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Inspire Policy Making with Territorial Evidence

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ESPON Projects
Insights for the discussions

CAROLINA CANTERGIANI

TECNALIA TEAM:

- Carolina Cantergiani
- Daniel Navarro
- Efren Feliu

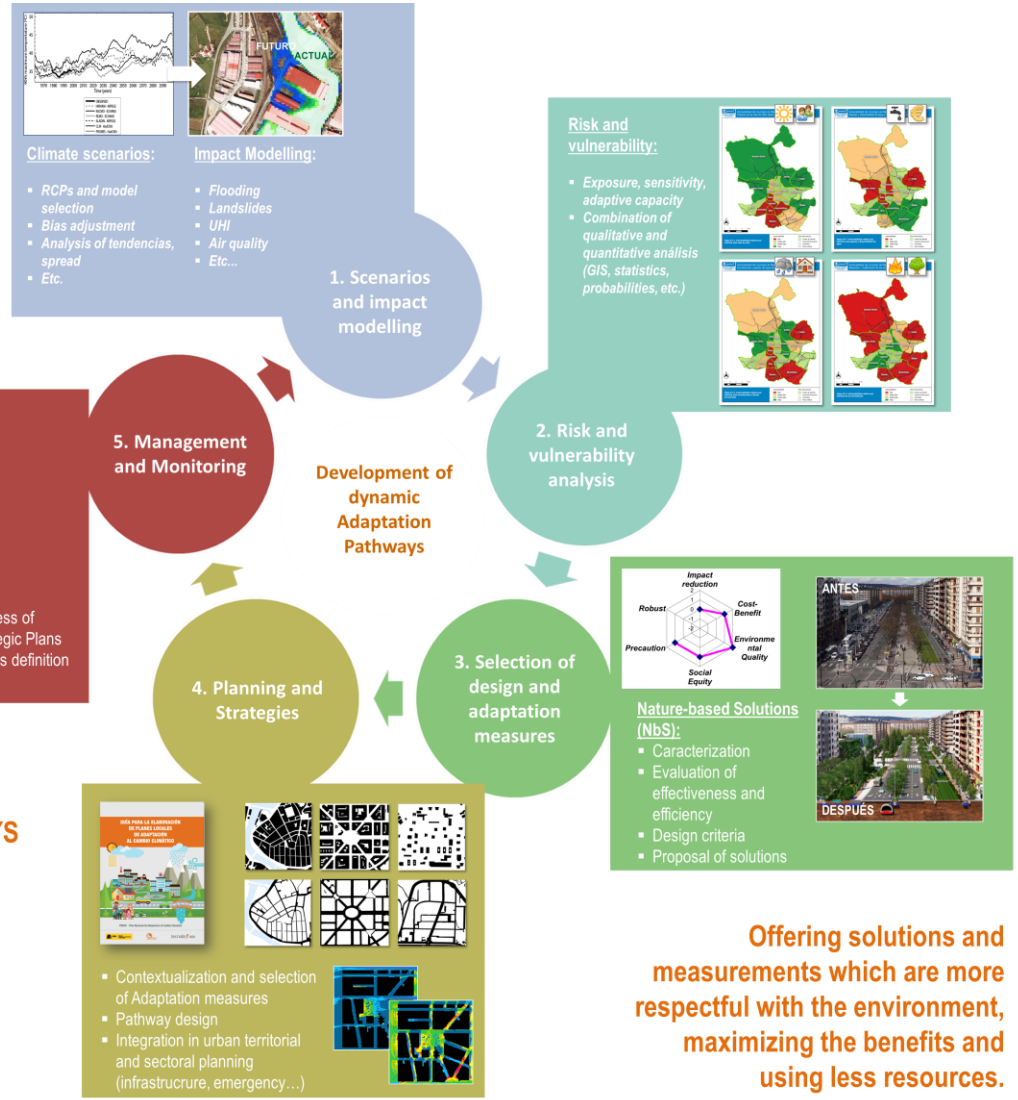
28/08/2024

Brief introduction

Operational units:

- Digital
- **Energy, Climate and Urban Transition**
- Industry and mobility
- Health
- Lab Services

CLIMATE CHANGE ADAPTATION PLATFORM



How? By designing ADAPTATION PATHWAYS to minimize risk and vulnerability towards climate change.

Offering solutions and measurements which are more respectful with the environment, maximizing the benefits and using less resources.

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EU Policy Context
Climate Change Adaptation

"**Climate change** is already **impacting Europeans' daily lives** and will continue to do so for the foreseeable future. Europe is expected to get warmer, some regions getting drier, while others wetter. These changes will not only **impact our health but also the ecosystems we depend on**. The EU is preparing to live with a changing climate through various **adaptation measures**." (EEA, 2024)

EU Adaptation Strategy

- **EU Adaptation Strategy**, adopted in February 2021
  - How the EU can adapt to the unavoidable impacts of climate change…

    … and become climate-resilient by 2050.

Smarter Adaptation
Faster Adaptation
Systemic Adaptation

- The EU Adaptation Strategy links directly to some important **global agreements:**
  - Paris Agreement
  - Sendai Framework for Disaster Risk Reduction
  - Sustainable Development Agenda

- It also connects directly to **major EU initiatives**:
  - Mission for a climate resilient Europe
  - Union's sustainable finance agenda

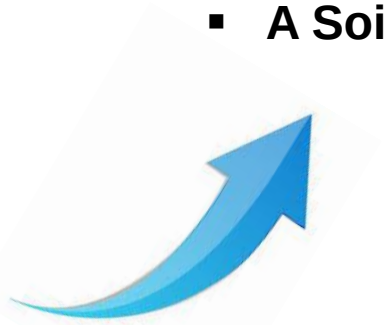
https://climate.ec.europa.eu/eu-action/adaptation-climate-change_en

EU Missions

- **EU Missions**, December 2019

- **Bring concrete solutions to some of our greatest challenges**.
- They have ambitious goals and will **deliver concrete results by 2030**.
- Deliver impact by **putting research and innovation into a new role**, combined with new forms of governance and collaboration, as well as by engaging citizens.

- **Adaptation to Climate Change**
- **Cancer**
- **Ocean and Waters**
- **Climate-Neutral and Smart Cities**
- **A Soil Deal for Europe**



Adaptation to Climate Change support at least 150 European regions and communities to become climate resilient by 2030

https://research-and-innovation.ec.europa.eu/funding/funding-opportunities/funding-programmes-and-open-calls/horizon-europe/eu-missions-horizon-europe_en

Increasing initiatives at EU Forum

- Key presence of Adaptation to Climate Change
  - WR&C, COP27, etc…
  - LIFE, Interreg, HEU calls, etc…
- Ongoing initiatives
  - EEA: CLIMATE-ADAPT
  - COPERNICUS: C3S
  - JRC: PESETA Report, Risk Data Hub
- All Member States are required to develop their National Adaptation Plan (NAP)

Relation with ESPON Projects

ESPON-HAZARDS

ESPON-CLIMATE

ESPON-GRETA

ESPON-TITAN

ESPON-CLIMATE UPDATE

ESPON-…

ESPON-READAPT (Re-Naturing Territorial Development for Climate Risk Adaptation)

GILL (Green Infrastructure at Local Level)

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ESPON-CLIMATE UPDATE 2022

UPDATE OF ESPON-CLIMATE (2011)

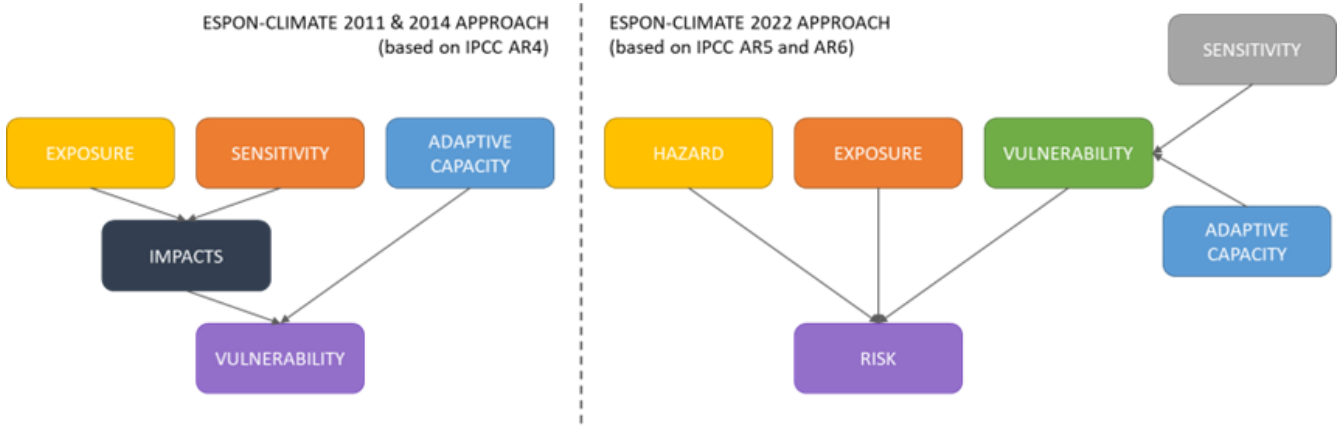
TECNALIA (Daniel Navarro, Joshua Lizundia, Carolina Cantergiani, Efren Feliu)

2022

ESPON CLIMATE Update 2022

- Coverage for ESPON countries (**EU27+5**) at regional level (**NUTS3**)
- **Methodology update** (from IPCC AR4>AR6)
- Different **climate scenarios** (baseline, RCP2.6, RCP4.5 and RCP8.5).

ESPON CLIMATE Update (2022)



Data update and alignment with other European initiatives:

Risk Data Hub (JRC DRKMC)
PESETA IV (JRC)
Copernicus Climate Data Store
EEA European Climate Data Explorer
Eurostat
Eurostat GISCO
EEA E-PRTR (European Environment Agency)
UNESCO
EIGE (European Institute for Gender Equality)

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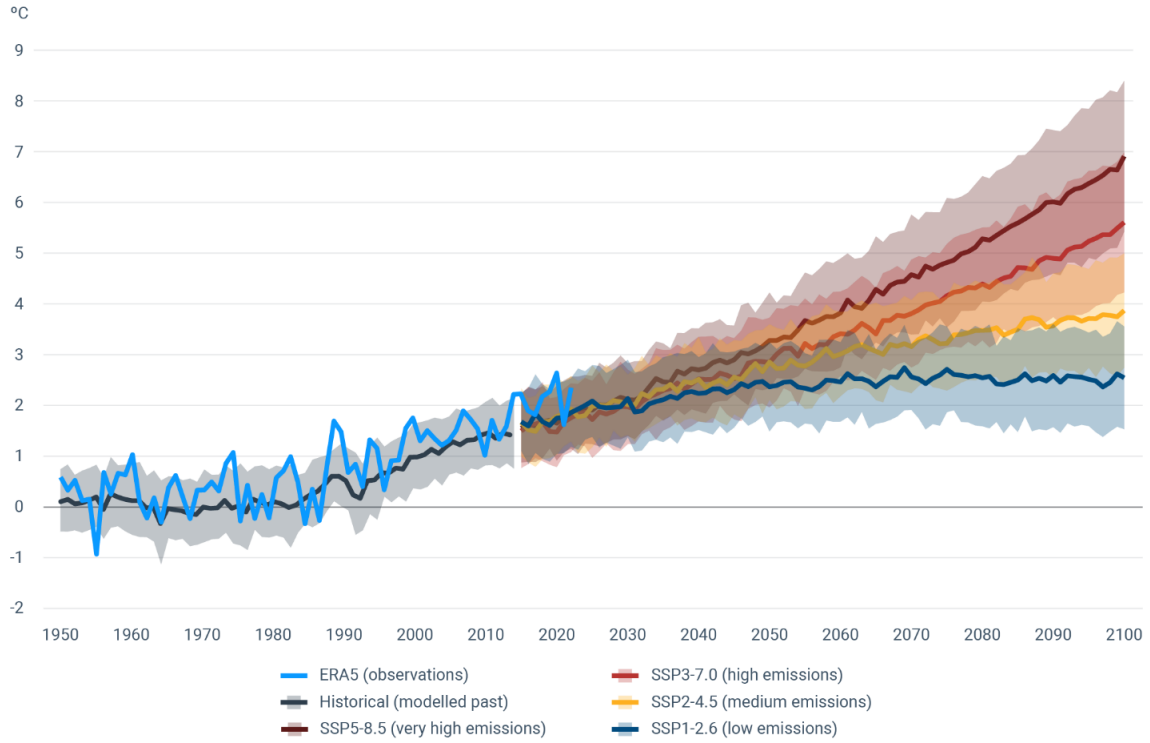
ESPON CLIMATE Update 2022

Results

7 impact chains + aggregated
Heat stress on population
Coastal flood on infrastructure, industry and service sectors
River flood on population
River flood on infrastructure, industry and service sectors
Flash floods on cultural sector
Wildfire on environment
Droughts on primary sector
Aggregated risk

8 Scenarios for each impact chain (abs & rel exp)
baseline climate (1981-2010)
low emissions (2070-2100 RCP2.6)
intermediate emissions (2070-2100 RCP4.5)
very high emissions (2070-2100 RCP8.5)



EUCRA, based on Copernicus Climate Change Service

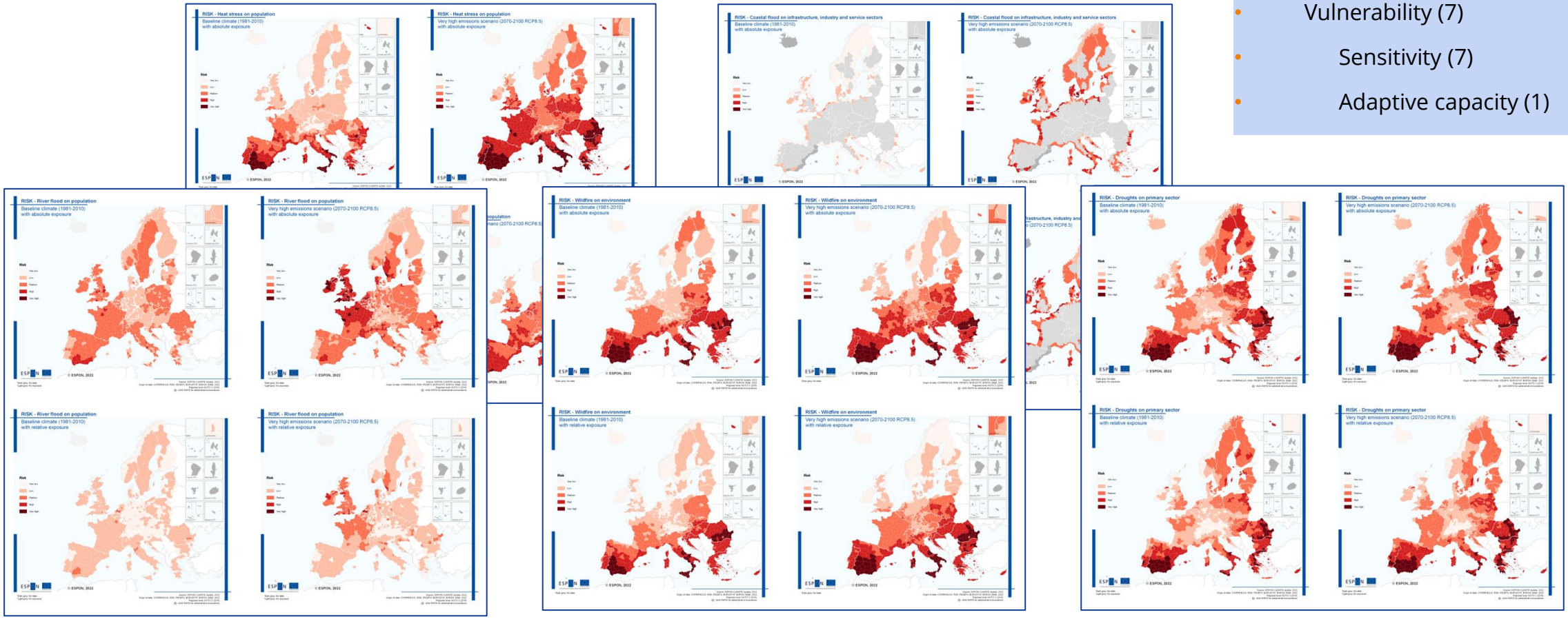
ESPON CLIMATE Update 2022

Results

Large amount of results

Total 121 map results at NUTS3

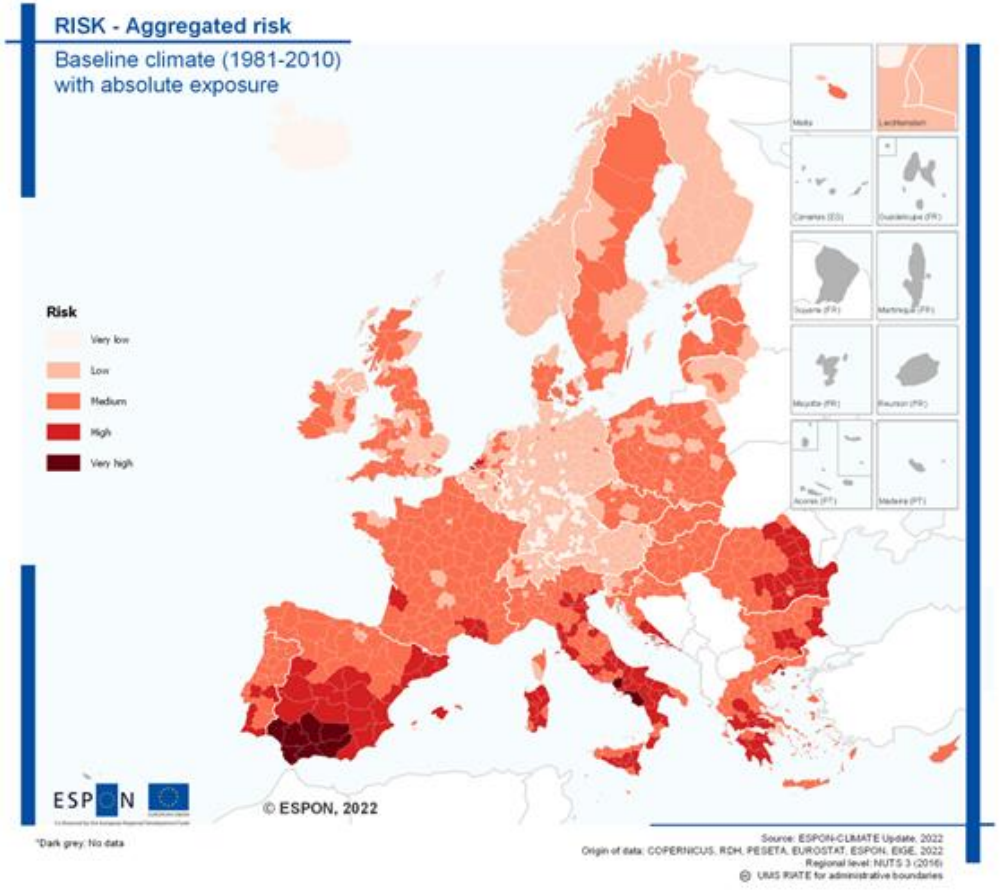
- Risk (64)
- Hazard (28)
- Exposure (14)
- Vulnerability (7)
- Sensitivity (7)
- Adaptive capacity (1)



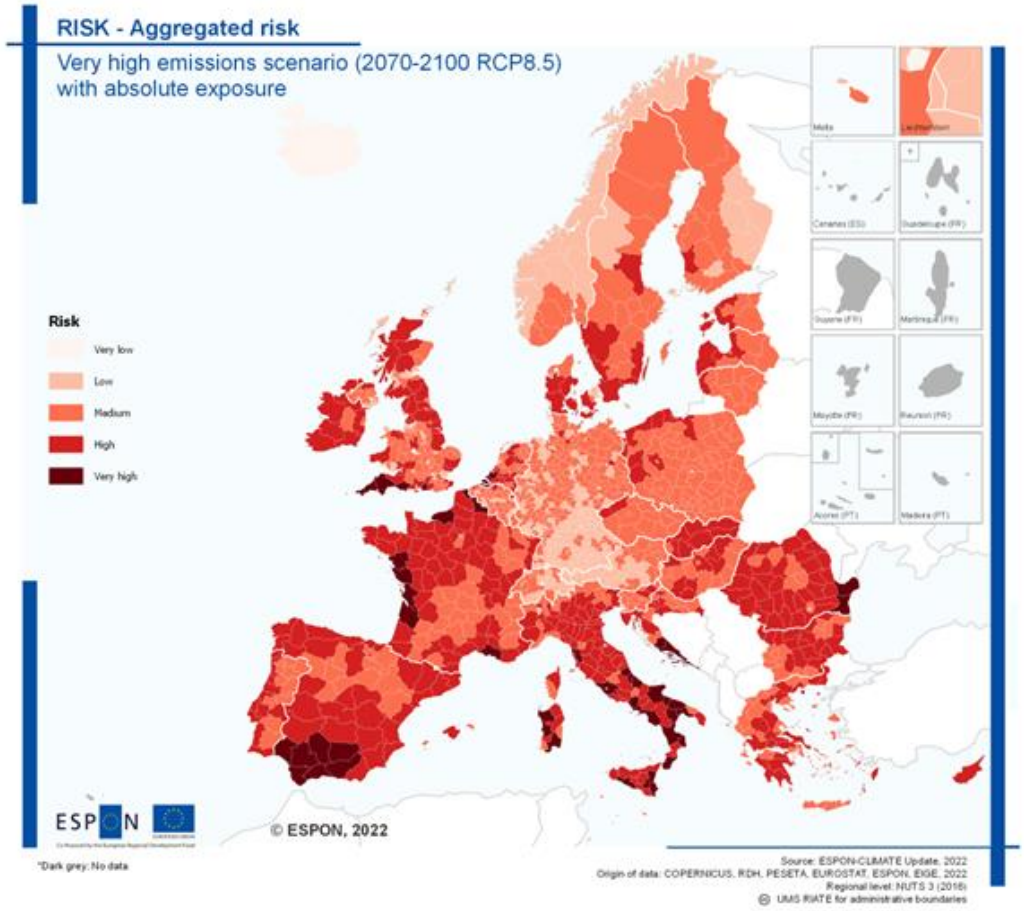
ESPON CLIMATE Update 2022

ESPON CLIMATE Update (2022) - Results

Aggregated risk – baseline scenario

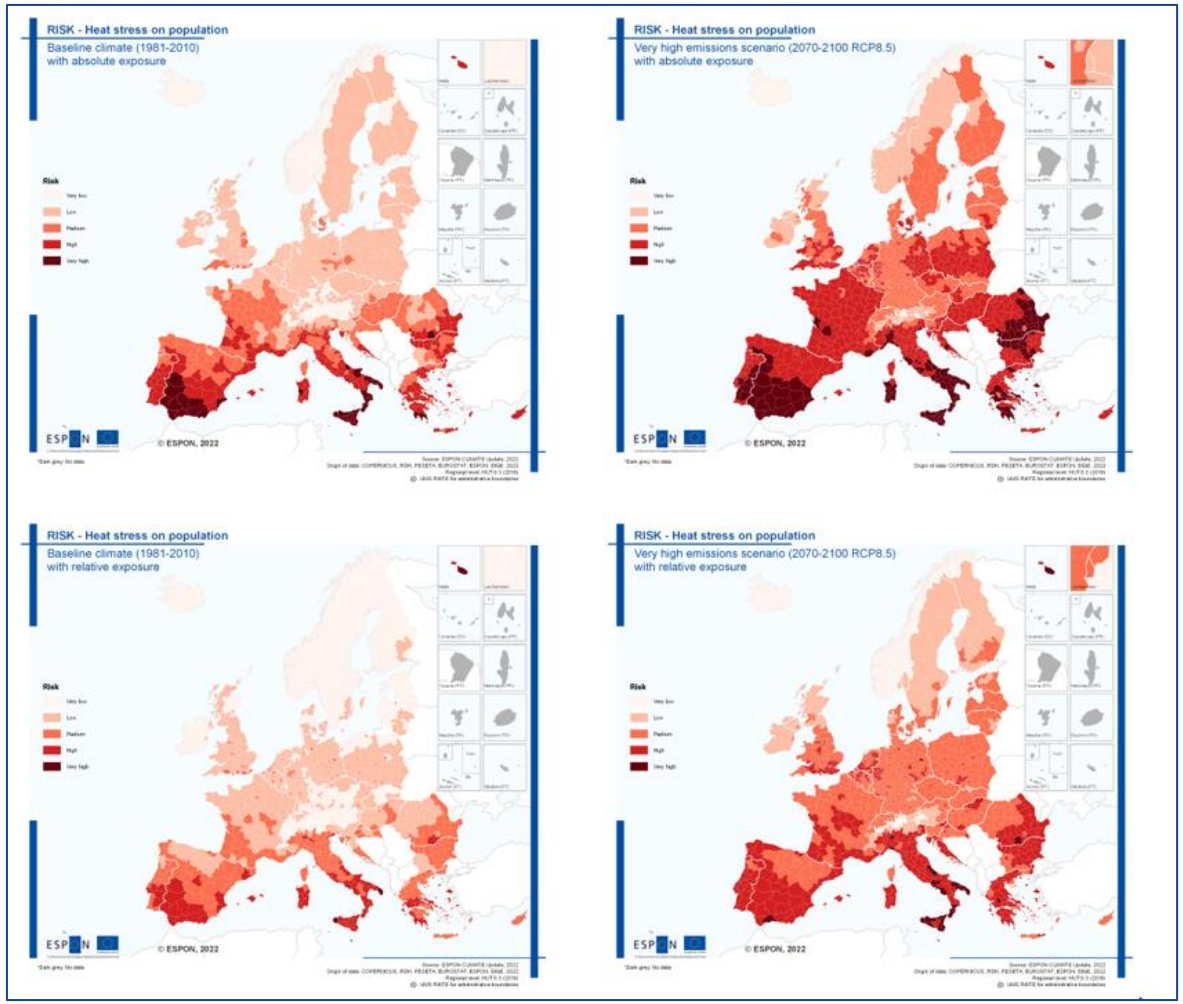


Aggregated risk – very high emissions scenario



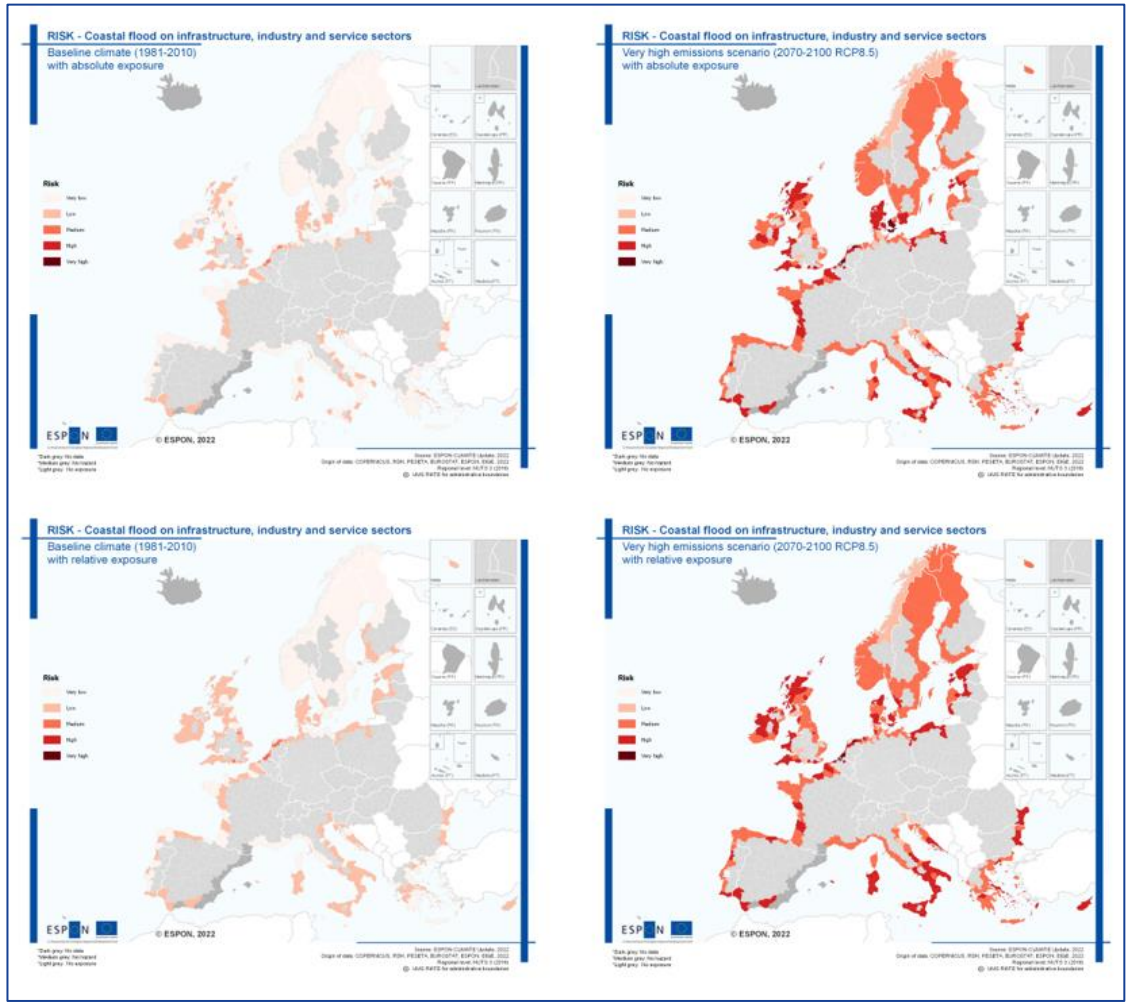
ESPON CLIMATE Update 2022

Results – Heat stress on population



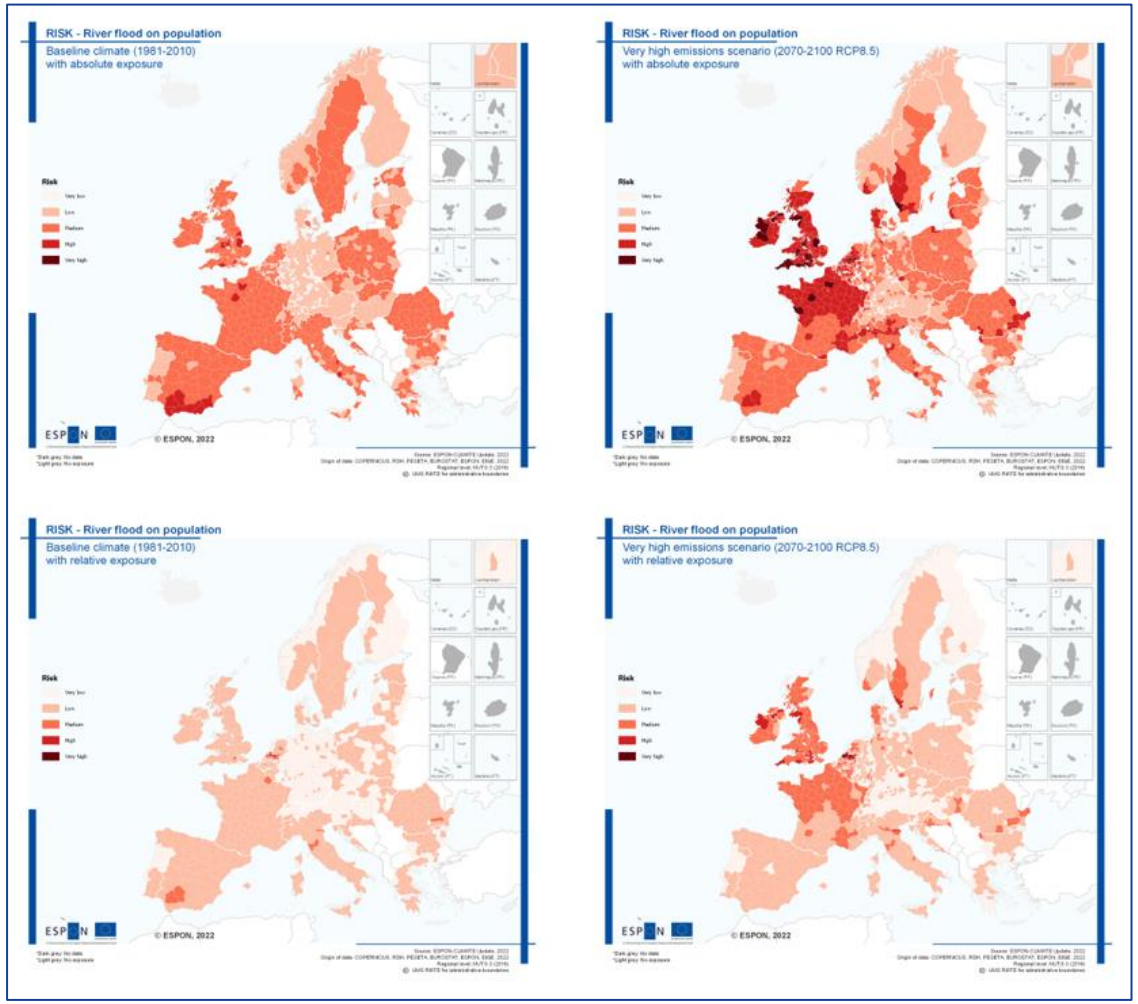
ESPON CLIMATE Update 2022

Results – Coastal flood on infrastructure



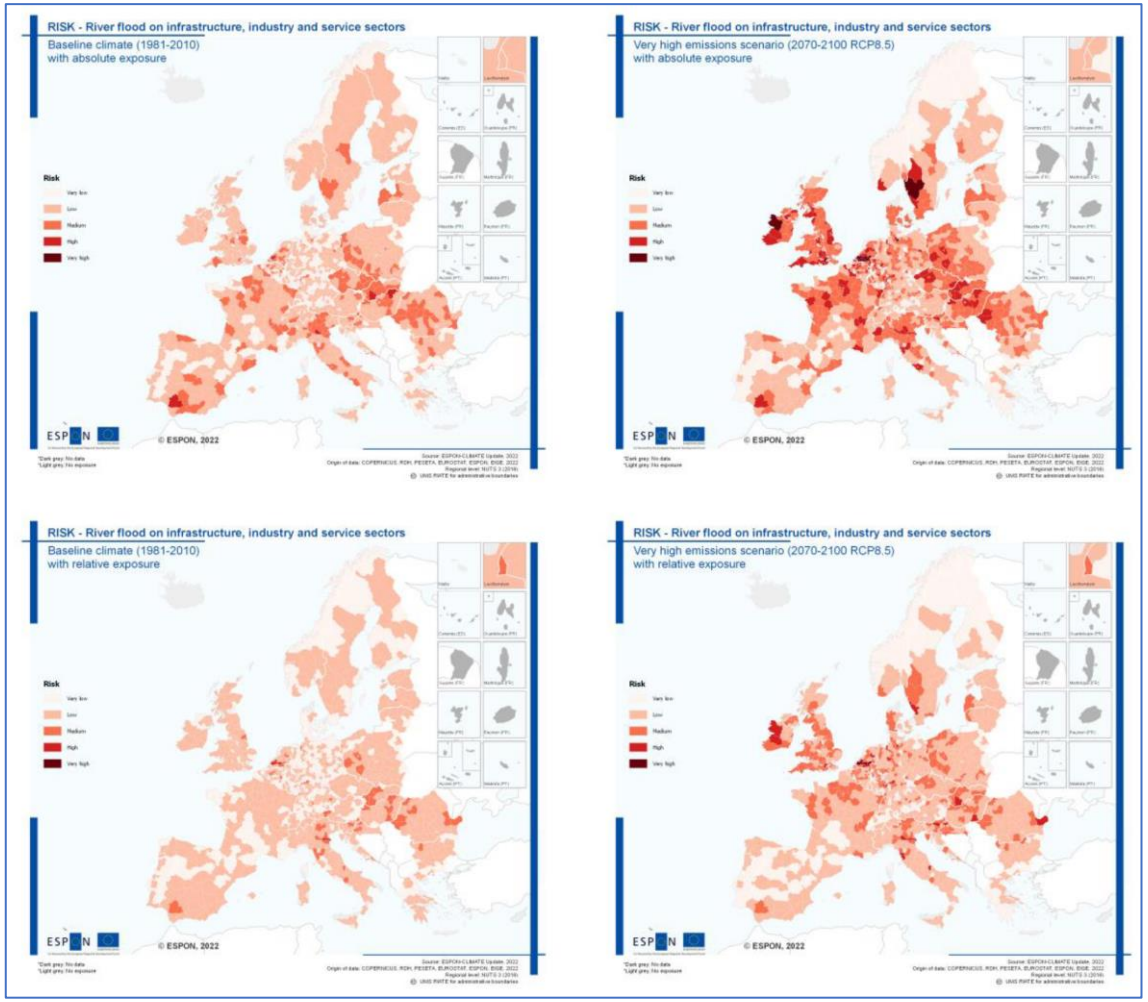
ESPON CLIMATE Update 2022

Results – River flood on population



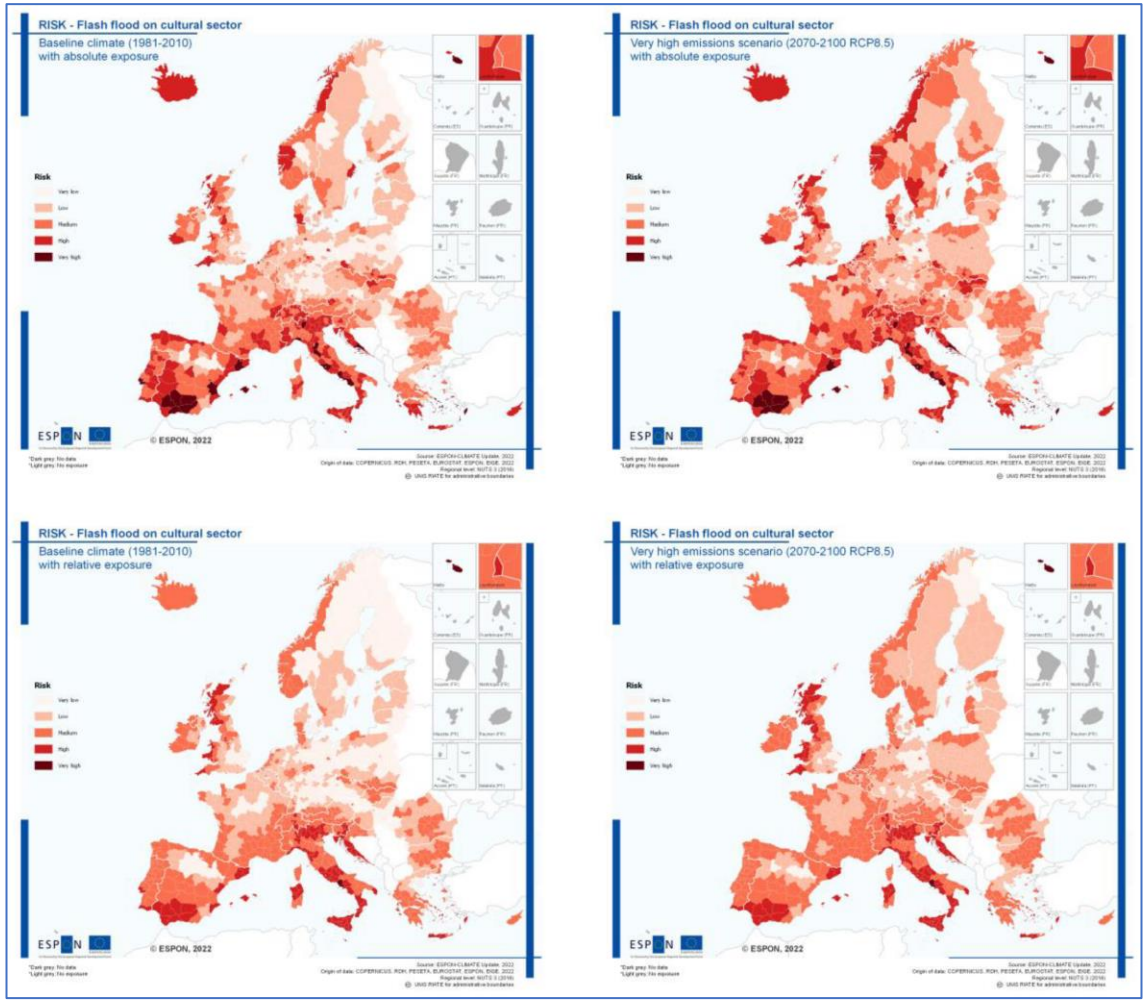
ESPON CLIMATE Update 2022

Results – River flood on infrastructure



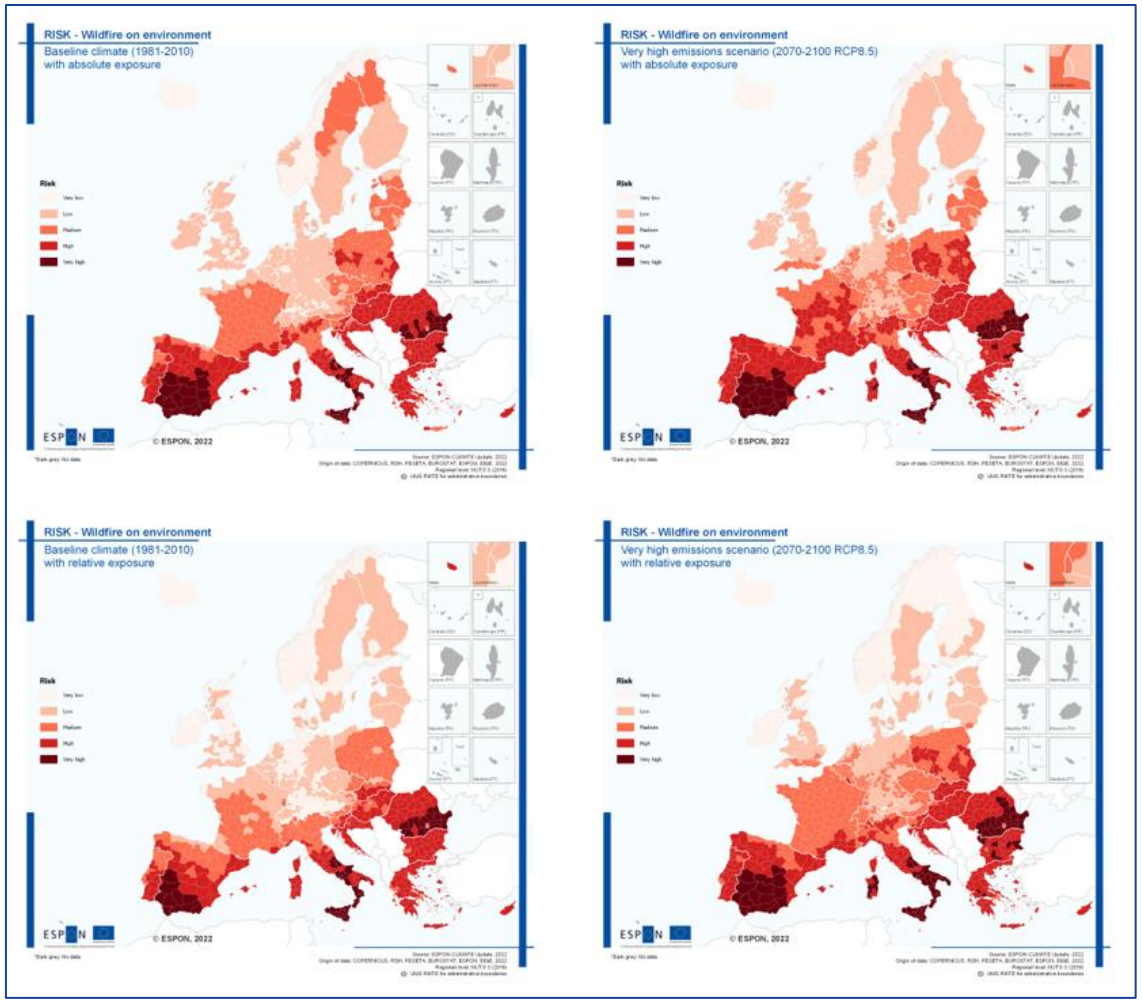
ESPON CLIMATE Update 2022

Results – Flash flood on cultural sector



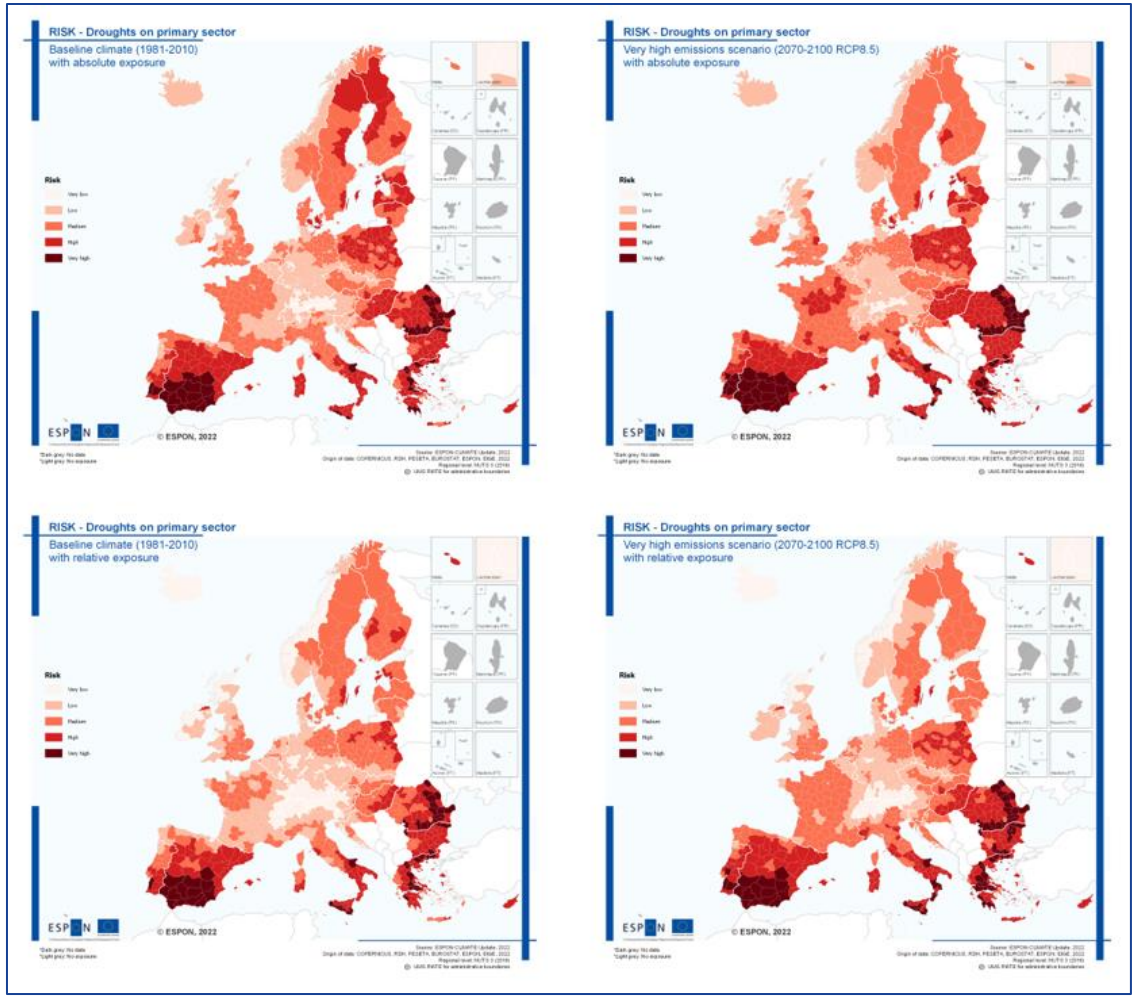
ESPON CLIMATE Update 2022

Results – Wildfire on environment



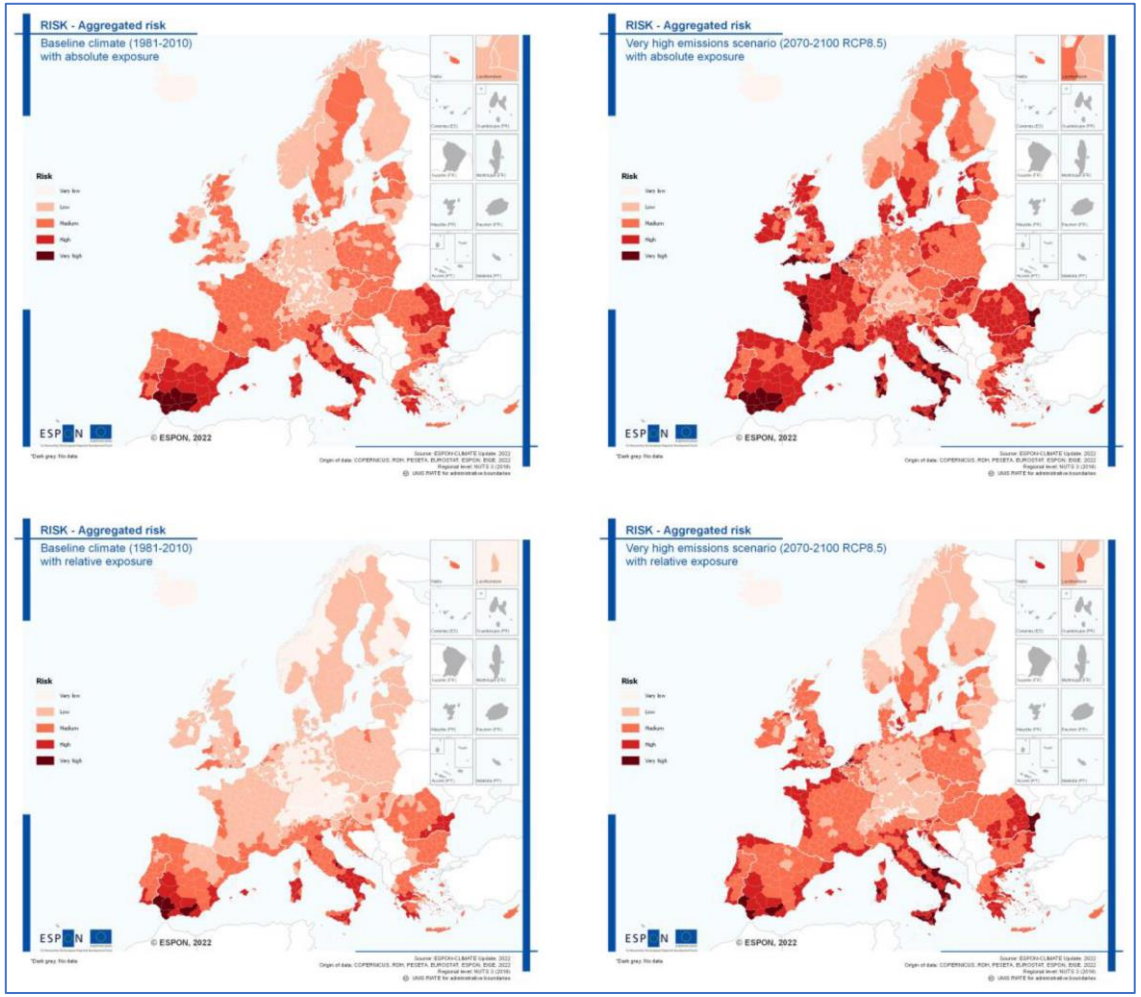
ESPON CLIMATE Update 2022

Results – Droughts on primary sector



ESPON CLIMATE Update 2022

Results – Aggregated risk



ESPON CLIMATE Update 2022

Assumptions and limitations

- **Methodological approach and data matter**
  - Conceptual differences (AR4 to AR5/AR6) / Align indicators-data sources – EU initiatives
- **Spatial and temporal scales matter**
  - More precise sources and proper indicators for analysis at finer scales / Some have a lower spatial resolution (NUTS2 or NUTS0)
- **General trends versus outliers**
  - General trend towards increasing risk from the baseline to very high emissions scenario. However, there are specific cases where the risk is expected to decrease.
- **Dealing with uncertainty: future risks Vs. current exposure and vulnerability**
  - Future scenarios consider the projection of hazard indicators based on climate models, but do not include the dynamic characterisation of exposure and vulnerability.

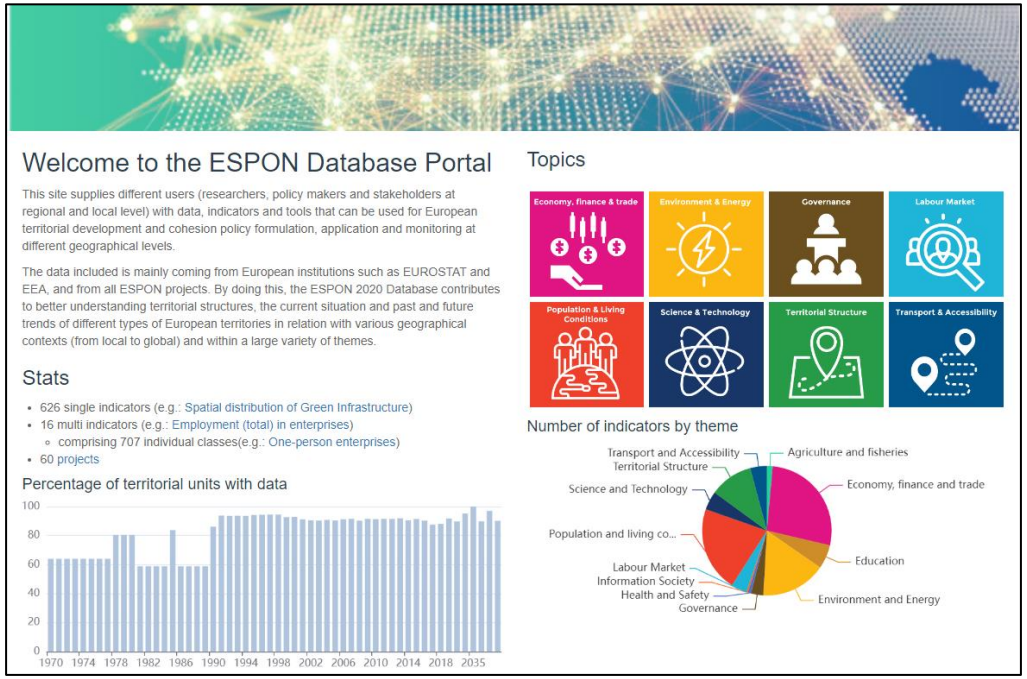
ESPON CLIMATE Update 2022

Further research and next steps

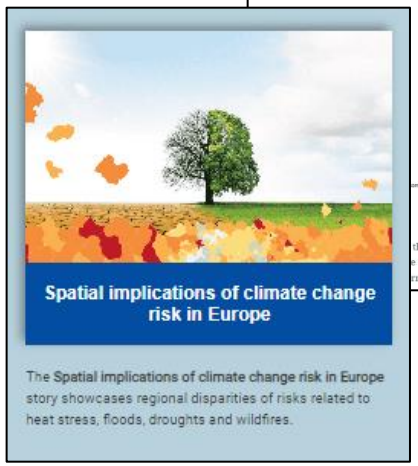
- **Improving data and overcoming data gaps**
- **Methodological refinement**
- Develop analysis related to **interdependencies and cascading effects**
- **Future exposure and vulnerability** against future climate
- **Sectoral detailed analysis**
- **Finer resolution zoom-in analysis and pilot cases**, including targeted-analysis and policy development
- **Improve visualization and data exploitation**

ESPON Programme's Knowledge Platform

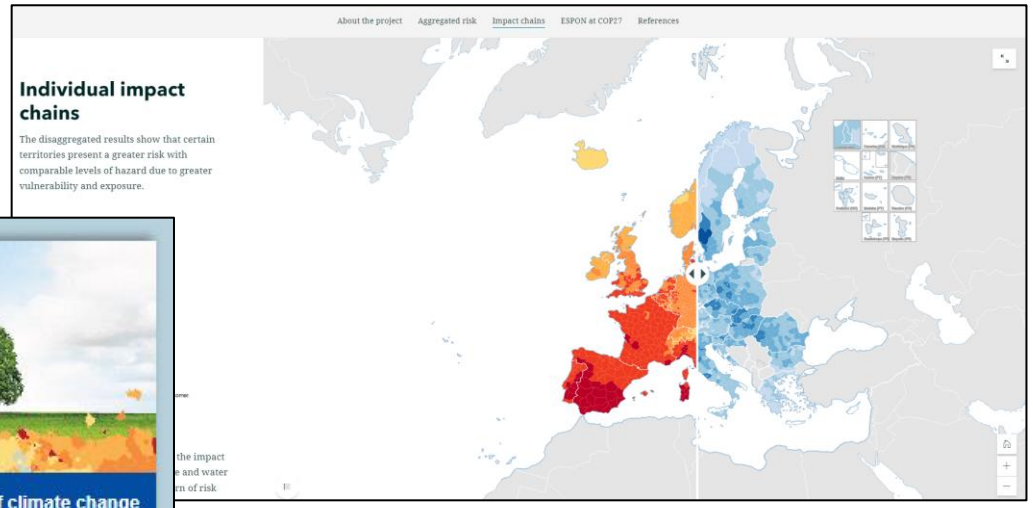
ESPON DATABASE and access to ESPON CLIMATE



ESPON Database



ESPON Climate



ESPON Climate Story Map

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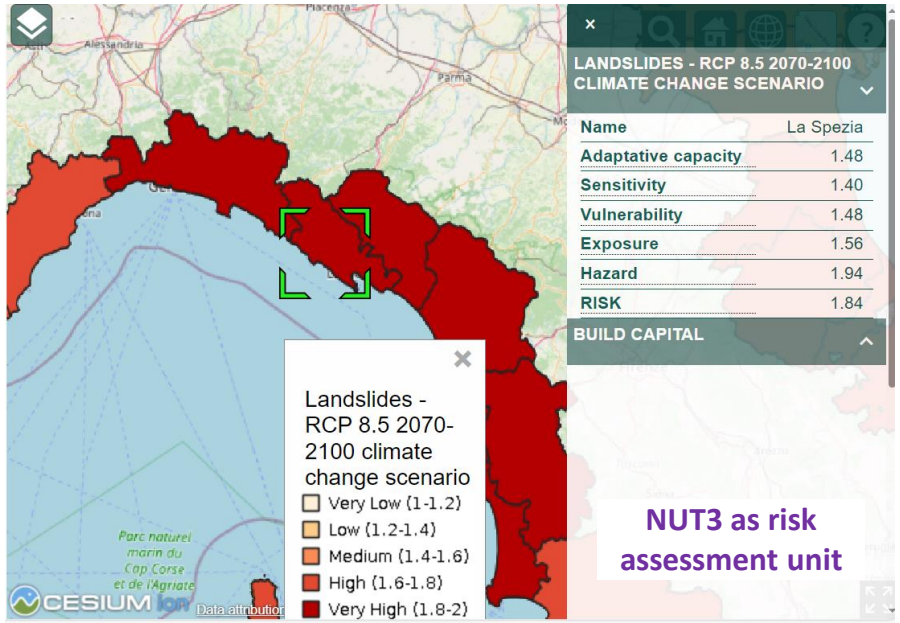
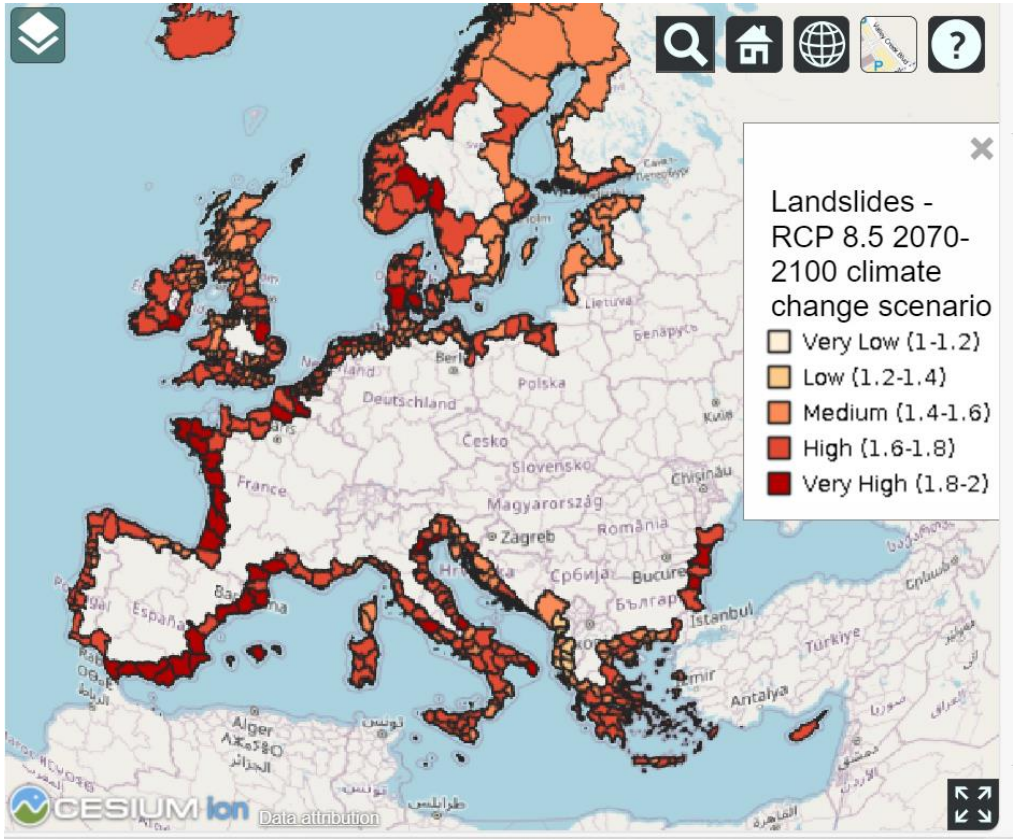
Potential Zoom-in (EU Level – NUTS3)

- **RESCUE ME Project (ongoing) - Landslides on coastal cultural landscapes**

Relative Risk Index (Period 2070-2100, Scenario RCP 8,5)



Outputs analogous to Task T1.2 *ATLAS of European coastal heritage landscapes typologies and climate change impacts*

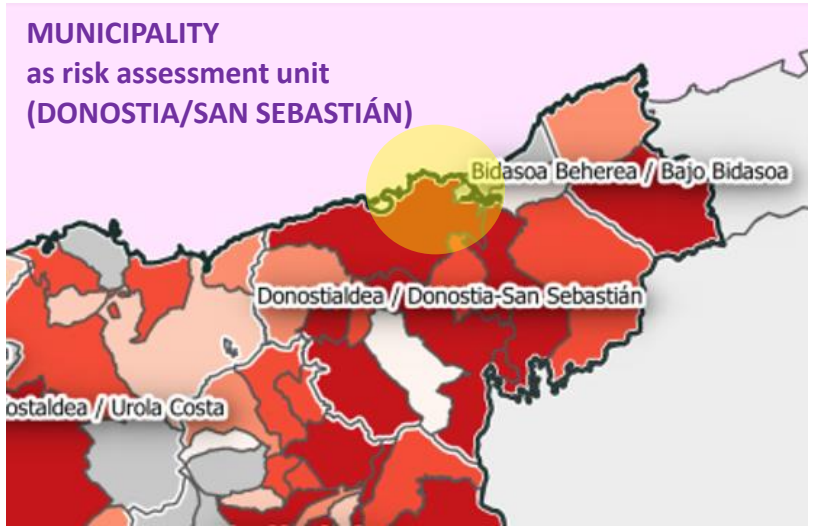


Potential Zoom-in (Regional Level)

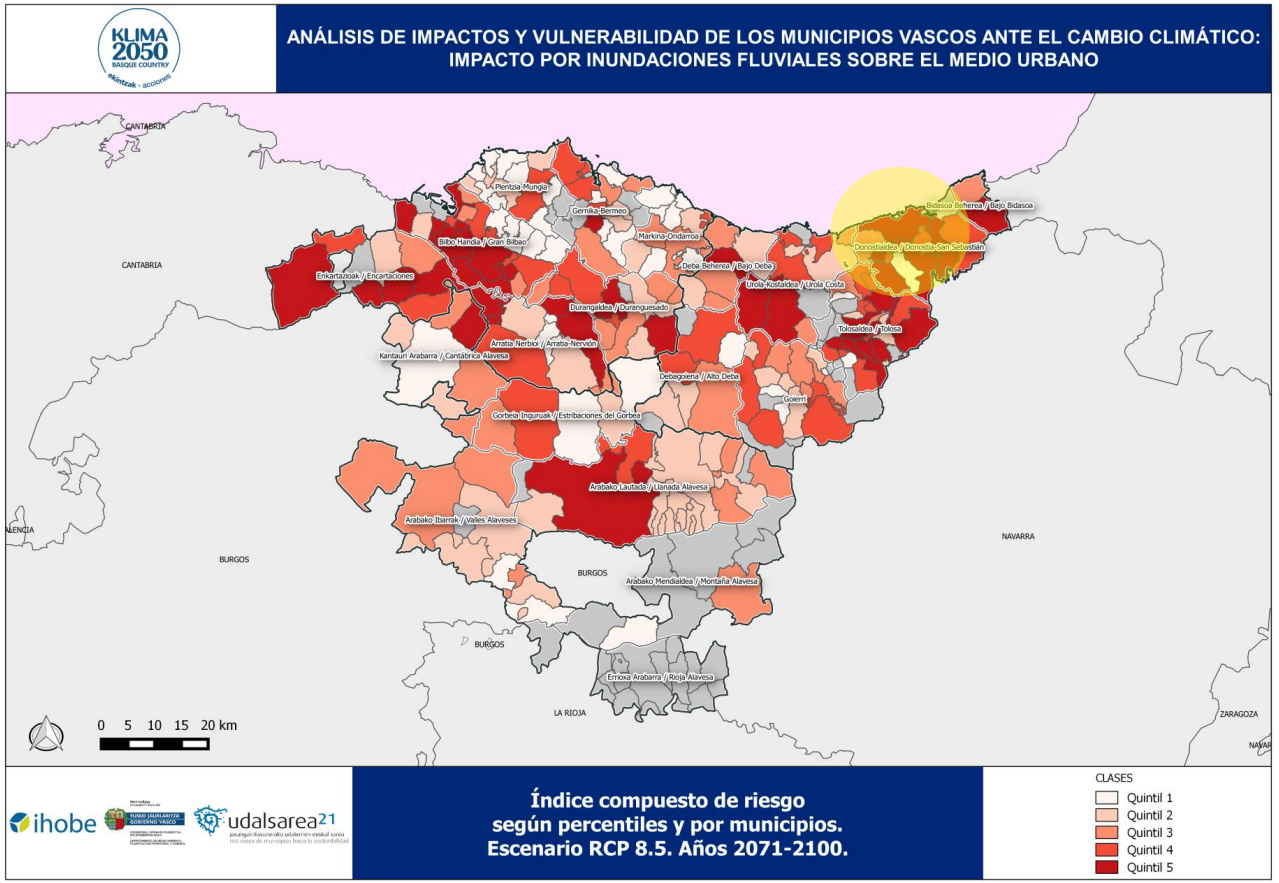
- **Basque Country – River Flooding on the Urban Environment**

Relative Risk Index

(Period 2070-2100, Scenario RCP 8,5)



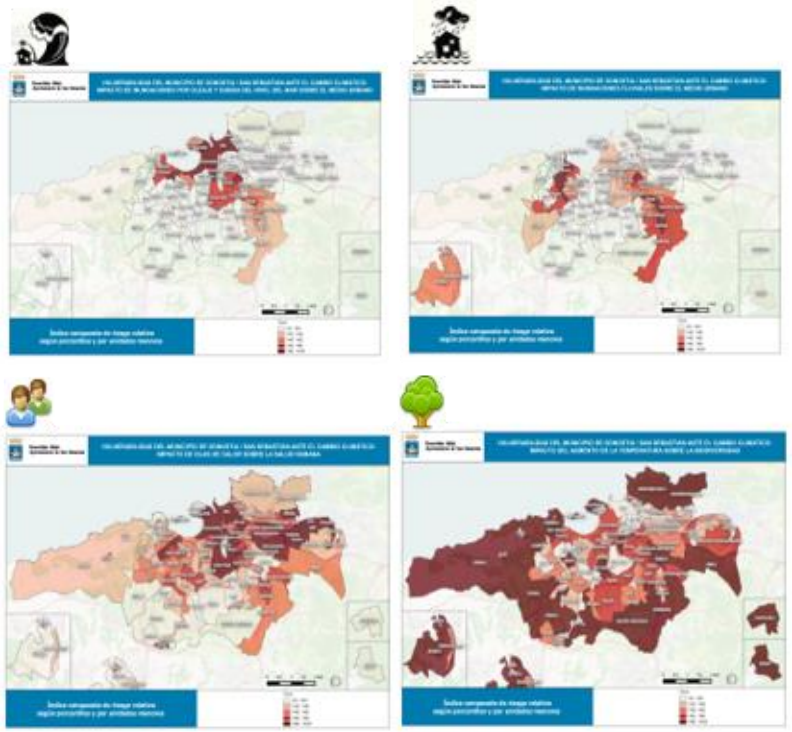
Granularity of risk assessment unit

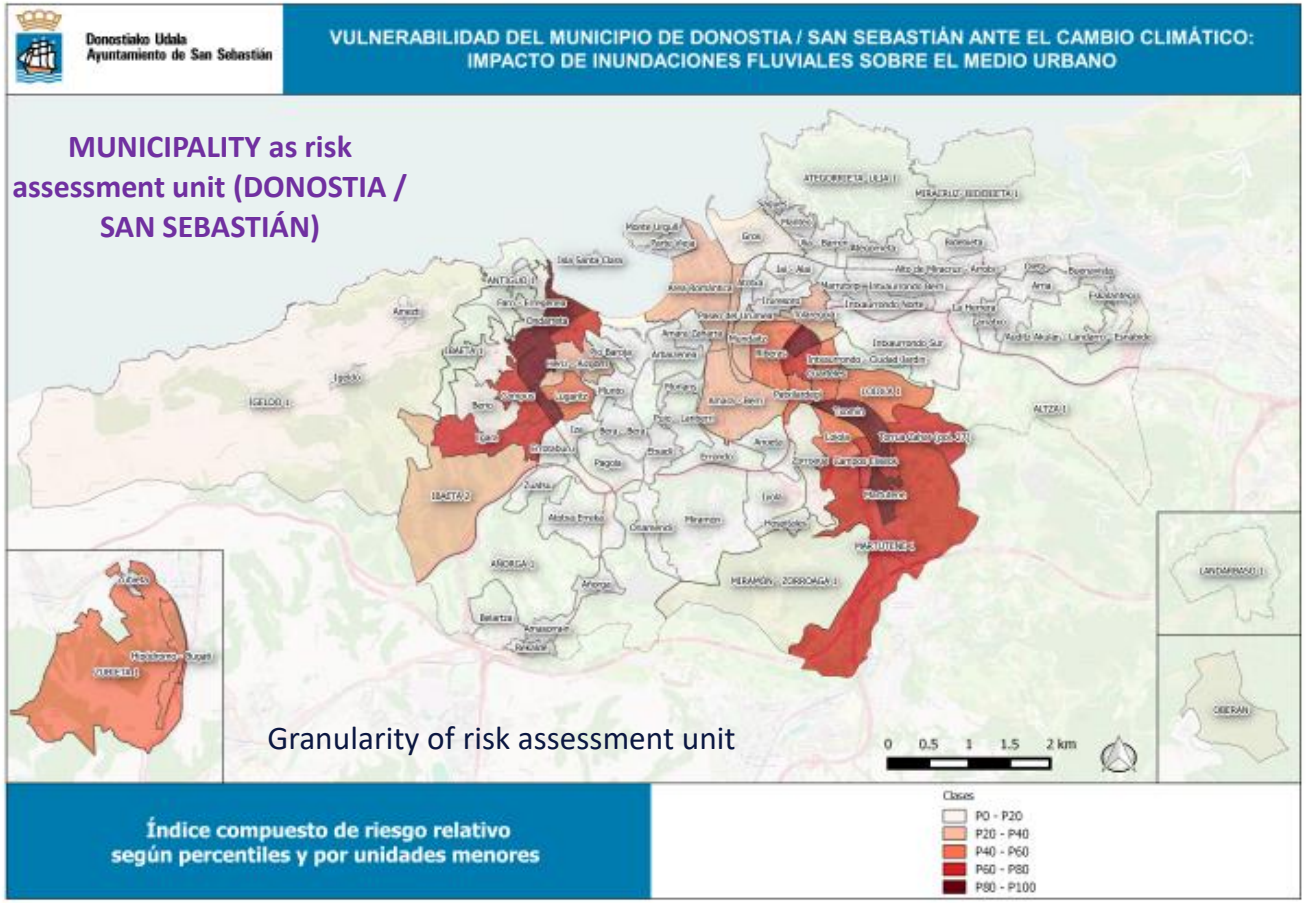


Potential Zoom-in (Local Level)

- **San Sebastian-Donosti, River Flooding on the Urban Environment**

Relative Risk Index (Period 2070-2100 Scenario RCP 8,5) - Present time





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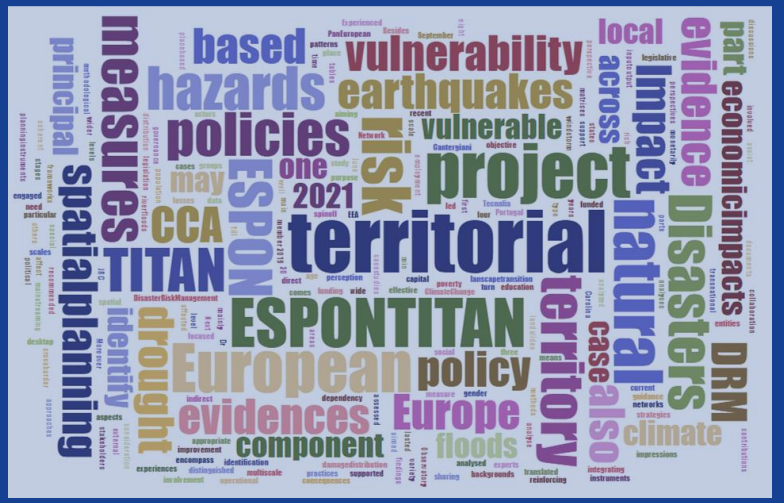


ESPON-TITAN
Territorial Impacts of Natural Disasters

APPLIED RESEARCH

TECNALIA (Carolina Cantergiani, Daniel Navarro, Gemma García, Efrén Feliu)

GTK (Johannes Klein, Marianne Valkama, Philipp Schmidt-Thomé, Vilja Kesäläinen, Michael Staudt)

TU-DORTMUND (Mark Fleischhauer, Stefan Greiving, Polina Mihal, Maren Blecking, Pauline Fehrmann, Lena Jorg)

TRINOMICS (Koen Rademaekers, Foivos Petsinaris, Lisa Korteweg, Olga Ivanova (independent expert), Louis Eklund)

CAMBRIDGE ECONOMETRICS (Boglárka Molnár, Dóra Fazekas, Jon Stenning)

2019/2021

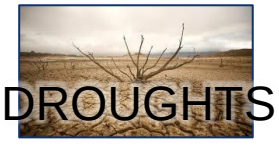
ESPON-TITAN

RIVER FLOODS

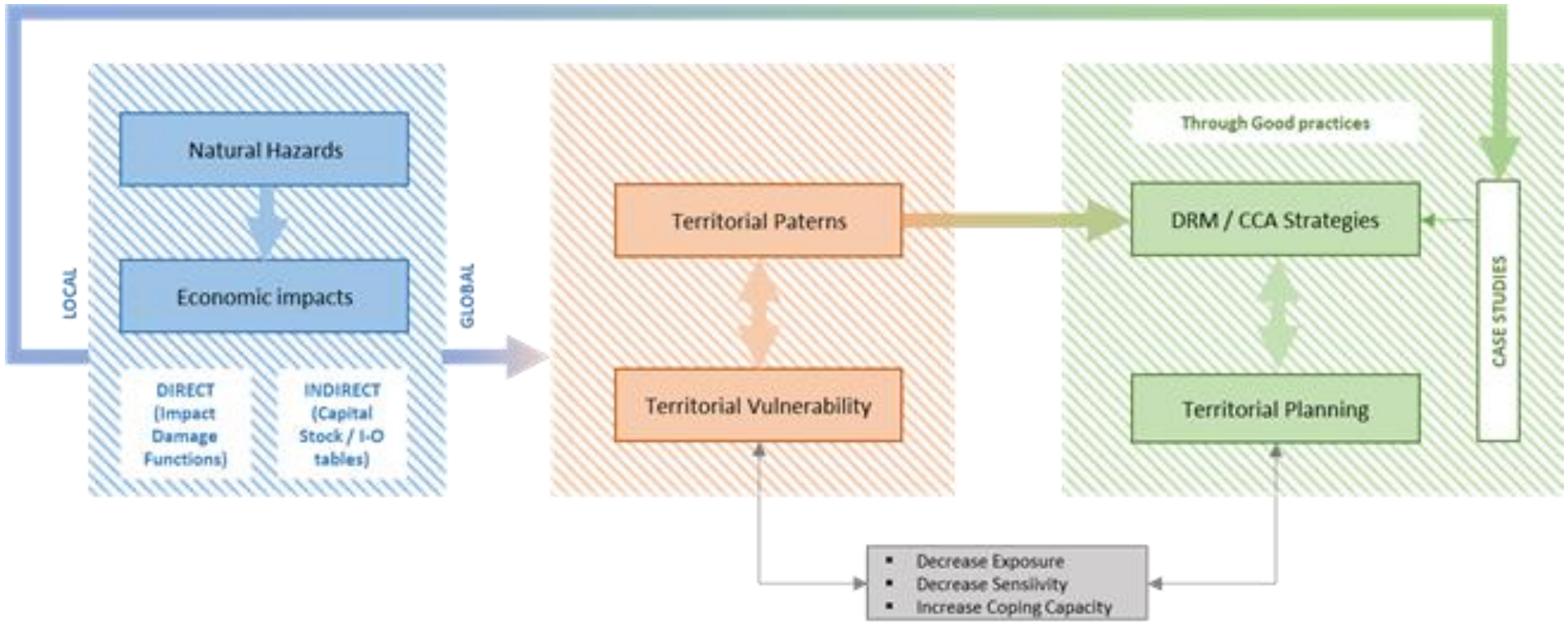
WINDSTORMS

EARTHQUAKES

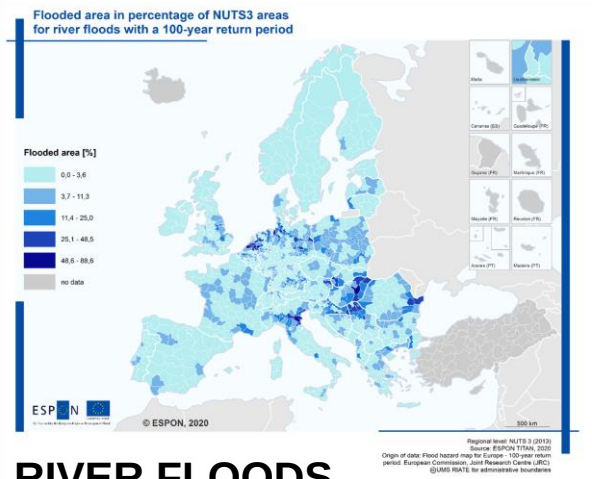
DROUGHTS



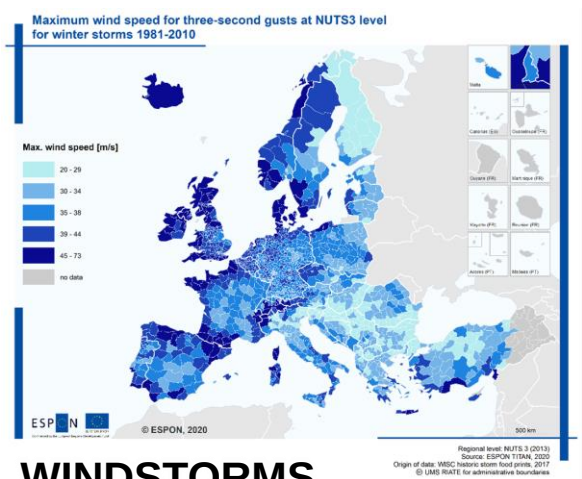
(LANDSLIDES)



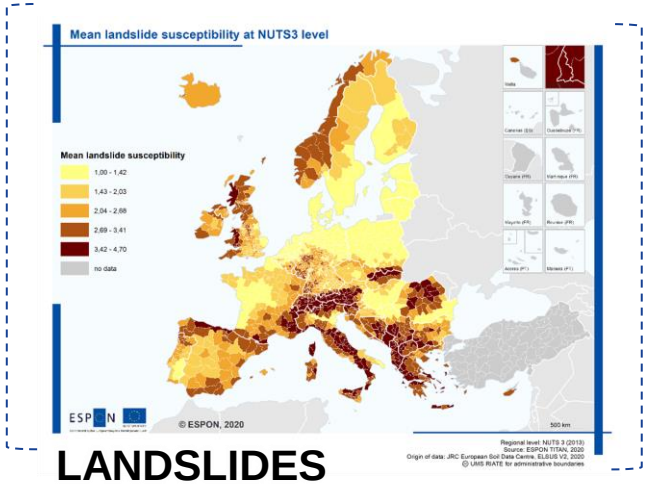
Natural Hazard Patterns



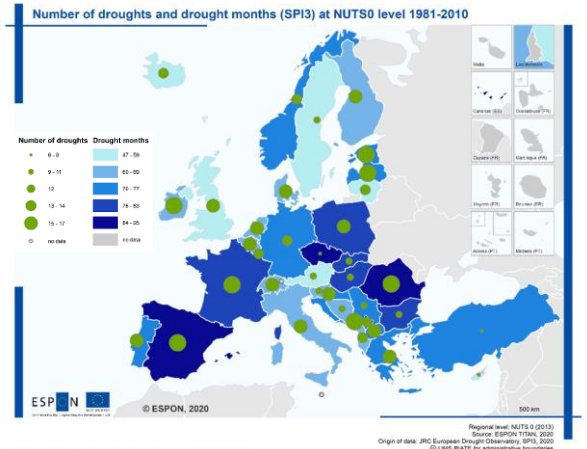
RIVER FLOODS



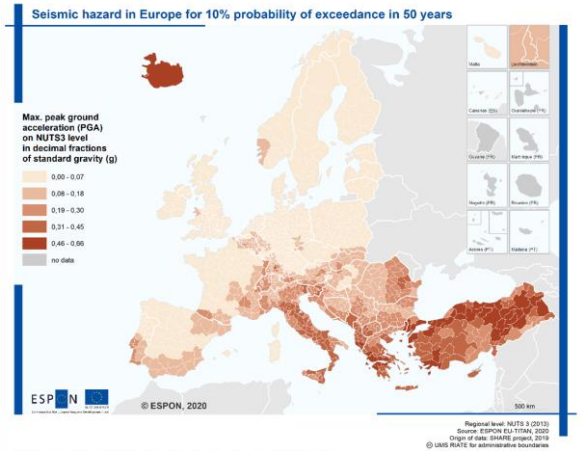
WINDSTORMS



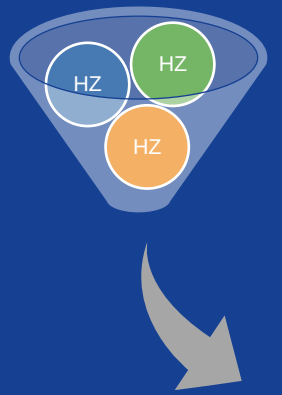
LANDSLIDES

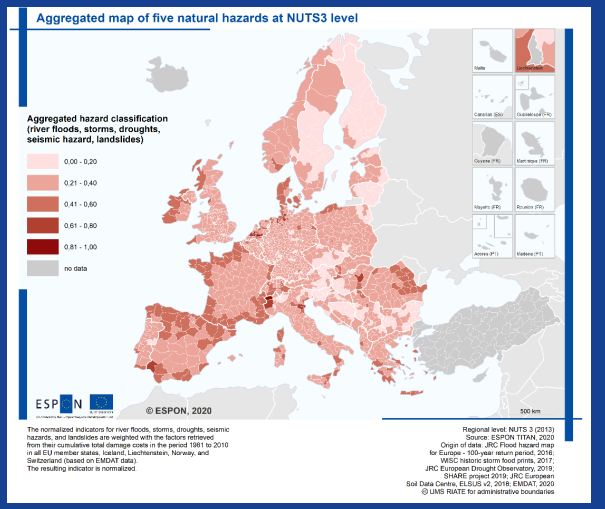


DROUGHTS



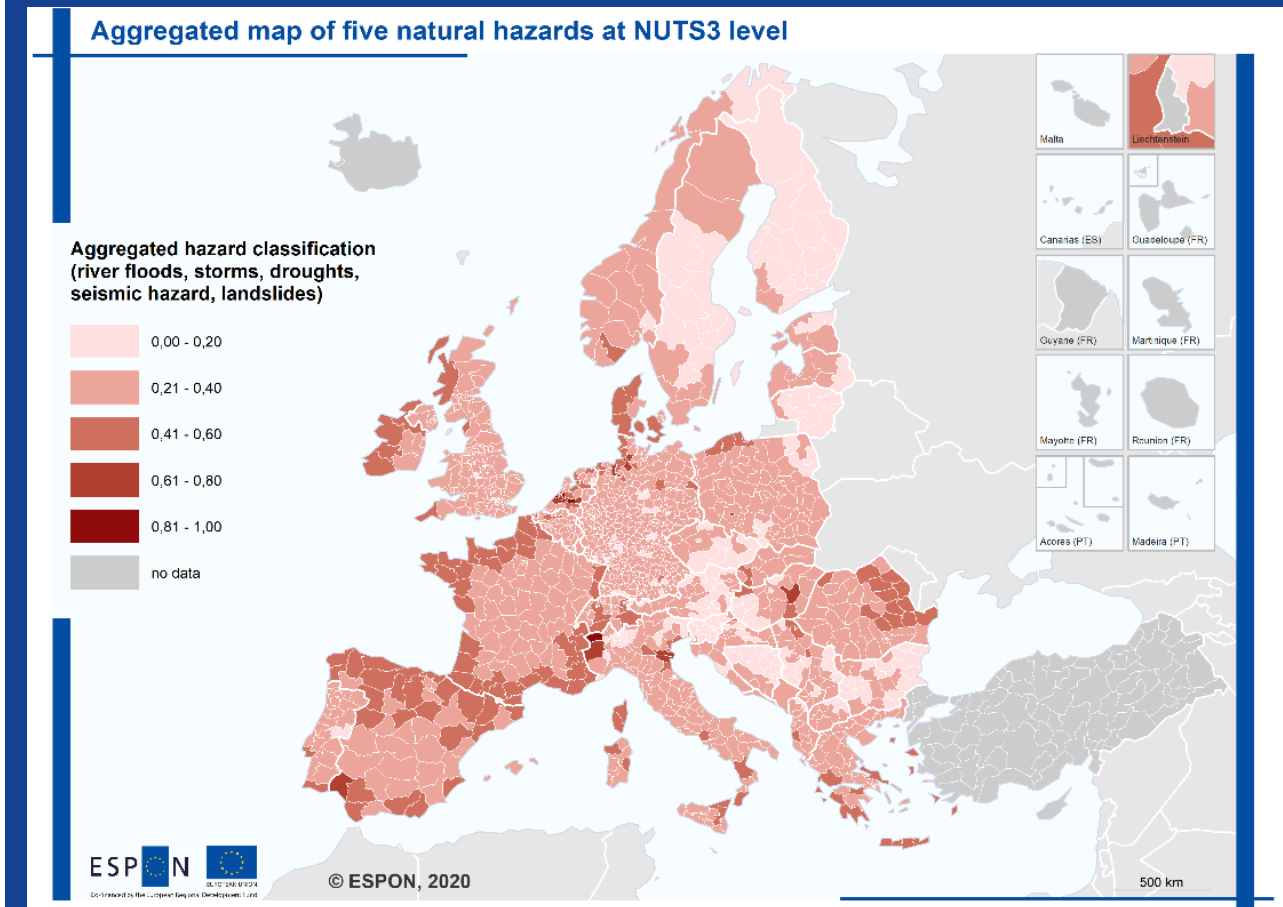
EARTHQUAKES





AGGREGATED HAZARDS

Natural Hazard Patterns, aggregated



The normalized indicators for river floods, storms, droughts, seismic hazards, and landslides are weighted with the factors retrieved from their cumulative total damage costs in the period 1981 to 2010 in all EU member states, Iceland, Liechtenstein, Norway, and Switzerland (based on EMDAT data).
The resulting indicator is normalized.

Regional level: NUTS 3 (2013)
Source: ESPON TITAN, 2020
Origin of data: JRC Flood hazard map for Europe - 100-year return period, 2016; WISC historic storm food prints, 2017; JRC European Drought Observatory, 2019; SHARE project 2019; JRC European Soil Data Centre, ELSUS v2, 2018; EMDAT, 2020
© UMS RIATE for administrative boundaries

consideration

- The relative weight of each chosen natural hazard was calculated by using the cumulative damage costs from Emergency Events Database (EM-DAT) + normalized

Hazard	Cumulative total damage costs 1981-2010 (in 2015 thousand of Euros)	Relative weight (%)
Winter storm	73.010.360	38,8
River flood	69.855.236	37,1
Drought	23.928.282	12,7
Earthquake	21.154.277	11,2
Landslide	262.597	0,1
Total	188.210.752	100,0

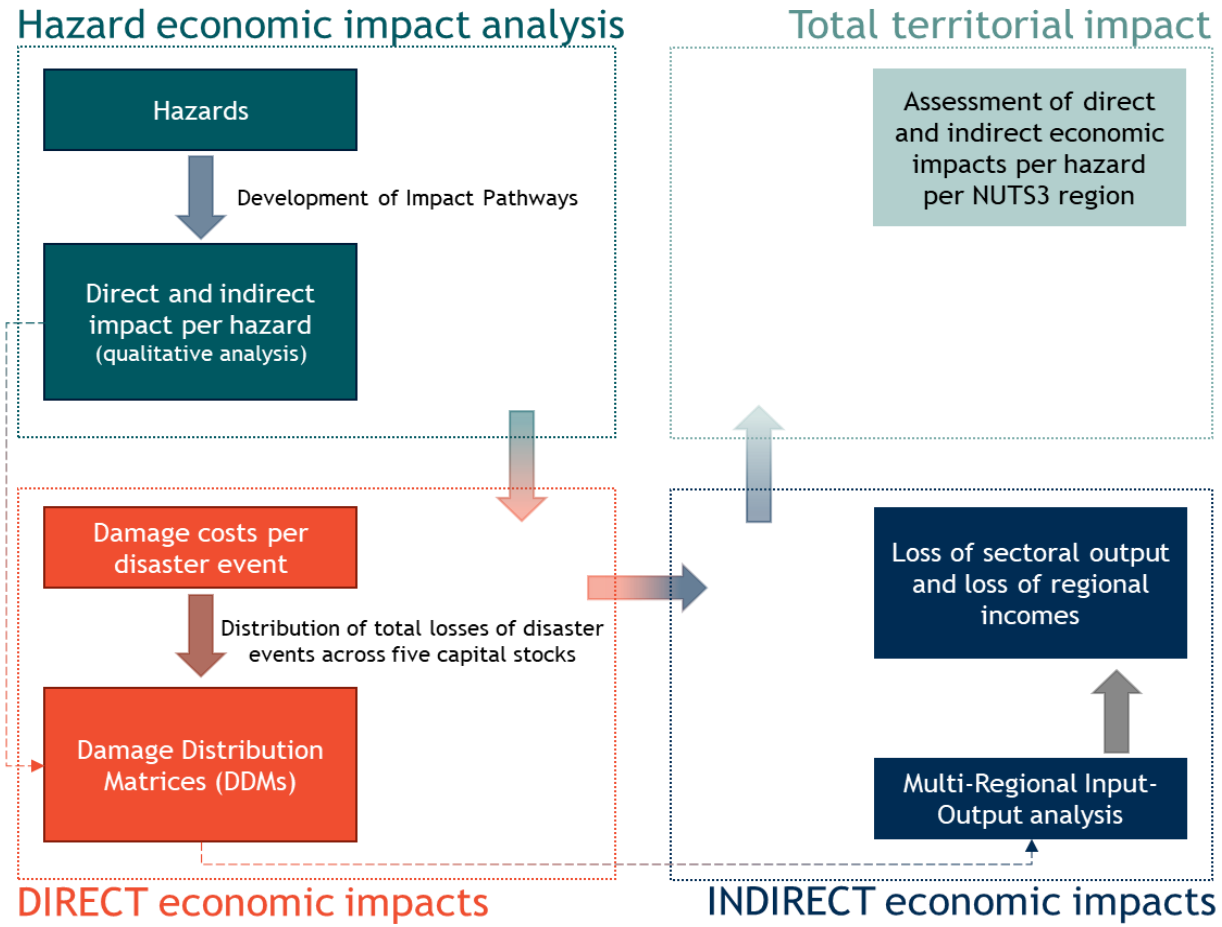
observation

- The aggregated hazard map does not respect any flood protection measures, some areas have a high aggregated hazard potential, meanwhile the effective risk is neglected.
- The drought potential is displayed on NUTS0, which partially leads to strong contrasts at national borders.
- It must be further considered that the weighting of the aggregation displays only economic damages, and not human fatalities or damages that cannot be expressed in monetary values.

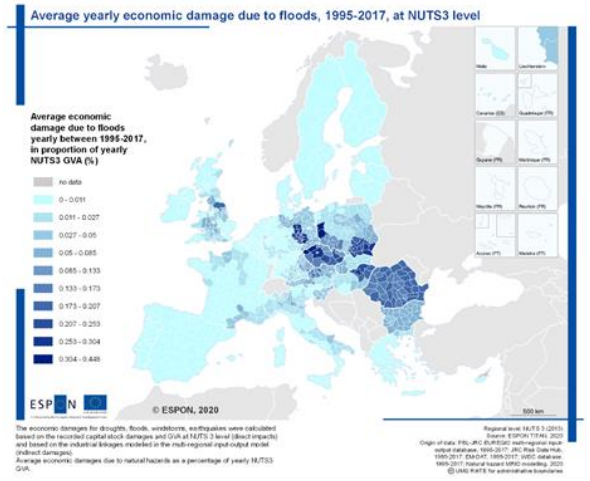
Economic Impacts Analysis, global

- Total economic impacts:
  - Direct (induced by direct damage to capital stock)
  - Indirect (induced by disruption of economic activities in other, linked regions)
- Global methodology (EU)
- Local methodology (FR, CZ)
- Publicly available sources (JRC Risk data hub, EM-DAT, WISC database…)

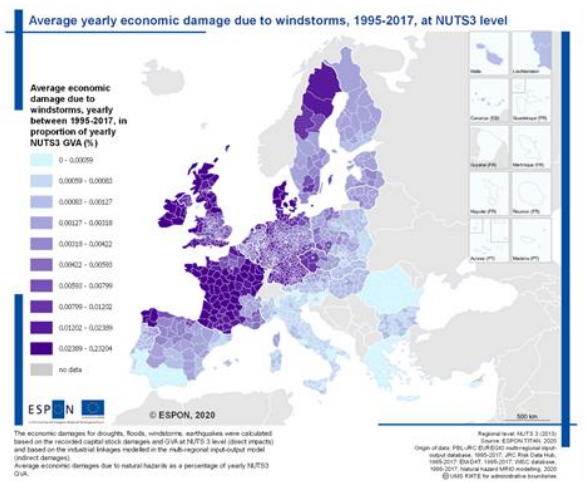
The direct and indirect economic impacts of the investigated hazards is provided by NUTS3 region by capital stock type



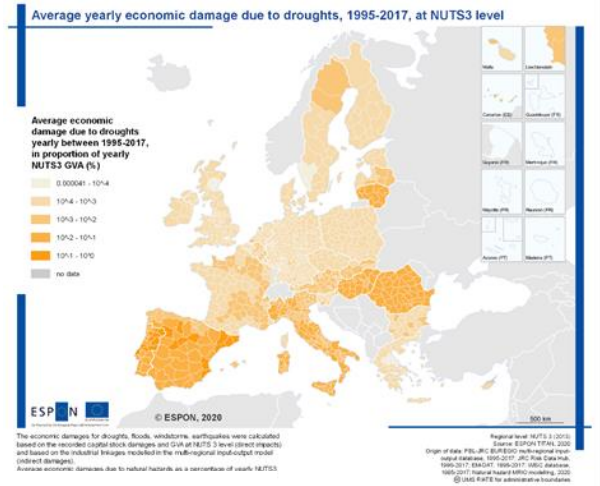
Economic Impacts Analysis, global



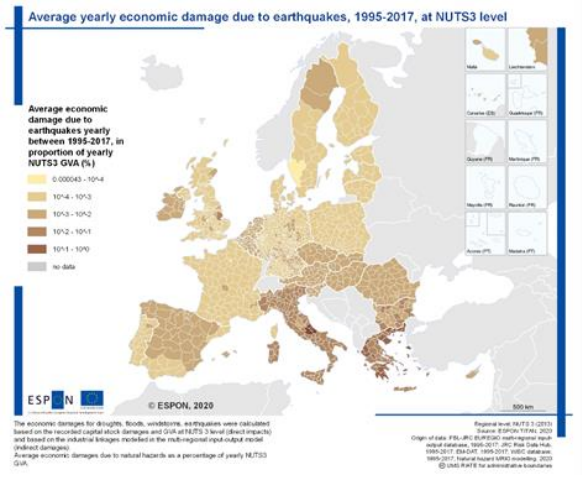
RIVER FLOODS



WINDSTORMS

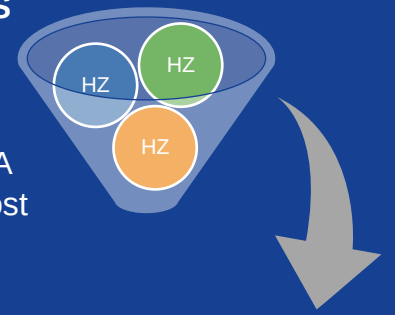


DROUGHTS

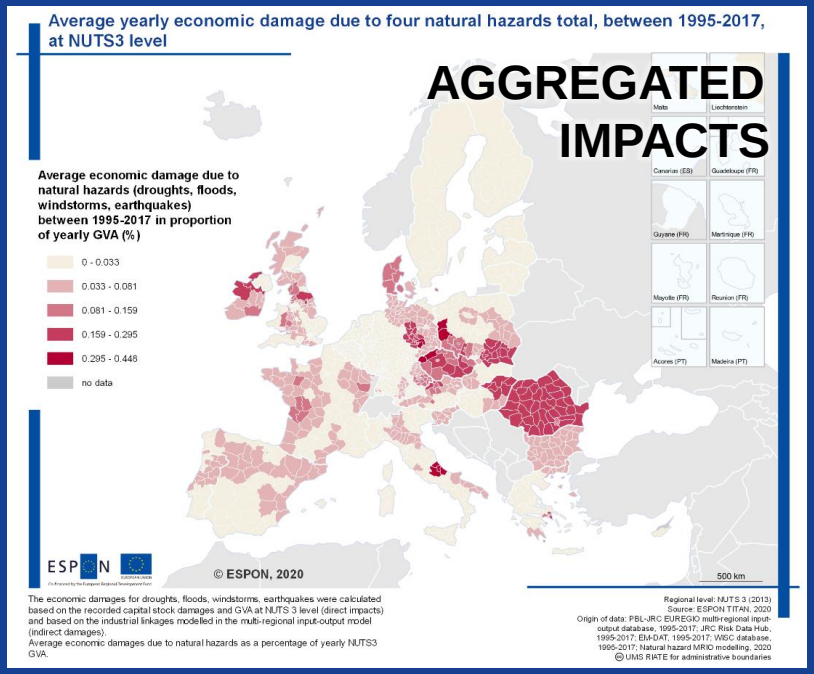


EARTHQUAKES

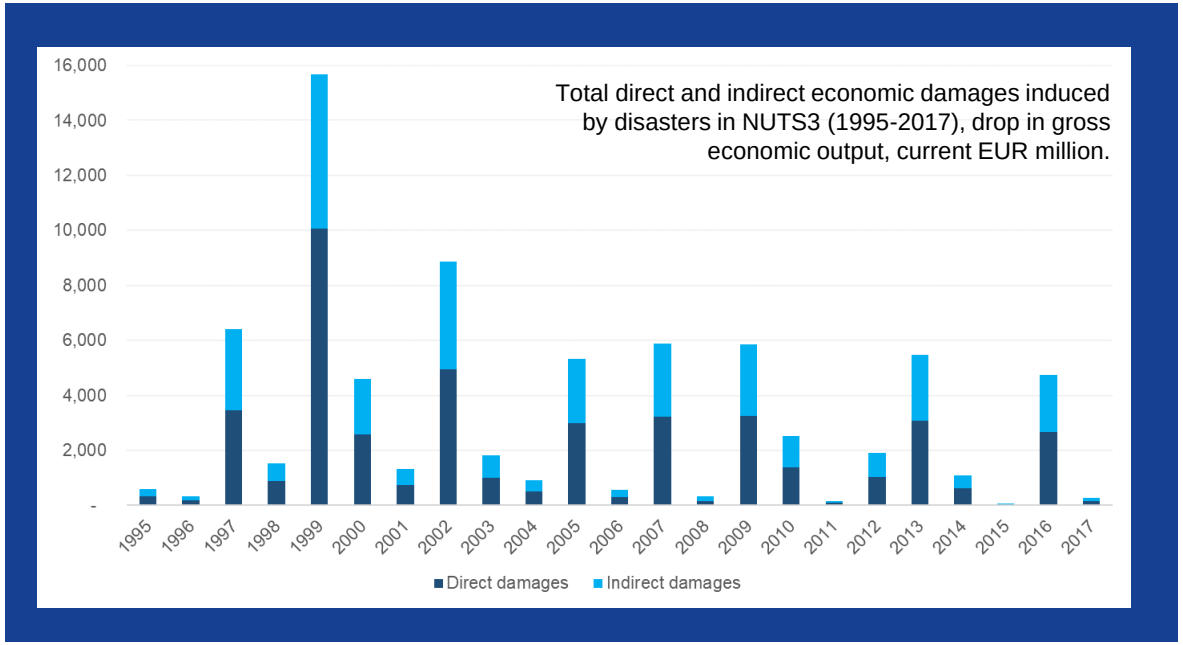
AVERAGE ECONOMIC IMPACTS OVER THE PERIOD 1995-2017

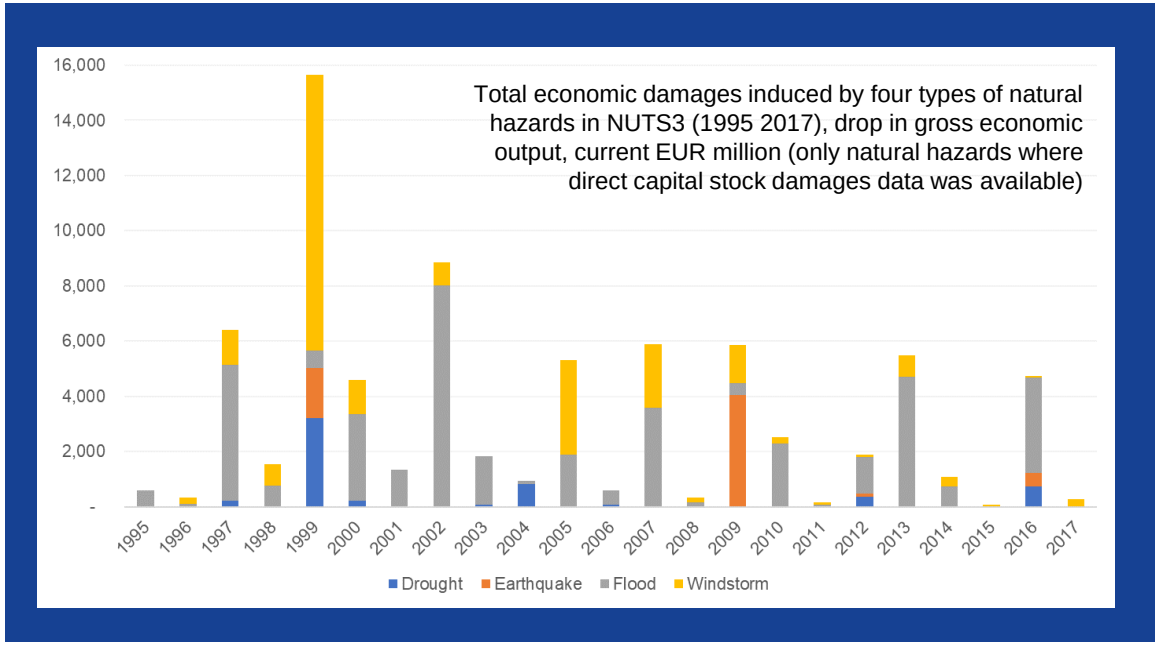


The maps capture the (negative) change of economic output to GVA ratio of the same region → the most heavily impacted regions are highlighted with darker colour.



Economic Impacts Analysis, global





- Total direct economic impacts (EUR 43,8 billion) / Total indirect economic impacts (EUR 32,6 billion), over the period 1995-2017).
- Indirect economic impacts tend to be almost as large as direct impacts (ratio of 60% and 90% in all of the assessed years).
- The assessed impacts consider production losses and supply chains impacts – they do not account for potential interruptions of critical infrastructure (the real potential indirect losses could be even higher)

- Flood and windstorm events have had the largest negative impact on economic output in almost all analysed years.
- Quite reasonably (illustrated by the year 2009), heavy earthquake, despite being rare, tend to result in significant economic losses.
- Some NUTS3 regions across Europe tend to be more vulnerable to certain types of natural hazards, while other regions are less impacted.

4.Economic Impacts Analysis, local

*Whilst in the economic impact analysis performed at EU level the direct and indirect damages results to be quite similar, the **local outcomes show that the direct damages increase to a relatively larger extent than indirect ones** as a result of detailed bottom-up information.*

- In the local methodology, impacts are assessed based on additional bottom-up information (and as such more accurate cost data), allowing a more in-depth understanding of the direct and indirect impacts.
  - need for better inclusion of local data in global data sets
  - the global methodology should serve a pre-screening purpose

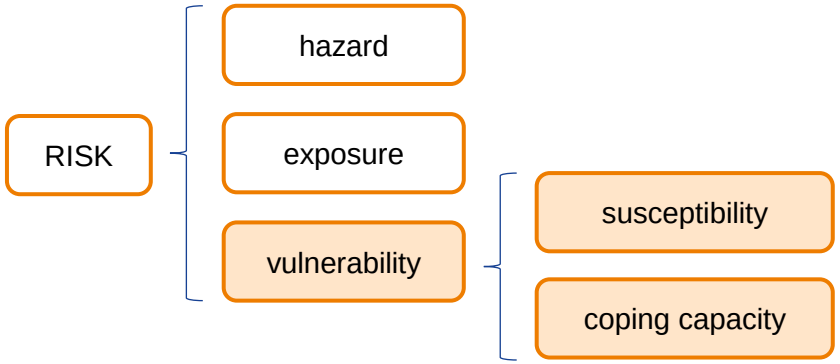
- The two test case studies also provided insights in DRM:
  - **Prague** (flood, 2013) shows that investments in flood defences reduce the overall damage costs and can play an important role in protecting vulnerable areas (historical centres and metro systems).
  - **Charente-Maritime** (windstorm, 2010)), the dikes and dunes were not able to prevent the flooding. Analysts report that the flood defences were built on past flooding experience (for a 100-year return period, which does not reflect the intensity of the Xynthia storm surges). Need to better consider climate change projections.

Vulnerability assessment

	Dimension	Indicator
susceptibility	Demography	Age of population
	Demography	Young-age dependency
	Demography	Old dependency
	Education and research	Early leavers from education and training
	Economy	Risk of Poverty and Social Exclusion
	Economy	Primary sector employments
	Economy	Unemployment rate
	Environment	Irrigable and irrigated areas
coping capacity	Demography	Natural population change
	Demography	Migration rate
	Education and research	Tertiary Educational Attainment
	Education and research	R&D expenditure
	Education and research	R&D personnel and researchers
	Education and research	Patent applications to the EPO
	Social capital and perception	Social capital
	Social capital and perception	Risk perception
	Health	Hospital beds
	Health	Practising physicians
	Economy	GDP per inhabitant
	Economy	Professional, scientific and technical employments
	Environment	Spatial distribution of GI
	Environment	Potential GI network for CC&DRR policies
	Gender	Gender equality index
	Governance	Quality of Government index
	Governance	Municipalities signatories to the Covenant of Majors

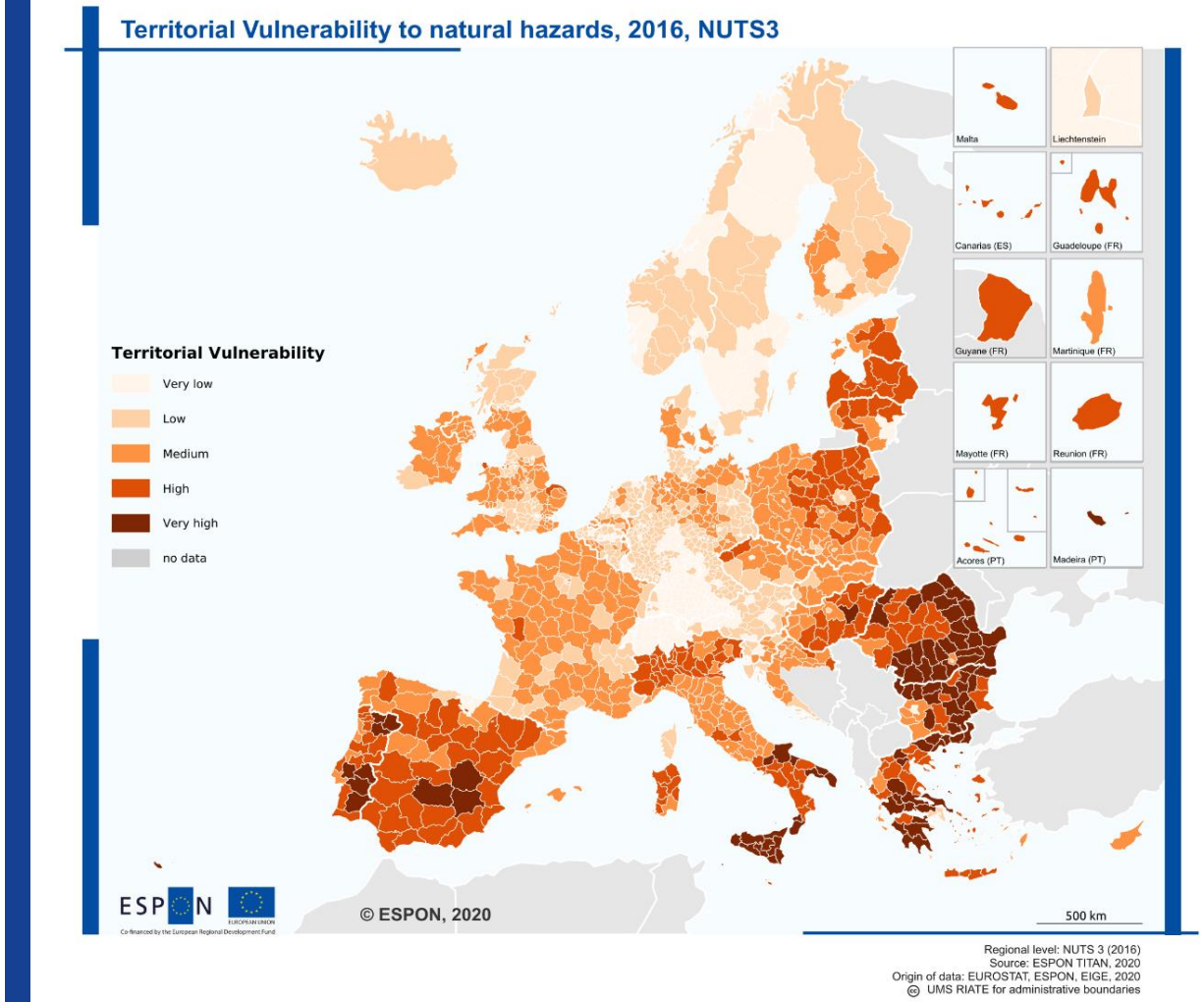
Vulnerability matters. *The vulnerability helps us understand* ***why the occurrence of a natural hazard become a disaster.***

- For the same level of hazard, the impact of disasters can vary considerably → explained by differences in vulnerability and exposure.

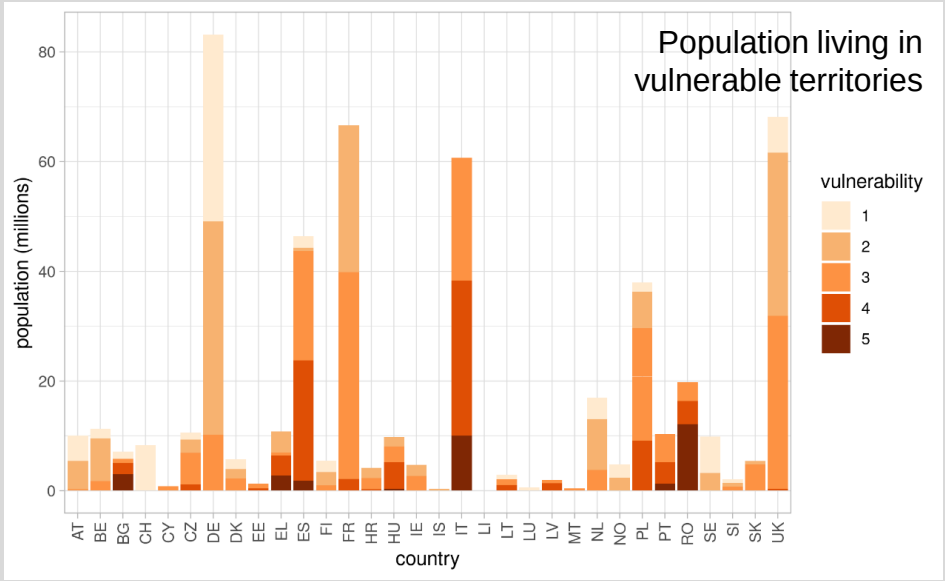


- The vulnerability assessment (PCA) considers 25 indicators:
  - 8 susceptibility (increase the territorial vulnerability)
  - 17 coping capacity (decrease the territorial vulnerability).

Vulnerability assessment



- The population living in territories with high/very high vulnerability sums 116 out of the 528 million (22%).



- Decreasing vulnerability of the territory may help to reduce the economic impact of natural disasters.

Vulnerability assessment

CONCLUSIONS / POLICY RECOMMENDATIONS

- Knowledge of territorial vulnerability patterns is crucial for proper disaster risk management. It allows the orientation of actions towards the most vulnerable regions, prioritizing those that could be most affected by the occurrence of an extreme natural phenomenon.
- In this sense, territorial planning has a key role in DRM due to the fact that its practice is closely linked to several vulnerability components, and therefore has the potential to balance existing vulnerability inequalities between territories.
- In addition, regarding economic impacts, a clearer orientation on vulnerability reduction could be an efficient way to reduce impacts of potential disasters. Moreover, tackling the vulnerability factors (e.g. education, hospital beds, etc.) would have substantial co-benefits in addition to the reduction of vulnerability to natural hazards.

ESPON-CLIMATE UPDATE is methodologically aligned with ESPON-TITAN

Policy instruments on DRM and CCA

Several DRM and CCA instruments and good practices are identified at EU and national levels. Although progress has been made in risk assessment, ***the practice of DRM and CCA is still far from fulfilling the requirements for an effective spatial, risk-oriented management approach*** *that includes also the multiple dynamics of changing hazards, exposure and vulnerability.*

- Multi-methodological approach: A desktop analysis (focused on existing studies on DRM and CCA practices in Europe) + analysis of primary data from the case studies = summary on the practice of DRM and CCA.
- Good practices: risk management and climate adaptation practices encompass spatial planning measures and innovative approaches (e.g. inclusion of innovative governance structures into spatial planning)
- Case studies: (although context-dependent) identification and description of successful cooperation mechanisms, qualitative contexts of DRM and CCA, and an estimation of effectiveness of policies and instruments.

Policy instruments on DRM and CCA

Country Code	relevant? (1 = yes)	ESPON countries Hazards	DRM - Assessment (assessment of hazards on national level and results: hazard maps, risk maps, multi-risk maps, reports)	DRM - Management (policies on national level: guiding decisions, strategies, programmes; way of integration into spatial planning: primary or secondary)	CCA - Assessment (assessment of climate change impacts on national level and results: impact maps, vulnerability maps, reports)	CCA - Management (policies on national level: guiding decisions, strategies, programmes; way of integration into spatial planning: primary or secondary)	Policies in general DRM/CCA	Good practice examples
EE		**Estonia (Estland)**			In 2015 the Estonian Environment Agency conducted a report of the climatic changes in the state, based on the	Climate Change Action Plan 2017 – 2020 Adaptation Plan) and Climate Change A		
EE	1	(1) Floods (river floods, storm surges)	The Floods Directive has been adopted in 2009 and since then a preliminary assessment of flood risks and flood risk	The Floods Directive has been adopted in 2009 and since then a preliminary assessment of flood risks and flood risk	Estonian Geological Survey is engaged in mineral resources and groundwater research, as well as geological mapping.	Mitigation plans aim to reduce the prob occurrence and the extent of flood, pro		
EE		(2) Droughts						
EE	1	(3) Storms (winter, convective)	Storms werden meist nur im Zusammenhang mit höherer Vulnerabilität gegenüber floods erwähnt. "Continuation of	At local level, the strong storm of 2005 in particular resulted in the development of detailed adaptation and action plans				
EE		(4) Earthquakes						
EE	1	(5) Others (flash floods, land slides)	N: Coastal flood/ Flash flood/ Storm convective/ Landslide/ Mudslide/ Avalanche	One of the goals for the Developement plan is: Land use and planning, including coastal areas, other areas with a risk of	Estonia does have a National Environmental Monitoring Programme to examine shoreline dynamics and coastal	"Estonian Environmental Strategy Until framework of environmental protectio		
EL	1	**Greece (**		A national framework for an effective risk management planning is the "Xenokrates" (National Civil Protection Plan)		The Ministry of Environment and Energ the development and implementation		
EL	1	(1) Floo	ted in 2009 been	Das Sondersekretariat für Wasserangelegenheiten hat Studien zum Hochwasserrisikomanagement in fünf		Framework for Spatial Planning in Coas (Elaboration by 2021: National Maritime		
EL	1	(2) Drou	hittee to % of the	National Programme for the Management and Protection of Water Resources (The drought and water scarcity	Research activity is also carried by the National Observatory of Athens (NOA) (http://www.noa.gr/) through	Since 1994 the national government has raising campaigns. With the aim of raisi		
EL		(3) Storr						
EL	1	(4) Earth	ic nded in 2003	Division of the Greek territory in seismic zones of different seismic hazard, based in the maximum expected horizontal	The first Greek Seismic Design Code was established in 1959 and was amended in 1985. Procedures for the renewal of	Earthquake Planning and Protection Org is a Legal Entity of Public Law under the		
EL	1	(5) Others (flash floods, land slides)	Forest fires: a **daily forest fire risk map** is issued by the General Secretariat for Civil Protection during the summer	Forest Cities is a project that strengthened the role of Greek local authorities in forest fire prevention, through the				
ES	1	**Spain (Spanien)**	**National Plan for the Prediction and Monitoring of Adverse Weather Events** by the Stage Agency of Meteorology		Impacts, Vulnerability and adaptation assessments: various have been carried out in Spain such as impact assessments	National Climate Change Adaptation Pl Adaptación al Cambio Climático (PNAC		
ES	1	(1) Floods (river floods, storm surges)	Flood Risk Management Plans: for each of the 16 river basin districts Flood Risk Management Plans have been	Integration of spatial planning within flood risk management: The Spanish authorities listed the adoption of	A **risk and impact assessment for the climate change on the Spanish coasts** was conducted by the Ministry of Agriculture,	**National Strategy fo Sustainable Coasta** main challenges identified for this strat		
ES	1	(2) Droughts	Spain participated in the MEDROPLAN (Mediterranean Drought Preparedness and Mitigation Planning) project,	**Drought Management Plans:** specific plans within the River Basin Management Plans and the River Basin Authorities are	The Ministry of Agriculture, Fish, Food and Environment (MAGRAMA) assessed the impacts of climate change on the	Water actions undertaken in Spain to ta Optimisation of irrigation infrastructure		
ES		(3) Storms (winter, convective)						
ES		(4) Earthquakes	The National Geographical Institute (IGN) hosts a website that visualises upcoming earthquakes and general seismic surveillance (Visualizador terremotos próximos). Besides the IGN publishes seismicity and hazard maps (available	**Special plans for seismic risks**: the plans will be prepared by those Autonomous Communities in whose territory earthquakes of equal or greater intensity than grade VI are foreseeable, corresponding to the iso-system of the seismic				
ES		(5) Others (flash floods, land slides)	NO: Coastal flood/ Avalanche *IMPORTANT: drought, earthquake + tsunami, riverine flood, flash flood, storm + tropical + extra tropical, storm convective,			*Urban planning and construction: first adaptate mitigation measures in this se introduced in the National Adaptation		

DRM / CCA Practices

Country Code	ESPON countries Hazards	National level (role of spatial planning in DRM)	Regional level (role of spatial planning in DRM)	Local level (role of spatial planning in DRM)	Good practice examples	Comments
AT	**Austria (Österreich)**					
AT	(1) Floods (river floods, storm surges)	The Austrian Conference on	The 2015 progress report on the	Integration of spatial planning	Clear integration of spatial planning	
AT	(2) Droughts					
AT	(3) Storms (winter, convective)					
AT	(4) Earthquakes					
AT	(5) Others (flash floods, land slides)					
BE	**Belgium (Belgien)**					
BE	(0) General information	Horizontal coordination	Climate change is not yet completely			
BE	(1) Floods (river floods, storm surges)	The environmental agency in Flanders	Climate change is mentioned in			spatial planning is a priorized sector
BE	(2) Droughts					- Research and studies funded by
BE	(3) Storms (winter, convective)					
BE	(4) Earthquakes					
BE	(5) Others (flash floods, land slides)					
BG	**Bulgaria (Bulgarien)**					
BG	(1) Floods (river floods, storm surges)	Climate adaptation is considered in			Key land use, spatial planning,	
BG	(2) Droughts					

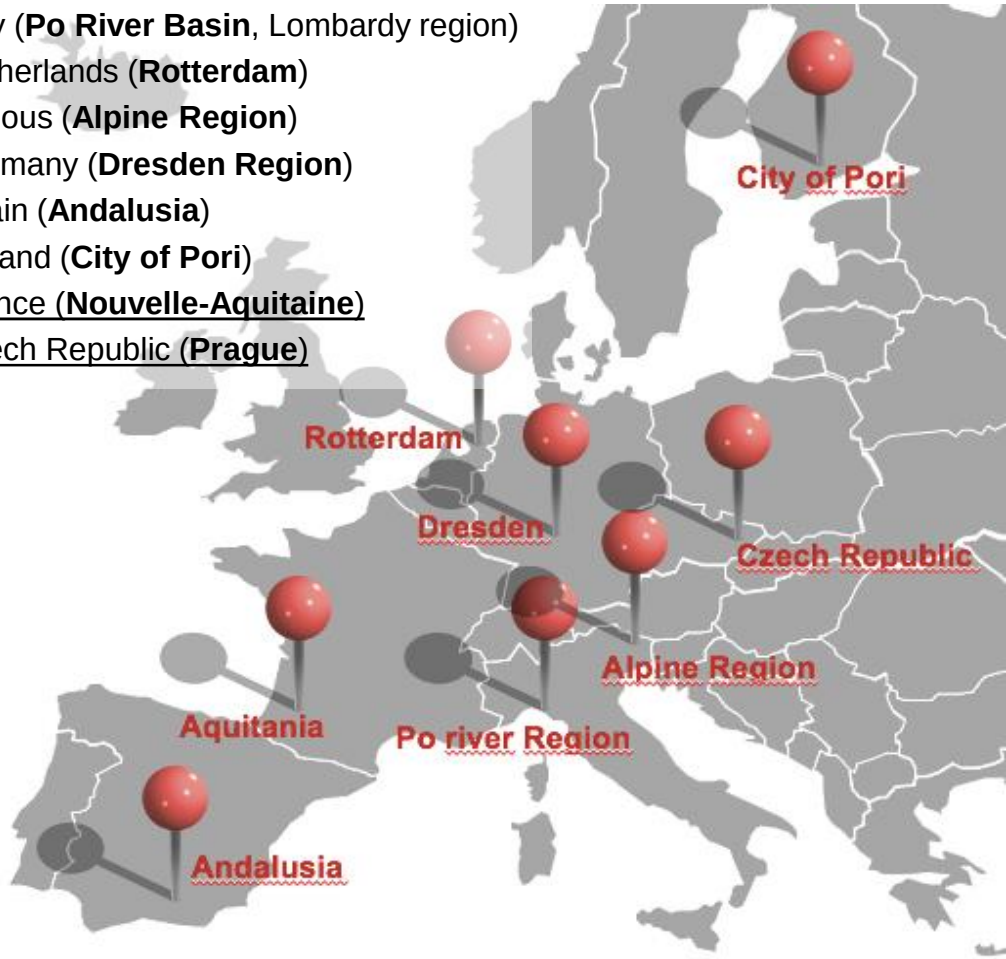
Role of Spatial Planning

ESPON-TITAN Case studies

Understanding practice in context.

- 8 case studies investigated, representing different spatial, institutional and governance settings, with homogeneously geographical distribution.
  - **Illustrate the findings** in terms of natural hazard distribution, associated economic impacts and policy instruments in comparison to the analyses made for the European level
  - **Contribute to the generation of policy recommendations** focused on a better integration of DRM and CCA in Spatial Planning
- Stakeholder consultations (practice of DRM, implementation of CCA measures, relation to spatial planning, existing coordination and cooperation among entities, lessons learned, etc.)

- Italy (**Po River Basin**, Lombardy region)
- Netherlands (**Rotterdam**)
- Various (**Alpine Region**)
- Germany (**Dresden Region**)
- Spain (**Andalusia**)
- Finland (**City of Pori**)
- France (**Nouvelle-Aquitaine**)
- Czech Republic (**Prague**)



ESPON-TITAN Case studies

LESSONS LEARNED AND GOOD PRACTICES (I)

- Territories should focus on more risk prevention activities rather than response/reaction, as prevention has a relevant cost but is worth it.
- Risk cannot be avoided nor be reduced to zero, but managed. Thus, residual risk should be accepted and managed through sound preparation and DRM measures.
- New methodologies could be implemented for risk assessment as a basis for prevention policies (e.g.: flood prevention areas based on scenarios, instead of probability of occurrence).
- Importance of binding laws regulating every aspect of DRM, to be complemented with support of other administrative instruments (prevention, maintenance, update…).

ESPON-TITAN Case studies

LESSONS LEARNED AND GOOD PRACTICES (II)

- The regional and national level should offer to the local level financial support, guidelines and knowledge.
- Vertical coordination and cooperation are major for DRM and CCA, as well as intersectoral coordination, that should be improved (DRM/CCA cannot remain sectoral but should be integrated with spatial planning and development programs).
- A sound strategy for DRM and CCA should involve all the relevant actors of the territory (professionals, universities, enterprises…).
- The supranational level should set common standards for DRM and CCA strategies within the EU (e.g.: Flood Risk Management Directive).

Policy messages and recommendations

Context	Topics covered by the Policy Recommendation
Economic impacts	(A) How to improve methodologies for calculating the economic costs of natural hazards and assessing their impact at different territorial scales.
	(B) What could be done to improve data availability on economic losses associated with natural hazards, especially at local and regional levels.
Connection between economic losses and appropriate DRM and CCA measures	(C) How to link measurement of economic losses due to natural hazards with the development of appropriate disaster risk management and climate change adaptation measures at different territorial scales.
Improvement of DRM and CCA practices	(D) To what extent different funding mechanisms (European Structural and Investment Funds, Financial Instruments, etc.) can be better mobilised to further support disaster risk management and climate change adaptation at territorial level.
	(E) How should regions, cities and local governments cooperate to ensure the efficiency and coordination of various measures related to disaster risk management and climate change adaptation? What could be a role for different umbrella organizations?
	(F) How to better integrate DRM and CCA into legislative frameworks and instruments of territorial development?

Include methodological issues (future research)

Address different parts of the Policy Process

- Problem identification and agenda setting
- Formulation and adoption
- Implementation
- Evaluation

EU Level Experiences from Case Studies

Policy messages and recommendations

A) Methodologies for calculating economic costs and impacts of natural disasters	B) Improve data availability on economic losses from natural disasters at local and regional levels	C) Link measurement of economic losses with the development of DRM and CCA measures	D) Mobilise European funding mechanisms to further support DRM and CCA at territorial levels	E) Cooperation and coordination of regions, cities and local governments	F) Integration of DRM and CCA into legislative frameworks and territorial development
• A-1: **Harmonisation** of risk assessment and risk evaluation • A-2: Further develop **damage functions** for hazards • A-3: Research on indirect losses and **indirect** impacts • A-4: Innovations in risk assessments regarding the **spatial and temporal dimension** of risk • A-5: Conceptualization of **criticality** as a basis for contributing to the valuation of risk • A-6: More strategic use of **research and cooperation projects** for DRM/CCA	• B-1: Framework for **collection of necessary data** at the local level • B-2: More **granular** data and reporting, including distinction between direct and indirect damages **Future research**	• C-1: DRM measures and CCA plans should **account for the total economic impacts** of the occurring natural hazards (incl. **direct and indirect** losses as well as **risk aversion** factors) • C-2: Spatially oriented risk assessment and management by **including the spatial and temporal dimensions** • C-3: Conceptualization of consideration of **critical infrastructures** in the evaluation of risk	• D-1: Promotion of a **pro-active and prevention-oriented** design of EU funding instruments	• E-1: Develop **cooperation structures** between regions, cities and local governments but also between DRM experts • E-2: Establish a clear **coordination** structure for DRM and provide it with **leadership** qualities	• F-1: **Support DRM and CCA** issues during amendment processes of EU Directives • F-2: Mainstreaming **climate change adaption** in territorial development policies

Co-financed by the European Regional Development Fund

Inspire Policy Making with Territorial Evidence

// ESPON-TITAN
(Spin-off Portugal - SOPORT)

SOPORT

- Goal: Develop a Strategic Planning Framework proposal for the inclusion of adaptation measures to cope with forest wildfires impacts in a climate change context into existing Spatial Planning instruments in the Algarve Region, Portugal.

2020 SEPTEMBER

TASK 1 — Local Context Diagnosis

- governance and policy framework
- existing data related to forest fires
- stakeholders mapping
- supporting tools: calls, interviews, surveys

TASK 2 — Identification of key challenges

- vision and objectives- key challenges
- prioritization of challenges
- viability analysis
- collaborative approach

TASK 3 — Development of the Concept

- context EU-scale
- cross-analysis TITAN
- lessons to be shared
- proposal of feasible alternatives

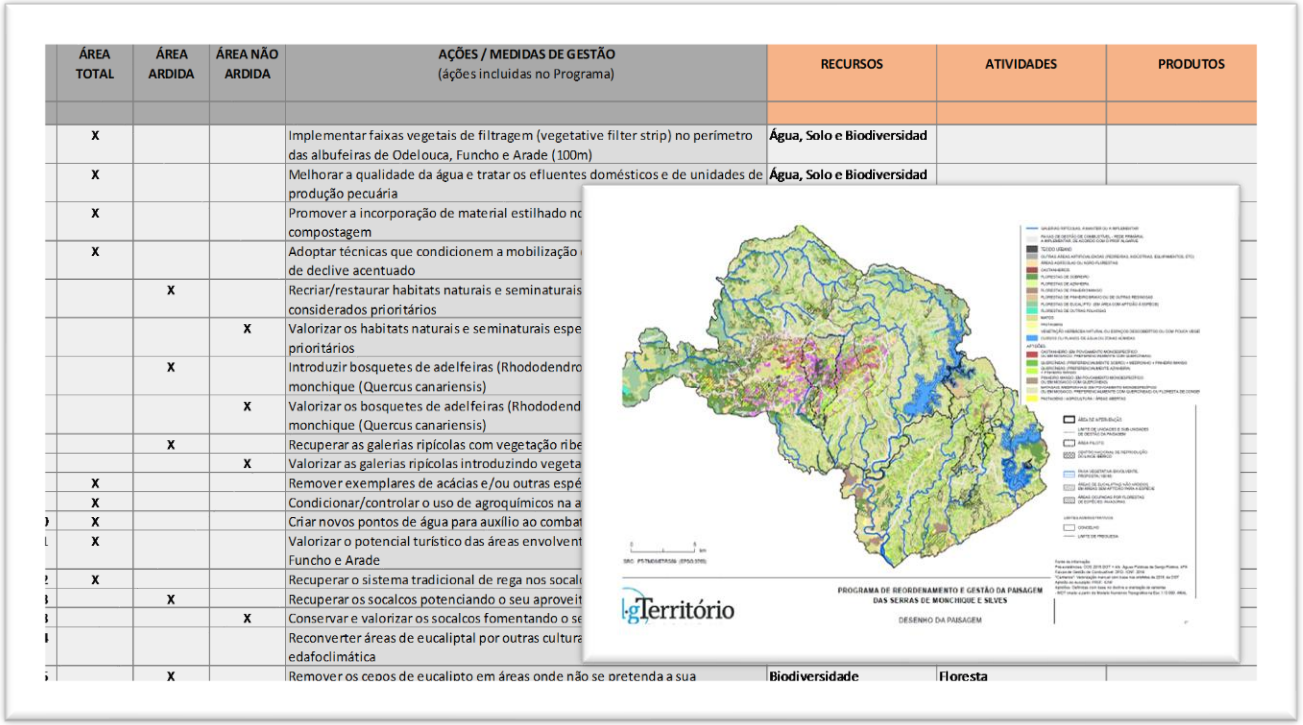
TASK 4 — Strategic Planning Framework

- policy recommendations
- multilevel governance
- adaptation/mitigation measures

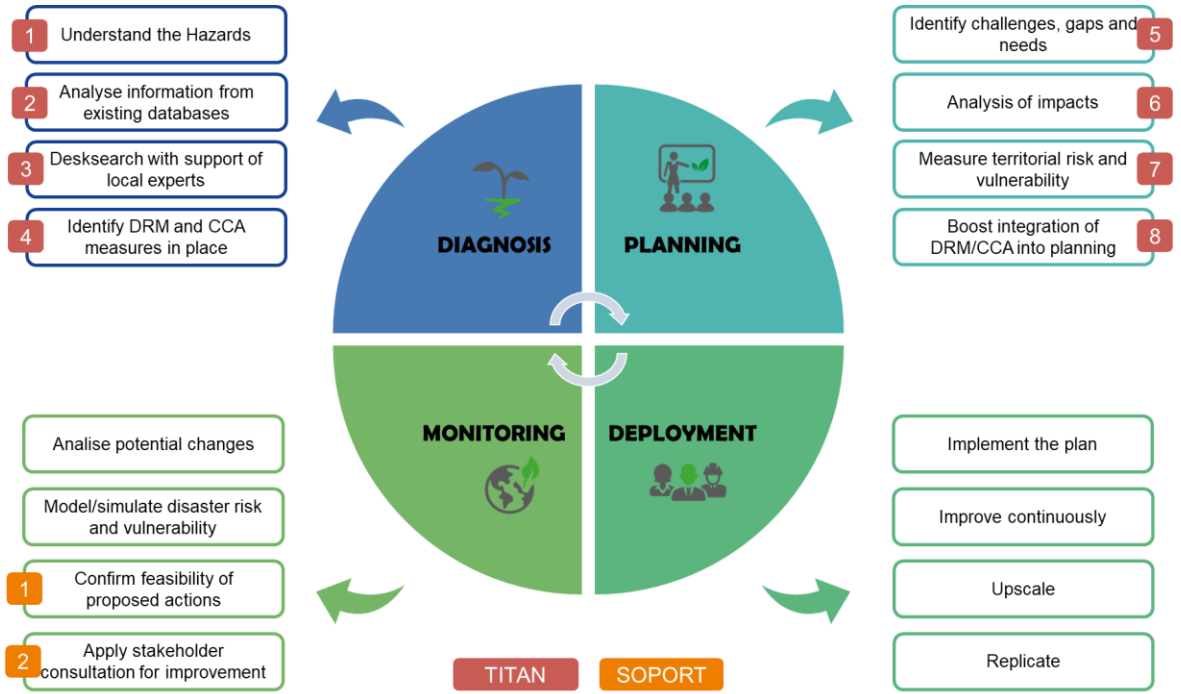
SEPTEMBER 2021

SOPORT

- Contextualization → Identification of challenges → Strategic framework
- *Programa de Reordenamento e Gestão da Paisagem (PRGP) das Serras de Monchique e Silves*
- Workshop: "*From planning to action: discussing challenges and potential solutions*"



ÁREA TOTAL	ÁREA ARDIDA	ÁREA NÃO ARDIDA	AÇÕES / MEDIDAS DE GESTÃO (ações incluidas no Programa)	RECURSOS	ATIVIDADES	PRODUTOS
X			Implementar faixas vegetais de filtragem (vegetative filter strip) no perímetro das albufeiras de Odelouca, Funcho e Arade (100m)	Água, Solo e Biodiversidad		
X			Melhorar a qualidade da água e tratar os efluentes domésticos e de unidades de produção pecuária	Água, Solo e Biodiversidad		
X			Promover a incorporação de material estilhado nc compostagem			
X			Adoptar técnicas que condicionem a mobilização de declive acentuado			
	X		Recriar/restaurar habitats naturais e seminaturais considerados prioritários			
		X	Valorizar os habitats naturais e seminaturais espe prioritários			
	X		Introduzir bosquetes de adelfeiras (Rhododendro monchique (Quercus canariensis)			
		X	Valorizar os bosquetes de adelfeiras (Rhododend monchique (Quercus canariensis)			
	X		Recuperar as galerias ripícolas com vegetação ribe			
		X	Valorizar as galerias ripícolas introduzindo vegeta			
X			Remover exemplares de acácias e/ou outras espé			
X			Condicionar/controlar o uso de agroquímicos na a			
X			Criar novos pontos de água para auxílio ao combat			
X			Valorizar o potencial turístico das áreas envolvent Funcho e Arade			
X			Recuperar o sistema tradicional de rega nos socal			
	X		Recuperar os socalcos potenciando o seu aproveit			
		X	Conservar e valorizar os socalcos fomentando o se			
			Reconverter áreas de eucaliptal por outras cultura edafoclimática			
	X		Remover os cepos de eucalipto em áreas onde não se pretenda a sua	Biodiversidade	Floresta	



SOPORT: Policy messages

- The stakeholder consultation should include members from multiple administrative levels, as well as impulse participation of actors with heterogeneous profiles.
- Guarantee a minimum number of assistants (better represent the real challenges and general feelings on the limitations encountered).
- Make use of the flexibility that the tool offers, by including additional challenges and elements that may be raise along the consultation process.
- Be aware that the tool is designed to cover basis needs, although a deeper review and complement of the actions should be proposed further.
- The exercises aims at rethinking the complaints and disagreements into suggestion and solutions, promoting a transformation of the limitations and weaknesses identified into strengths and opportunities.
- The co-learning process is an indirect objective of the implementation of the tool, to foster a systematic continuous improvement on planning approaches.

Adapting to Climate Change, role of NbS

- **Nature-based Solutions play crucial role in building Europe's climate resilience**
- Building infrastructure that is resistant to hazards and using **nature-based solutions** are examples of **climate change adaptation measures**, critical to increase our resilience and reduce disaster risks.
- NbS address societal challenges (e.g., climate change, disaster risks, food and water security, and human health) by **protecting, sustainably managing or restoring natural ecosystems**. They simultaneously provide **human well-being and biodiversity benefits**, **enhancing ecosystem services**. (EEA, 2023)
- Nature-based Solutions need to be **scaled up and expanded** to help Europe **better cope with the impacts of climate change**.

ESPON

EUROPEAN UNION

Co-financed by the European Regional Development Fund

Inspire Policy Making with Territorial Evidence

// Thank you

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