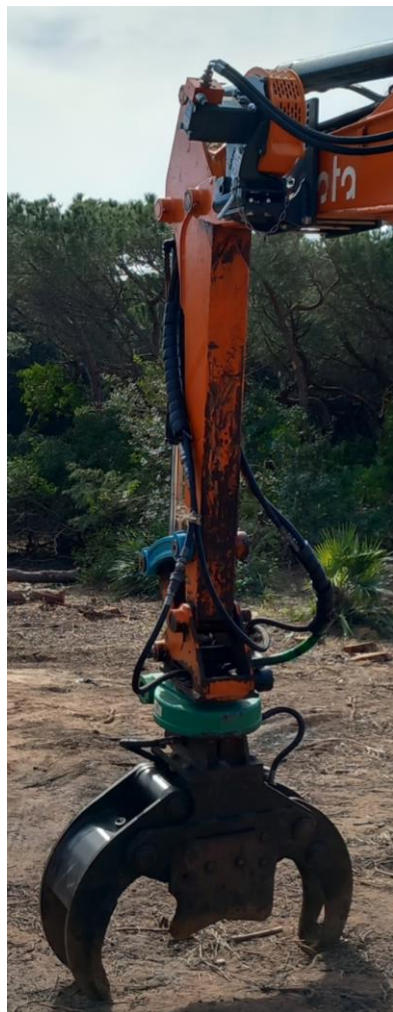
- Highly time and labour consuming
- Mostly carried on by public authorities
- Ageing staff and low level of mechanization
- Limited financial resources vs large areas to manage





Wildfire prevention infrastructure maintenance

Proposal for alternative work systems in forest fuel removal (preventive silviculture).



Traditional: motor-manual and tractor



Innovative: motor-manual and excavator+winch

Living Lab Sardinia (Italy)

- Reduction of cost and strain
- Multiple services with low impact and low cost equipment

FUEL BREAK CHARACTERISTICS		
Plot	1	2
Main tree, shrub species	<i>Pinus spp.</i> , <i>Pistacia lentisus</i>	
Mean DBH (cm)	25	23
Trees removal (%)	30	30
Shrubs removal (%)	30	100
MECHANIZED WORK		
Costs per Area (€/ha)	-1,126	-2,792
MANUAL WORK		
Cost per Area (€/ha)	-1,714	-3,174
Cost decrease (%)	-35	-13

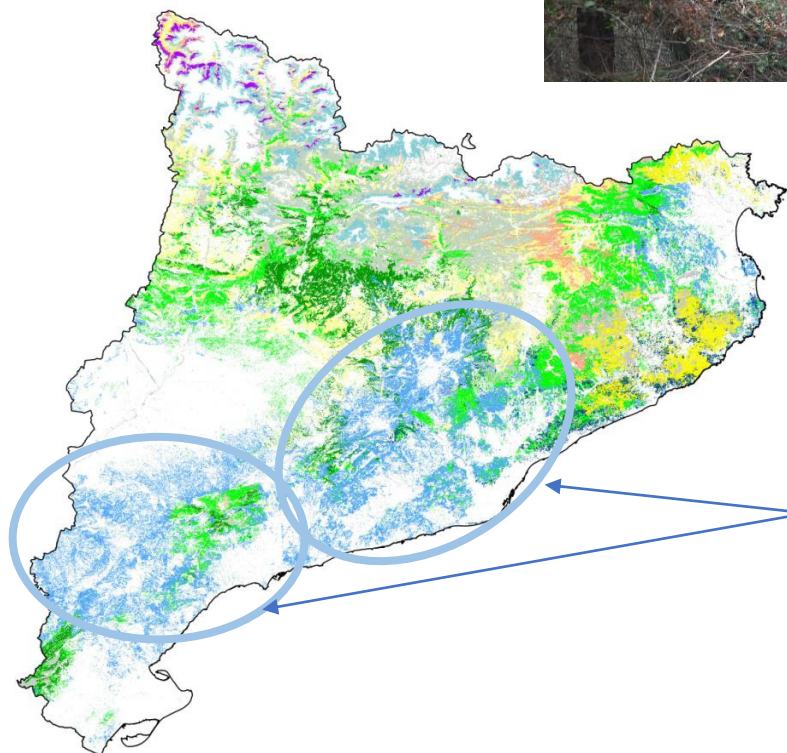


Preventive silviculture in young pine forests

Thinning of dense and extremely dense post-fire regenerated stands of *Pinus halepensis*



MAPA DE COBERTES DEL SÒL



Living Lab Catalonia (Spain)

- Over 330,000 ha of *Pinus halepensis*
- Management challenge due to wildfire risk
- Excessive cost with current systems
- Release of coarse woody biomass
- Private landowners reluctant to accept public intervention, even if at no cost





Preventive silviculture in post-wildfire regenerate stands

Introduction of a professional light forest machine for thinning.

Living Lab Catalonia (Spain)

- High mobility and combo configuration for minimal relocation costs
- Relatively low acquisition and operative costs
- Minimal impact and narrow corridors

FOREST CHARACTERISTICS			
Plot	1	2	3
Main species	<i>Pinus halepensis</i>		
Density (trees/ha)	2040	5260	9620
Mean DBH (cm)	17	10	6
MECHANIZED WORK			
Costs per Area (€/ha)	-2,257	-3,336	-4,950
Value of biomass (€/ha)	1,516	1,835	809
Economic Balance (€/ha)	-741	-1,500	-4,141
MANUAL WORK			
Value of biomass (€/ha)	No biomass recovery		
Cost per Area (€/ha)	> -4,000	-3,000	-4,408
Public Subsidy (€/ha)	2,000	2,000	3,000





Showcasing the integrated wildfire management platform

Lovorko Maric
MicroDigital

SILVANUS <https://silvanus-project.eu/>



SILVANUS

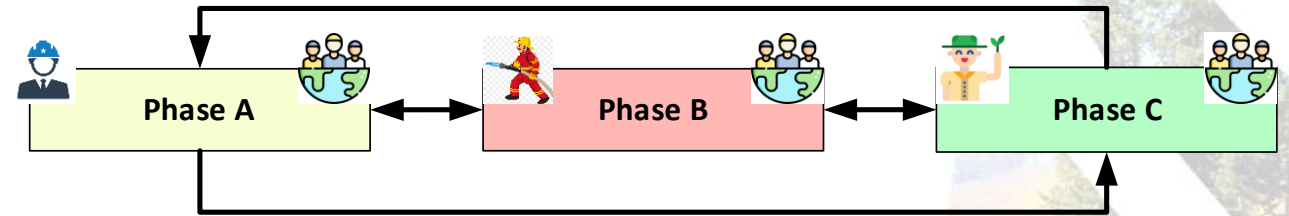
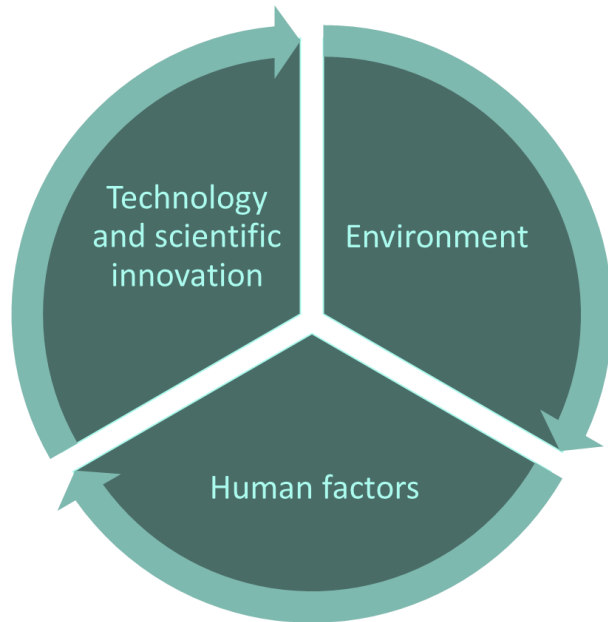
SILVANUS in a nutshell

VISION

To develop an integrated technology platform with innovative toolkits that provide decision-making support in preparedness, response and recovery phase of wildfire management and enhancing the human, environment, and economic resilience to wildfires

MISSION

Adopt synergistic alliance between

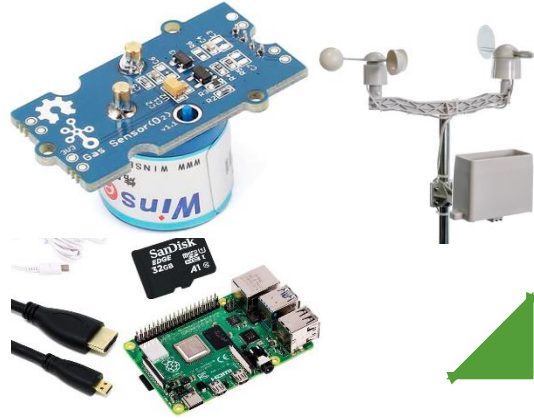


Emphasis on human factors for enhanced prevention and preparedness to wildfire [Phase A]

Data driven, ICT platform design for enabling insights for fire detection and response coordination [Phase B]

Adoption of evidence-based approach for the strategies and recommendations on forest restoration policies [Phase C]

SILVANUS rings of protection



First line of defence

- identify the regions of high probability (consider historic cases, biofuel available in the region, etc)
- Use of in-situ devices. Such devices could include (but not limiting to), smoke sensors, humidity sensors, temperature sensors, cctv, etc.

Second line of defence

- Use of drones for visual inspection, use of human intelligence from social media (who report fire citing in social media)



Third line of defence

- robots, resource mobilisation, setup of forward command centre, bring people to safety, etc.



Fourth line of defence

- deploy water cannons, water bombs, etc.



SILVANUS Integrated Fire Management Platform

SILVANUS

As of May 2024

Layers

- Fire Danger Index
- Smoke/Fire Detection
- Health Impact Assessment
- Evacuation Route Planning
- Social Media Fire Events
- Fire detection at the edge
- Unmanned Ground Vehicles
- Mobile App Fire Events
- Fire Spread Simulation

30 value

15 30 60 120

Firefight Resource Allocation

Priority Resource Allocation

Forest Map

Pins

Routes

Origin: area under risk, Destination...
6 days ago

Smoke/Fire Detection

1/1

Gargano

41.883739, 15.942746

25/06/2024 14:55

Information

Sensor Type: temperature, humidity, smoke gas, camera

Range: 5 meters

Fire Detection:

- contains fire: false
- fire score: 0.0071
- fire probability: none

Smoke Detection:

- contains smoke: false

SILVANUS users/stakeholders in integrated wildfire management



Civil Protection Authority



Forester/Researcher



Firefighter



Citizens


Key pilot demonstration outcome of 2023





PREVENT FOREST FIRES DIRECTLY FROM YOUR PHONE



 **SILVANUS**
Silvanus-Project.eu



The project has received funding from the European Union's Horizon 2020 research and innovation programme under Grant Agreement no. 101037247



SILVANUS INVITES YOU TO DOWNLOAD
THE CITIZEN ENGAGEMENT APP



For iOS



For Android





Slido Question 4

How can local and regional authorities help SILVANUS effectively engage citizens and communities to increase awareness and usage of the SILVANUS app and learn more about our project?





When fire prevention becomes a driving force for rural development



LIFE SORIA

ForestAdapt

Beatriz Oliver Pozo

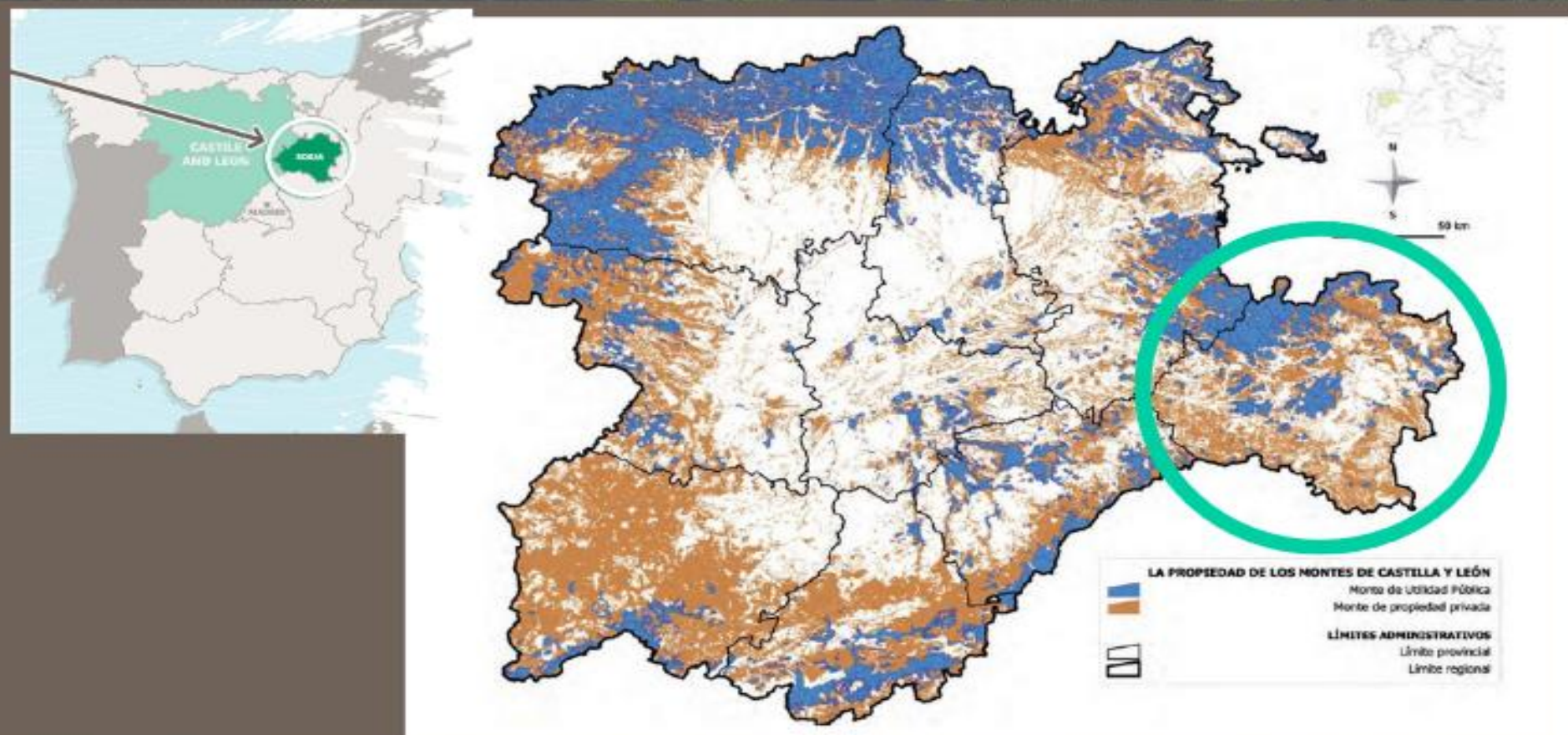
Fundación Global Nature, Spain

LIFE Soria ForestAdapt <https://www.soriaforestadapt.es/>

supported by **Amanda del Río** and **Vanessa Sánchez Ortega**

📍 LARGE AREA OF PRIVATE FOREST PROPERTY

About 2/3 of the wooded forest area is managed by the private owners.



THE FOREST AS A NATURAL SHIELD



📍 SUCCESS STORY IN FIRE PREVENTION

Europe's largest area of *Juniperus thurifera*



MODEL OF SOCIAL ENGAGEMENT

The sum of all the factors, social and economic, that make forest conservation possible reduces the risk of forest fires.

PLAN DE MEDIDAS PREVENTIVAS
CONTRA INCENDIOS FORESTALES
PLAN 42





Slido Question 5

Do you think rural depopulation has an impact on the number of forest fires (in your area)?





Q&A session

Moderated by **Claudia Berchtold**, FIRELOGUE

Supported by **Erlend Hansen**, MIP4Adapt, Ricardo.



Slido Question 6

What is your primary source of information for enhancing wildfire risk management?

(Please include link or short description if possible)





Feedback

Please share your thoughts on today's event:

**What did you find most interesting or valuable?
What areas could be improved for future events?**





Closing remarks

Georgios Boustras

Mission Board Member

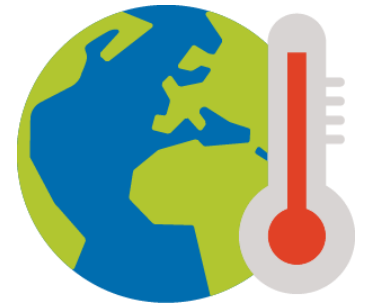


Closing remarks

- Recording, presentation and a summary report of the event will be shared on the online community site.
- Upcoming events

Thematic July Month: Temperature Rising

- Heatwave Chronicles: Strategies for Resilience in a Warming World, 10 July
- We are moving our Community and associated services from CIRCABC to [Futurium!](#)
- Registration to the online EU Mission Adaptation Community





EUROPEAN UNION



Thank you !

#EUmissions

#HorizonEU

#MissionClimateAdaptation

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