Report of the progress on FRMP updating in Italy

Final Version of March/2023

Deliverable Number 3.3.2.

Project Acronym	STREAM
Project ID Number	10249186
Project Title	Strategic Development of Flood Management
Priority Axis	2 – Safety and Resilience
Specific objective	2.2 - Increase the safety of the Programme area from natural and man-made disaster
Work Package Number	3
Work Package Title	Creating Flood Knowledge Documents
Activity Number	3.3.
Activity Title	Flood Risk Management Plan
Partner in Charge	University of Zadar
Partners involved	LP, PP1, PP3, PP5, PP6, PP7, PP8, PP9, PP10, PP11, PP13, PP14, PP15
Status	Final
Distribution	Public

Contents

INTRODUCTION

This report provides an overview of the progress made in updating the Flood Risk Management Plan in Italy. As a country prone to various types of flooding, it is crucial to continually enhance and refine strategies for mitigating the impacts of floods. This report aims to outline the key advancements and initiatives undertaken to strengthen Italy's Flood Risk Management Plan, ensuring a more resilient and adaptive approach to flood risk. Additionally, the report emphasizes the importance of stakeholder engagement and participatory processes in the updating of the Flood Risk Management Plan. Recognizing the diverse interests and responsibilities of various actors, including government agencies, private sector entities, and local communities, the plan aims to foster collaboration and shared ownership in the management of flood risks.

REPORT OF THE PROGRESS ON FRMP UPDATING IN ITALY

The reporting of Flood Risk Management Plan (FRMP) updating for Italy covers the Eastern Alps District Basin Authority (*Distretto Idrografico Alpi Orientali*) experience and presents the measures planned for the 2016-2021 and 2022-2027 periods in application of the 2007 European Flood Directive (2007/60/EC).

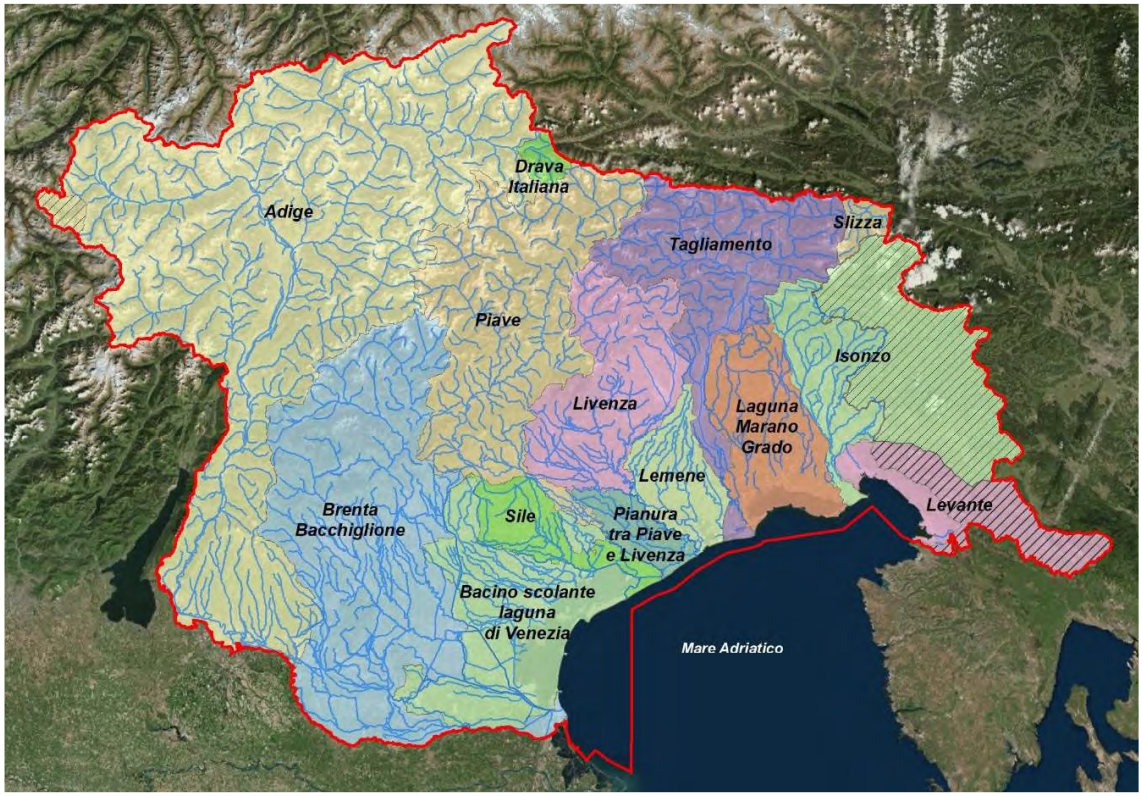


Figure 1. The Eastern Alps District structure in Units of Management (Source Aggiornamento e revisione del Piano di Gestione del Rischio di Alluvioni - Relazione Generale, Autorità di bacino distrettuale delle Alpi Orientali 2021)

The Eastern Alps District Basin Authority is one of the 5 River Basin Districts committed to the application of the Flood Directive in Italy, and is structured in 9 Units of Management corresponding to the different river basins flowing into the Adriatic Sea.

The analysis considered the plan documents and annexes publicly available (https://sigma.distrettoalpiorientali.it/portal/index.php/direttiva-alluvioni/) for both phases and selected those concerning the Venice Lagoon, i.e., those included in the Veneto Region Unity of Management (UoM) that affect the basins draining into the lagoon and the lagoon area itself. This Unity of Management covers interventions at the regional and at the local scale, accordingly this report presents both planning levels separately.

The focus on a local scale Unity of Management almost correspondent to the City of Venice metropolitan area ease a comparison with the Flood Risk Management planning efforts performed

by Croatian Pilot Cities of the Interreg Stream Project, and with other Flood Risk Management and Climate Change Adaptation experiences ongoing in Venice Municipality.

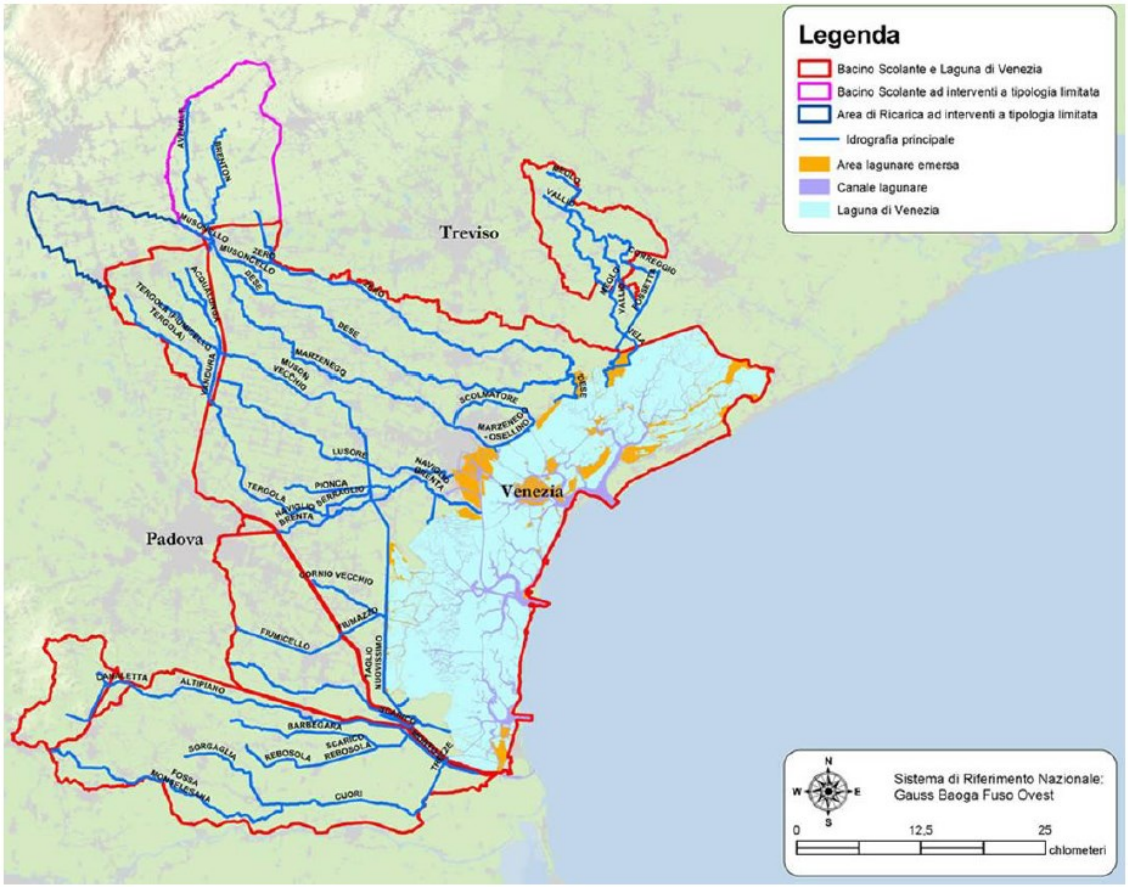


Figure 2. River basins draining into Venice Lagoon: main hydrographic network (Source Bacino Idrografico Scolante nella Laguna di Venezia - Piano stralcio per l'Assetto Idrogeologico (PAI) – RELAZIONE – Regione del Veneto, 2015).

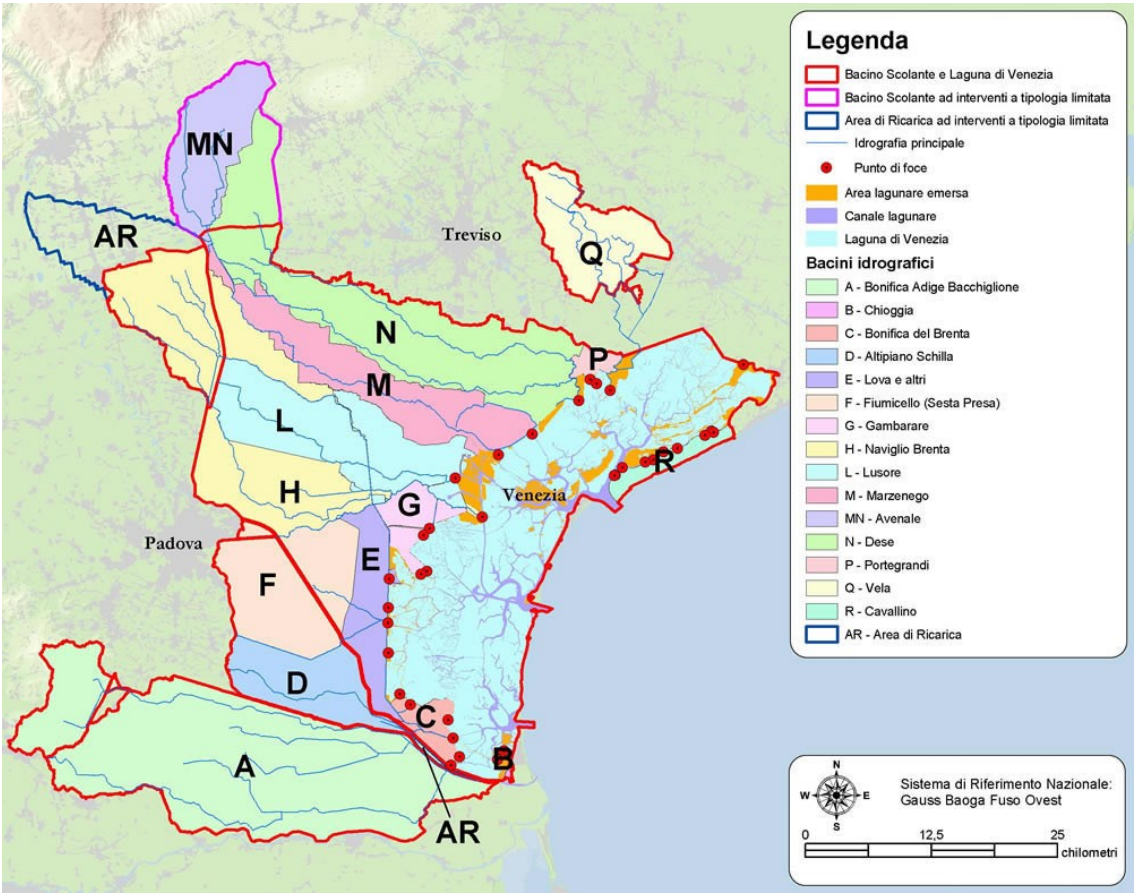


Figure 3. River basins draining into Venice Lagoon: areas of pertainance and inlets (Source: https://www.arpa.veneto.it/temi-ambientali/acqua/acque-interne/bacino-scolante-1)

The key sources of the data collection have been:

- the 2022-2027 FRMP update - general document which details measures at the district level;
- the 2022-2027 FRMP update - annex III, which resumes the progress of implementation of the previous phase and presents the new proposed interventions;
- the 2016-2021 FRMP – annex IV, which present an overview table of all the information foreseen for the plan.

Relevant measures where assembled in a resuming matrix, based on the table already available for the 2016-2021 plan (Annex IV), confronting old to new versions, costs and progresses of implementation, and adding the new planned measures missing. Planned interventions are grouped and presented here according to the Flood Directive's flood risk management measures class and typology, both at Regional and at the local level.

Each measure of the Flood Risk Management Plan is presented within a form (see the table sample below) briefly reporting the following information:

- Measure brief description;
- Measure location;

- Targeted hazard, i.e., heavy rainfalls (R), floods (F), high tides (T), and coastal storm surges (S);
- Expected contribution to flood risk management and climate change adaptation;
    - Understanding and assessing DR,
    - Forecasting and assessing hazards,
    - Reducing DR impacts,
    - Hazard mitigation and dispersion,
    - Protecting exposed elements,
    - DR-informed governance,
    - Awareness and preparedness,
    - Emergency procedures;
- Progress of implementation reported in the 2022-2027 Plan;
- Costs and financial coverage;
- Responsible body;
- Implementation timeframes;

These components are highlighted and reported solely based on measures' descriptions and on the information provided in the plan's tables.

<table>
<tr><td colspan="5">Targeted Hazard</td><td rowspan="6">Measure description

Measure location</td></tr>
<tr><td>Severe rainfalls (R)</td><td>Floods (F)</td><td>Severe winds (W)</td><td>High tides (T)</td><td>Coastal storm surges (S)</td></tr>
<tr><td colspan="5">Contribution to FRM and CCA</td></tr>
<tr><td>Understanding and assessing DR</td><td>Forecasting and assessing hazards</td><td>Reducing DR impacts</td><td colspan="2">Hazard mitigation and dispersion</td></tr>
<tr><td>Protecting exposed elements</td><td>DR informed governance</td><td>Awareness and preparedness</td><td colspan="2">Emergency procedures</td></tr>
<tr><td colspan="5">Progress of implementation</td></tr>
<tr><td>Proposed</td><td>Not Started</td><td>Planning Ongoing</td><td>On Going Construction</td><td>Completed</td><td></td></tr>
<tr><td colspan="2">Implementation timeframes</td><td colspan="2">Cost</td><td>Responsible bodies</td><td></td></tr>
<tr><td colspan="2">2016 – 2021
2022 – 2027</td><td colspan="2"></td><td></td><td></td></tr>
</table>

The FRMP measures for the river basins draining into Venice Lagoon are presented in this deliverable following the four phases of the flood risk management cycle, prevention – protection – preparedness – recovery, covering the two planning phases, 2016-2021, 2022-2027, and the regional and local levels of intervention.

1. Prevention measures (M2)

The planned prevention measures have been 6 at the regional scale for a total of 145 thousand euros, 1 at the Venice watershed and lagoon scale for 600 thousand euros for the first period (2016-2021), with 2 additional measures that will continue in the second phase of the plan (2022-2027) for 120thousand euros.

1.1. Regional scale

Measure class and typology	Measure Name	1st phase - (2016 - 2021)	2nd phase (2022 - 2027)	Cost (€)	Hazard targeted
M21_1 – Update of the hydrological system plan (PAI)	Aggiornamento delle norme del PAI o strumenti equivalenti (PGUAP o strumenti derivati) e recepimento negli strumenti urbanistici di pianificazione e gestione del territorio per tener conto dei nuovi scenari di rischio idraulico	1		20.000	R - F
M22_1 – Settlements relocations initiatives	Promuovere iniziative di programmazione e attuazione per la delocalizzazione degli insediamenti dalle aree maggiormente esposte a rischio di esondazione	1		0	R - F
M23_1 – Buildings' vulnerability reduction manual	Predisposizione di un manuale su come operare per ridurre la vulnerabilità degli edifici o gruppi di edifici in aree allagabili e di ristagno idrico	1		3.000	R - F
M24_1 – Rivers embankments' monitoring systems	Primo sviluppo di sistemi di monitoraggio - a basso costo - dei corpi arginali e delle opere di difesa idraulica definendo degli standard minimi di riferimento	1		100.000	R - F
M24_2 – Mapping update and upgrade of exposed cultural and landscape heritage elements	Progressivo aggiornamento delle mappe di rischio in relazione ai dati disponibili dei beni culturali, sia di proprietà pubblica, sia di proprietà privata, e ai beni paesaggistici	1	1	30.000	R - F - T
M24_3 – Mapping update of territories' topography	Programmare (phase Ia-A) ed effettuare (phase Ia-B) l'aggiornamento sistematico della topografia del territorio con particolare riferimento alla rete idrografica principale	1		12.500	R - F
M24_4 – Mapping update of the hydraulic interventions' catalogue	Definizione di un protocollo per lo sviluppo e l'aggiornamento del catalogo georeferenziato delle opere idrauliche a scala regionale / provinciale	1		10.000	R - F
M24_5 – Improvement of the Ministry of Culture cultural heritage "Carta del Rischio" and "Vincoli in Rete" initiatives	Potenziamento e aggiornamento della Carta del Rischio e di Vincoli in Rete del MIBACT, attraverso collegamenti tra mappe e banca dati del patrimonio culturale, con schede di approfondimento sul singolo bene	1	1	90.000	R - F

- M21_1 – Update of the hydrological system plan (PAI), mainstreaming flood scenarios for local planning tools.
- M22_1 – Settlements relocation initiatives from overly exposed flood risk areas, also including renaturalization and landscape redevelopment interventions of the areas.
- M23_1 – Development of a buildings' vulnerability reduction manual for urban planning interventions concerning areas affected by floods in the past.
- M24_1 – Rivers embankments' status monitoring, so as to report sections and areas that do not reach minimum standard requirements.
- M24_2 – Mapping update and upgrade of cultural and landscape heritage exposed elements.
- M24_3 – Mapping update of territories' topography, paying particular attention to the hydrographic network.

- M24_4 – Mapping update of hydraulic interventions' catalogue, so as to coordinate their maintenance.
- M24_5 - Mapping and database update of cultural heritage assets, reporting on their conservation status, so as to define appropriate protocols of interventions in case of flooding.

This section applies to the whole Veneto region, presenting prevention measures already in place (with ongoing implementations) in the previous version of the plan (2016-2021) targeting flood risk through monitoring, mapping and planning interventions. The proposed initiative of settlement relocations (M22_1), undoubtedly the most ambitious and complex in terms of risk reduction, has been set as "not feasible" after the past planning period. The key addressed exposed elements of these prevention measures are buildings, cultural heritage, riverbanks and hydraulic interventions.

<table>
<tr><td colspan="5">Targeted Hazard</td><td rowspan="8">Measure description
M21_1 – Update of the hydrological system plan (PAI).
Update of the hydrological system plan (PAI), mainstreaming flood risk scenarios to local urban planning and development tools.

Measure location
Veneto's regional basins</td></tr>
<tr><td>Severe rainfalls (R)</td><td>Floods (F)</td><td>Severe winds (W)</td><td>High tides (T)</td><td>Coastal storm surges (S)</td></tr>
<tr><td colspan="5">Contribution to FRM and CCA</td></tr>
<tr><td colspan="2">Understanding and assessing DR</td><td colspan="2">Forecasting and assessing hazards</td><td>Reducing DR impacts
Hazard mitigation and dispersion</td></tr>
<tr><td colspan="2">Protecting exposed elements</td><td colspan="2">DR informed governance</td><td>Awareness and preparedness
Emergency procedures</td></tr>
<tr><td colspan="5">Progress of implementation</td></tr>
<tr><td>Proposed</td><td>Not Started</td><td>Planning Ongoing</td><td>On Going Construction</td><td>Completed</td></tr>
<tr><td colspan="2">Implementation timeframes</td><td colspan="2">Cost</td><td>Responsible bodies</td></tr>
<tr><td colspan="2">2016 – 2021
2022 – 2027</td><td colspan="2">€ 20.000</td><td>Veneto Region, Eastern Alps District Basin Authority</td></tr>
</table>

Targeted Hazard				
Severe rainfalls (R)	Floods (F)	Severe winds (W)	High tides (T)	Coastal storm surges (S)
Contribution to FRM and CCA				
Understanding and assessing DR	Forecasting and assessing hazards	Reducing DR impacts	Hazard mitigation and dispersion	
Protecting exposed elements	DR informed governance	Awareness and preparedness	Emergency procedures	
Progress of implementation				
Proposed	Not Started	Planning Ongoing	On Going Construction	Completed

Implementation timeframes	Cost	Responsible bodies
2016 – 2021 2022 – 2027	Measure stated as not feasible	Veneto Region

Measure description

M22_1 – Settlements relocations initiatives.

Promotion and programming of settlements relocations initiatives from overly exposed flood risk areas, especially in the case of urbanized flood plains. The measure implementation may coordinate and include the possibility of renaturalization and landscape redevelopment of the intervention areas.

Measure location

Veneto's regional basins

Targeted Hazard				
Severe rainfalls (R)	Floods (F)	Severe winds (W)	High tides (T)	Coastal storm surges (S)
Contribution to FRM and CCA				
Understanding and assessing DR	Forecasting and assessing hazards	Reducing DR impacts	Hazard mitigation and dispersion	
Protecting exposed elements	DR informed governance	Awareness and preparedness	Emergency procedures	
Progress of implementation				
Proposed	Not Started	Planning Ongoing	On Going Construction	Completed

Implementation timeframes	Cost	Responsible bodies
2016 – 2021 2022 – 2027	€ 3.000	Eastern Alps District Basin Authority

Measure description

M23_1 – Buildings' vulnerability reduction manual.

Development of a buildings' vulnerability reduction manual for urban planning interventions concerning areas affected by stagnation and flood risk. The measure aims at exposed buildings vulnerability reduction, providing local Municipalities with a manual for the urban planning tools implementation in vast areas previously affected by floods.

Measure location

Veneto's regional basins

Veneto's coastal areas

Targeted Hazard				
Severe rainfalls (R)	Floods (F)	Severe winds (W)	High tides (T)	Coastal storm surges (S)
Contribution to FRM and CCA				

Measure description

M24_1 – Rivers embankments' monitoring systems.

Understanding and assessing DR	Forecasting and assessing hazards	Reducing DR impacts	Hazard mitigation and dispersion
Protecting exposed elements	DR informed governance	Awareness and preparedness	Emergency procedures

Progress of implementation

Proposed	Not Started	Planning Ongoing	On Going Construction	Completed

Implementation timeframes	Cost	Responsible bodies
2016 – 2021 2022 – 2027	€ 100.000	Eastern Alps District Basin Authority

Development of hydraulic defences and rivers embankments' low-cost monitoring systems, setting minimum standard requirements. This measure is essentially aimed at reducing, as far as possible, elements exposed in areas defended by embankments whose characteristics are unknown and for which is not possible to know the behaviour during flooding events. The development of low-cost monitoring techniques should report the status of sections and areas that do not reach minimum standard requirements and need future maintenance.

Measure location

Veneto's regional basins

Targeted Hazard

Severe rainfalls (R)	Floods (F)	Severe winds (W)	High tides (T)	Coastal storm surges (S)

Contribution to FRM and CCA

Understanding and assessing DR	Forecasting and assessing hazards	Reducing DR impacts	Hazard mitigation and dispersion
Protecting exposed elements	DR informed governance	Awareness and preparedness	Emergency procedures

Progress of implementation

Proposed	Not Started	Planning Ongoing	On Going Construction	Completed

Implementation timeframes	Cost	Responsible bodies
2016 – 2021 2022 – 2027	€ 30.000	Ministry of Culture (MIBACT), Eastern Alps District Basin Authority

Measure description

M24_2 – Mapping update and upgrade of exposed cultural and landscape heritage elements.

Progressive update and upgrade of risk maps focused on exposed cultural and landscape heritage elements, both public and private. This measure aims at improving the data quality and representation of cultural and landscape assets in relation to their number, role and vulnerability during flood events, so to support decision-making and measures implementation regarding these elements.

Measure location

Veneto's regional basins

Targeted Hazard

Severe rainfalls (R)	Floods (F)	Severe winds (W)	High tides (T)	Coastal storm surges (S)

Contribution to FRM and CCA

Understanding and assessing DR	Forecasting and assessing hazards	Reducing DR impacts	Hazard mitigation and dispersion

Measure description

M24_3 – Mapping update of territories' topography.

Program and perform the systematic mapping update of territories' topography paying particular attention to the hydrographic

Protecting exposed elements	DR informed governance	Awareness and preparedness	Emergency procedures	
Progress of implementation				
Proposed	Not Started	Planning Ongoing	On Going Construction	Completed
Implementation timeframes	**Cost**	**Responsible bodies**		
2016 – 2021 2022 – 2027	€ 12.500	Veneto Region		

network. Such topography improvement is needed to model flood risk mapping.

Measure location

Veneto's regional basins

Targeted Hazard				
Severe rainfalls (R)	Floods (F)	Severe winds (W)	High tides (T)	Coastal storm surges (S)
Contribution to FRM and CCA				
Understanding and assessing DR	Forecasting and assessing hazards	Reducing DR impacts	Hazard mitigation and dispersion	
Protecting exposed elements	DR informed governance	Awareness and preparedness	Emergency procedures	
Progress of implementation				
Proposed	Not Started	Planning Ongoing	On Going Construction	Completed
Implementation timeframes	**Cost**	**Responsible bodies**		
2016 – 2021 2022 – 2027	€ 10.000	Eastern Alps District Basin Authority, Veneto Region		

Measure description

M24 4 – Mapping update of the hydraulic interventions' catalogue.

Develop and update the hydraulic interventions' GIS mapping catalogue at the regional and county level. This protocol aims at reordering the available data on hydraulic interventions, so to program and coordinate their maintenance.

Measure location

Veneto's regional basins

Targeted Hazard				
Severe rainfalls (R)	Floods (F)	Severe winds (W)	High tides (T)	Coastal storm surges (S)
Contribution to FRM and CCA				
Understanding and assessing DR	Forecasting and assessing hazards	Reducing DR impacts	Hazard mitigation and dispersion	
Protecting exposed elements	DR informed governance	Awareness and preparedness	Emergency procedures	
Progress of implementation				
Proposed	Not Started	Planning Ongoing	On Going Construction	Completed

Measure description

M24 5 – Improvement of the Ministry of Culture cultural heritage "Carta del Rischio" and "Vincoli in Rete" mapping initiatives.

Improvement and update of the Ministry of Culture's mapping and database of cultural heritage assets, enhancing their interoperability. This aims at reporting on cultural heritage assets conservations status, and to define appropriate interventions protocols for reducing their vulnerability and planning their protection in case of a flooding event.

Measure location

Implementation timeframes	Cost	Responsible bodies	Veneto's regional basins
2016 – 2021 2022 – 2027	€ 90.000	Ministry of Culture (MIBACT), Eastern Alps District Basin Authority	

1.2. Venice watershed and lagoon

Measure class and typology	Measure Name	Measure Location	1st phase - (2016 - 2021)	2nd phase (2022 - 2027)	Cost (€)	Hazard targeted
M24_3 - Mapping update of territories' topography	Manutenzione annuale e gestione integrata dell'ambito costiero. Rilievi ed analisi degli ambiti di foce fluviale - Provincia di Venezia	Bacino scolante laguna Veneta; Provveditorato alle OO.PP. Per il Triveneto; foce fiumi Piave, Sile	1		600000	F - S

Mapping update of territories' topography (M24_3) is ongoing also at the local scale, analyses specifically focus on Venice Lagoon rivers' outlets areas.

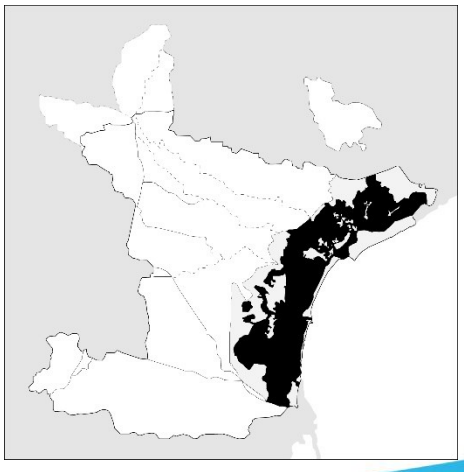
Targeted Hazard				
Severe rainfalls (R)	Floods (F)	Severe winds (W)	High tides (T)	Coastal storm surges (S)
Contribution to FRM and CCA				
Understanding and assessing DR	Forecasting and assessing hazards	Reducing DR impacts	Hazard mitigation and dispersion	
Protecting exposed elements	DR informed governance	Awareness and preparedness	Emergency procedures	
Progress of implementation				
Proposed	Not Started	Planning Ongoing	On Going Construction	Completed
Implementation timeframes	**Cost**	**Responsible bodies**		
2016 – 2021 2022 – 2027	€ 600.000	Public Works Superintendency		

Measure description

M24_3 – Mapping update of territories' topography.

Reliefs and analysis of Venice Lagoon rivers' outlets areas' topography for their periodic maintenance and integrated management.

Measure location



2. Protection measures (M3)

The protection measures foreseen for the first planning period (2016-2021) have been 4 at the regional scale for a total of 3,358 million euros, and 9 at the Venice watershed and lagoon scale for 33,494 million euros. Furthermore, at the local level, 2 additional measures will continue in the second phase of the plan (2022-2027) for 223,5 million euros.

2.1. Regional scale

Measure class and typology	Measure Name	1st phase - (2016 - 2021)	2nd phase (2022 - 2027)	Cost (€)	Hazard targeted
M33_1 – Riverbed, floodplain and coastal defence and regulation interventions	Progettazione dei lavori di adeguamento arginale lungo i canali consorziali	1		262.500	R - F
M35_1 – Hydrographic system maintenance programs	Programma di manutenzione della rete idrografica	1		3.000.000	R - F
M35_2 – Watercourses integrated maintenance and management guidelines	Linee guida per la manutenzione e la gestione integrata dei corsi d'acqua	1		10.000	R - F
	Rilievo sezioni di riferimento morfologico sui corsi d'acqua a supporto della redazione delle linee guida di manutenzione fluviale	1		85.000	R - F

Protection measures concerned (2016-2021 planning phase) morphological survey (M35_2), integrated management guidelines (M35_2) and programming (M35_1), riverbanks upgrading works (M33_1) for the whole hydrographic network of the Plan. These measures target directly rivers and rainwaters structural and infrastructural control.

Targeted Hazard				
Severe rainfalls (R)	Floods (F)	Severe winds (W)	High tides (T)	Coastal storm surges (S)
Contribution to FRM and CCA				
Understanding and assessing DR	Forecasting and assessing hazards	Reducing DR impacts	Hazard mitigation and dispersion	
Protecting exposed elements	DR informed governance	Awareness and preparedness	Emergency procedures	
Progress of implementation				
Proposed	Not Started	Planning Ongoing	On Going Construction	Completed
Implementation timeframes	**Cost**	**Responsible bodies**		
2016 – 2021 2022 – 2027	€ 262.000	Veneto Region		

Measure description

M33_1 – Riverbed, floodplain and coastal defence and regulation interventions.

Riverbanks structural upgrading works on canals of the whole hydrographic network.

Measure location

Veneto's regional basins

Targeted Hazard				
Severe rainfalls (R)	Floods (F)	Severe winds (W)	High tides (T)	Coastal storm surges (S)
Contribution to FRM and CCA				
Understanding and assessing DR	Forecasting and assessing hazards	Reducing DR impacts	Hazard mitigation and dispersion	
Protecting exposed elements	DR informed governance	Awareness and preparedness	Emergency procedures	
Progress of implementation				
Proposed	Not Started	Planning Ongoing	On Going Construction	Completed
Implementation timeframes	**Cost**	**Responsible bodies**		
2016 – 2021 2022 – 2027	€ 3.000.000	Veneto Region		

Measure description

M35_1 – Hydrographic system maintenance programs.

Programming an integrated management of the whole hydrographic system. To this regard competent authorities should define, and progressively implement, a detailed program and timeline of interventions, or the existing planning tool pursuing these tasks.

Measure location

Veneto's regional basins

Targeted Hazard				
Severe rainfalls (R)	Floods (F)	Severe winds (W)	High tides (T)	Coastal storm surges (S)

Measure description

M35_2 – Watercourses integrated maintenance and management guidelines.

Contribution to FRM and CCA			
Understanding and assessing DR	Forecasting and assessing hazards	Reducing DR impacts	Hazard mitigation and dispersion
Protecting exposed elements	DR informed governance	Awareness and preparedness	Emergency procedures

Progress of implementation				
Proposed	Not Started	Planning Ongoing	On Going Construction	Completed

Implementation timeframes	Cost	Responsible bodies
2016 – 2021 2022 – 2027	€ 10.000	Eastern Alps District Basin Authority

Watercourses integrated maintenance and management constitutes a coordination element between flood risk mitigation and rivers status and morphology protection. The definition of guidelines should aim both at river morphological and environmental conservation as well as at the sustainability of defence interventions themselves.

Measure location

Veneto's regional basins

Targeted Hazard				
Severe rainfalls (R)	Floods (F)	Severe winds (W)	High tides (T)	Coastal storm surges (S)

Contribution to FRM and CCA			
Understanding and assessing DR	Forecasting and assessing hazards	Reducing DR impacts	Hazard mitigation and dispersion
Protecting exposed elements	DR informed governance	Awareness and preparedness	Emergency procedures

Progress of implementation				
Proposed	Not Started	Planning Ongoing	On Going Construction	Completed

Implementation timeframes	Cost	Responsible bodies
2016 – 2021 2022 – 2027	€ 85.000	Eastern Alps District Basin Authority

Measure description

M35_2 – Watercourses integrated maintenance and management guidelines.

Morphological survey of watercourses to support the redaction of the integrated management guidelines. This hydro-morphological monitoring should evaluate the current impacts of both pressures and of the intervention already in place.

Measure location

Veneto's regional basins

2.2. Venice watershed and lagoon

Measure class and typology	Measure Name	Measure Location	1st phase - (2016 - 2021)	2nd phase (2022 - 2027)	Cost (€)	Hazard targeted
M31_1 – Water discharges and	Interventi di ripascimento periodico ogni 10 anni pari al 10% del volume di sabbia	Litorali di Pellestrina, Lido	1		12.500.000	S

Measure class and typology	Measure Name	Measure Location	1st phase - (2016 - 2021)	2nd phase (2022 - 2027)	Cost (€)	Hazard targeted
floods natural retention	refluita inizialmente. Lavori di ripascimento di circa Mmc/10 anni nei litorali di Pellestrina e di Lido di Venezia			1	12.500.000	S
M32_1 – Hydraulic discharges retention	Progettazione dei lavori di :Costruzione di casse di espansione e laminazione per la riduzione dei picchi di piena da realizzare lungo l'alto bacino del fiume Marzenego (PG_044 e PG_045)	Noale, Trebaseleghe, Piombino Dese, Loreggia, Resana, Massanzago	1		343.000	F
M33_1 – Riverbed, floodplain and coastal defence and regulation interventions	Progettazione dei lavori di :Completamento della sistemazione idraulico-ambientale dello scolo Lusore a monte della botte a sifone del Taglio di Mirano - II Stralcio (PG_077), 1° Lotto	Mirano, Santa Maria di Sala, Villanova di Camposampiero, Borgoricco	1		245.000	F
	Progettazione dei lavori di :Interventi di rinaturalizzazione e di riduzione dei picchi di piena nell'alto bacino del Fiume Dese (PG_177)	Scorzè, Trebaseleghe, Piombino Dese, Resana	1		406.000	F
	Interventi per la salvaguardia di Venezia e della laguna di competenza dello Stato, in attuazione della legge 798/84 - Sistema MOSE	Bocche di porto, sistema MOSE	1		221.000.000	T
				1	221.000.000	T
	Interventi urgente di protezione e ripascimento del litorale di Pellestrina	Litorali di Pellestrina	1		11.000.000	S
	Ripresa di frane estese sia lato fiume che lato campagna, con necessità di diaframmi e jet-grouting	Stra, Fiesso d'Artico, Dolo, Mira	1		1.000.000	F
			1		600.000	F
	Interventi di difesa idrogeologica delle arginature del canale Novissimo	Chioggia (VE) e Codevigo (PD), Campagna Lupia (Ve)	1		1.000.000	F
M34_1 – Urban surface water management	Pulizia ed espurgo del bacino di arrivo dell'impianto idrovoro di Tessera in comune di Venezia	Venezia	1		900.000	F
M35_1 – Hydrographic system maintenance programs	Manutenzione delle opere di difesa costiera di Lido di Venezia e Pellestrina e della Laguna retrostante	Litorali di Pellestrina, Lido, laguna	1		18.000.000	S

- M31_1 – Beach nourishment periodic intervention (every 10 years) on the Pellestrina and Lido di Venezia coasts.

- M32_1 – Flood retention basin construction works for reducing flood peaks along the Marzenego river upper basin.
- M33_1 – Interventions for river basins hydraulic and environmental upgrading, embankments reinforcement, renaturalization and flood peaks reduction of the Dese River, Taglio and Novissimo Canals.
- M33_1 – Recovery of extensive landslides along, around and within riverbanks.
- M33_1 – MOSE system interventions for Venice and its lagoon protection.
- M34_1 – Urban surface water management through Tessera drainage plant's (Venice) cleaning and draining.
- M35_1 – Coastal defence works maintenance programs for Lido di Venezia, Pellestrina and behind lagoon.

The planned protection measures target water outflows, rainwaters and floods defence, management and regulation interventions along riverbeds, floodplains as well as coasts of the Venetian area, thus exclusively targeting different hazards from rivers (rainwater and rivers floods) and the sea (high tides and storm surges). The cost of these structural measures outweighs all the others, with around 40 million euros for river and coastal protections and 220 million for the MOSE system alone.

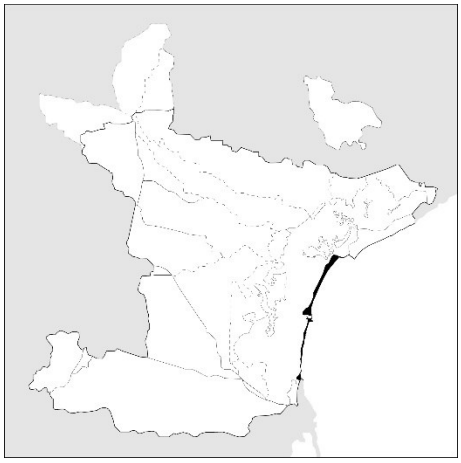
Targeted Hazard				
Severe rainfalls (R)	Floods (F)	Severe winds (W)	High tides (T)	Coastal storm surges (S)
Contribution to FRM and CCA				
Understanding and assessing DR	Forecasting and assessing hazards	Reducing DR impacts	Hazard mitigation and dispersion	
Protecting exposed elements	DR informed governance	Awareness and preparedness	Emergency procedures	
Progress of implementation				
Proposed	Not Started	Planning Ongoing	On Going Construction	Completed
Implementation timeframes	**Cost**	**Responsible bodies**		
2016 – 2021 2022 – 2027	€ 12.500.000	Public Works Superintendency		

Measure description

M31_1 – Water discharges and floods natural retention.

Beach sand nourishment periodic interventions (every 10 years) on the Pellestrina and Lido di Venezia coasts.

Measure location



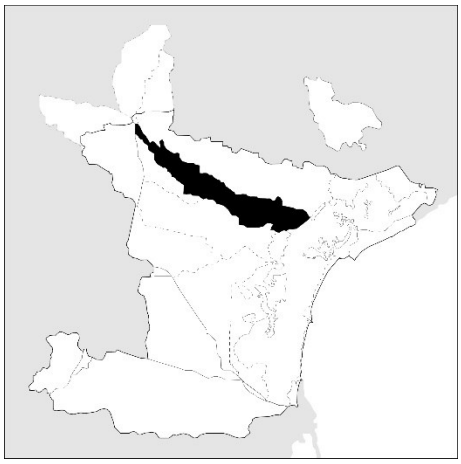
Targeted Hazard				
Severe rainfalls (R)	Floods (F)	Severe winds (W)	High tides (T)	Coastal storm surges (S)
Contribution to FRM and CCA				
Understanding and assessing DR	Forecasting and assessing hazards	Reducing DR impacts	Hazard mitigation and dispersion	
Protecting exposed elements	DR informed governance	Awareness and preparedness	Emergency procedures	
Progress of implementation				
Proposed	Not Started	Planning Ongoing	On Going Construction	Completed
Implementation timeframes	**Cost**	**Responsible bodies**		
2016 – 2021 2022 – 2027	€ 343.000	Veneto Region		

Measure description

M32_1 – Hydraulic discharges retention.

Construction works of flood retention basins for reducing flood peaks along the Marzenego river upper basin.

Measure location



Targeted Hazard				
Severe rainfalls (R)	Floods (F)	Severe winds (W)	High tides (T)	Coastal storm surges (S)
Contribution to FRM and CCA				

Measure description

M33_1 – Riverbed, floodplain and coastal defence and regulation interventions.

Understanding and assessing DR	Forecasting and assessing hazards	Reducing DR impacts	Hazard mitigation and dispersion
Protecting exposed elements	DR informed governance	Awareness and preparedness	Emergency procedures

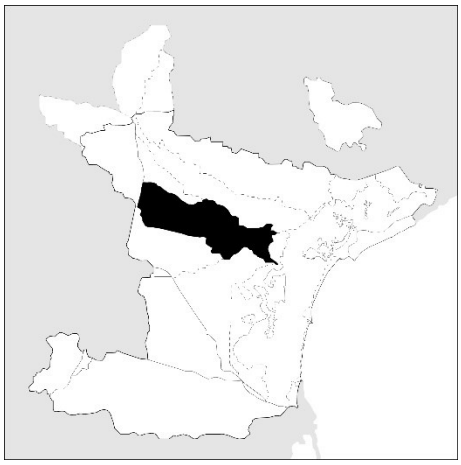
Progress of implementation

Proposed	Not Started	Planning Ongoing	On Going Construction	Completed

Implementation timeframes	Cost	Responsible bodies
2016 – 2021 2022 – 2027	€ 245.000	Veneto Region

Intervention for river basins hydraulic and environmental upgrading of the Lusore and Taglio Canals.

Measure location



Targeted Hazard

Severe rainfalls (R)	Floods (F)	Severe winds (W)	High tides (T)	Coastal storm surges (S)

Contribution to FRM and CCA

Understanding and assessing DR	Forecasting and assessing hazards	Reducing DR impacts	Hazard mitigation and dispersion
Protecting exposed elements	DR informed governance	Awareness and preparedness	Emergency procedures

Progress of implementation

Proposed	Not Started	Planning Ongoing	On Going Construction	Completed

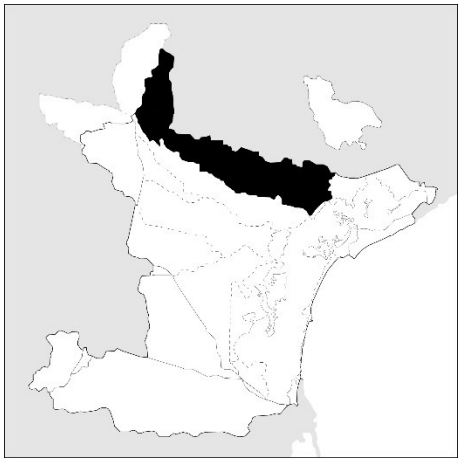
Implementation timeframes	Cost	Responsible bodies
2016 – 2021 2022 – 2027	€ 406.000	Veneto Region

Measure description

M33_1 – Riverbed, floodplain and coastal defence and regulation interventions.

Interventions for renaturalization and flood peaks reduction on the Dese River upper basin.

Measure location



Targeted Hazard

Severe rainfalls (R)	Floods (F)	Severe winds (W)	High tides (T)	Coastal storm surges (S)

Contribution to FRM and CCA

Understanding and assessing DR	Forecasting and assessing hazards	Reducing DR impacts	Hazard mitigation and dispersion

Measure description

M33_1 – Riverbed, floodplain and coastal defence and regulation interventions.

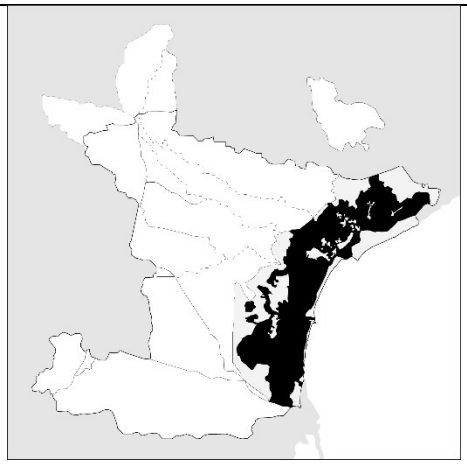
Interventions for Venice and its lagoon protection based on the MOSE system.

Measure location

Protecting exposed elements	DR informed governance	Awareness and preparedness	Emergency procedures

Progress of implementation				
Proposed	Not Started	Planning Ongoing	On Going Construction	Completed

Implementation timeframes	Cost	Responsible bodies
2016 – 2021 2022 – 2027	€ 221.000.000	Public Works Superintendency



Targeted Hazard				
Severe rainfalls (R)	Floods (F)	Severe winds (W)	High tides (T)	Coastal storm surges (S)

Contribution to FRM and CCA			
Understanding and assessing DR	Forecasting and assessing hazards	Reducing DR impacts	Hazard mitigation and dispersion
Protecting exposed elements	DR informed governance	Awareness and preparedness	Emergency procedures

Progress of implementation				
Proposed	Not Started	Planning Ongoing	On Going Construction	Completed

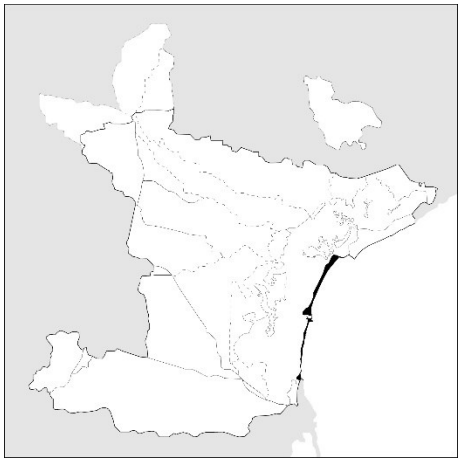
Implementation timeframes	Cost	Responsible bodies
2016 – 2021 2022 – 2027	€ 11.000.000	Public Works Superintendency

Measure description

M33_1 – Riverbed, floodplain and coastal defence and regulation interventions.

Protection and beach nourishment urgent intervention on the Pellestrina coast.

Measure location



Targeted Hazard				
Severe rainfalls (R)	Floods (F)	Severe winds (W)	High tides (T)	Coastal storm surges (S)

Contribution to FRM and CCA			
Understanding and assessing DR	Forecasting and assessing hazards	Reducing DR impacts	Hazard mitigation and dispersion
Protecting exposed elements	DR informed governance	Awareness and preparedness	Emergency procedures

Progress of implementation

Measure description

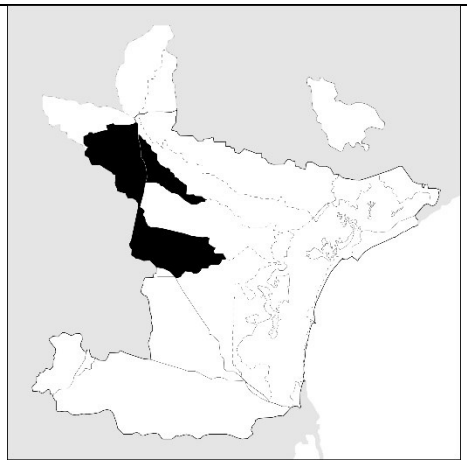
M33_1 – Riverbed, floodplain and coastal defence and regulation interventions.

Recovery of extensive landslides along, around and within riverbanks.

Measure location

Proposed	Not Started	Planning Ongoing	On Going Construction	Completed

Implementation timeframes	Cost	Responsible bodies
2016 – 2021 2022 – 2027	€ 1.000.000 € 600.000	Veneto Region



Targeted Hazard				
Severe rainfalls (R)	Floods (F)	Severe winds (W)	High tides (T)	Coastal storm surges (S)

Contribution to FRM and CCA			
Understanding and assessing DR	Forecasting and assessing hazards	Reducing DR impacts	Hazard mitigation and dispersion
Protecting exposed elements	DR informed governance	Awareness and preparedness	Emergency procedures

Progress of implementation				
Proposed	Not Started	Planning Ongoing	On Going Construction	Completed

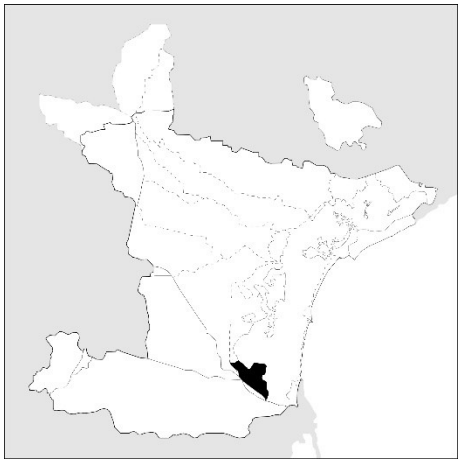
Implementation timeframes	Cost	Responsible bodies
2016 – 2021 2022 – 2027	€ 1.000.000	Veneto Region

Measure description

M33_1 – Riverbed, floodplain and coastal defence and regulation interventions.

Interventions for embankments reinforcement along the Novissimo Canal.

Measure location



Targeted Hazard				
Severe rainfalls (R)	Floods (F)	Severe winds (W)	High tides (T)	Coastal storm surges (S)

Contribution to FRM and CCA			
Understanding and assessing DR	Forecasting and assessing hazards	Reducing DR impacts	Hazard mitigation and dispersion
Protecting exposed elements	DR informed governance	Awareness and preparedness	Emergency procedures

Progress of implementation

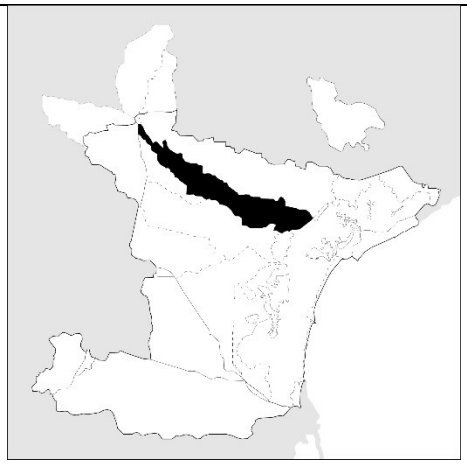
Measure description

M34_1 – Urban surface water management through Tessera (Venice) drainage plant's cleaning and draining.

Measure location

Proposed	Not Started	Planning Ongoing	On Going Construction	Completed

Implementation timeframes	Cost	Responsible bodies
2016 – 2021 2022 – 2027	€ 900.000	Veneto Region



Targeted Hazard				
Severe rainfalls (R)	Floods (F)	Severe winds (W)	High tides (T)	Coastal storm surges (S)

Contribution to FRM and CCA			
Understanding and assessing DR	Forecasting and assessing hazards	Reducing DR impacts	Hazard mitigation and dispersion
Protecting exposed elements	DR informed governance	Awareness and preparedness	Emergency procedures

Progress of implementation				
Proposed	Not Started	Planning Ongoing	On Going Construction	Completed

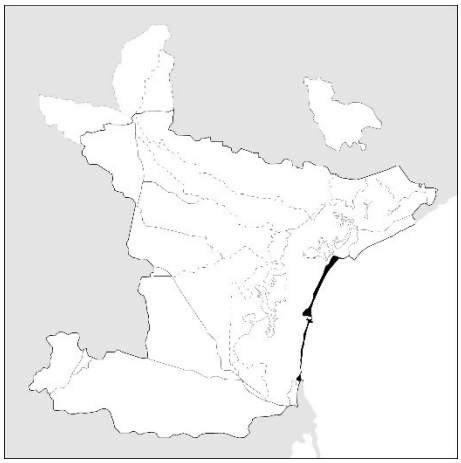
Implementation timeframes	Cost	Responsible bodies
2016 – 2021 2022 – 2027	€ 18.000.000	Public Works Superintendency

Measure description

M35_1 – Hydrographic system maintenance programs.

Coastal defence works maintenance programs for Lido di Venezia, Pellestrina and the lagoon behind.

Measure location



3. Preparedness measures (M4)

The preparedness measures planned for the first period (2016-2021) were 9 at the regional scale for a total of 210 thousand euros, and 2 at the Venice watershed and lagoon scale for 15,25 million euros. The measures continuing in both planning periods (2016-2027) at the regional level are 14 for which are founded 755 thousand euros. The second phase of the plan (2022-2027) funded 15 new measures at the regional level for 1,557 million euros.

3.1. Regional scale

Measure class and typology	Measure Name	1st phase - (2016 - 2021)	2nd phase (2022 - 2027)	Cost (€)	Hazard targeted
M41_1 – Flood forecasting and early warning	Accordo tra ISPRA e Reg Veneto per l'utilizzo dei dati di monitoraggio e previsione meteo marina ai fini dell'allertamento rispetto al rischio di inondazione costiero lagunare e foci fluviali in relazione alle funzioni del CFD della Protezione Civile	1		0	S - T
	Dotare il Servizio Meteorologico Regionale afferente al Centro Funzionale Decentrato, di modellistica meteorologica a scala locale, capace di aggregare le precipitazioni previste nell'intervallo temporale di 1 ora.	1		30.000	R - F
	Installazione di un microradar meteorologico in banda X e sviluppo di un software di segnalazione automatica dell'allarme al verificarsi di precipitazioni intense [sviluppare un software capace di elaborare in automatico e in tempo reale le immagini provenienti dai radar meteorologici regionali al fine di individuare le precipitazioni intense e di allertare via SMS una serie di utenti predefiniti (autorità locali di protezione civile, vigili del fuoco, ecc.) nelle aree interessate dai fenomeni stessi.]	1		30.000	R - F
	Omogeneizzazione dei messaggi di allertamento secondo protocolli nazionali	1		10.000	
	Acquisizione di una piattaforma software per la visualizzazione unificata dei modelli idrologici e idraulici presso il CFD della Regione Veneto	1	1	30.000 10.000	R - F
	Campagna di misure di portata e definizione delle scale di deflusso dei principali corsi d'acqua del Veneto		1	900.000	R - F
	Integrazione del Sistema operativo di previsione dei fenomeni di mareggiata in Alto Adriatico nell'ambito delle attività del Centro Funzionale Decentrato.		1	60.000	S - T
	Rafforzamento del numero di operatori dedicati alla Sala Operativa Regionale nell'ordinario e in corso di evento alluvionale		1	166.164	R - F
	Revisione delle procedure inerenti il sistema di allertamento in uso presso il Centro Funzionale Decentrato		1	10.000	R - F
	Revisione delle soglie complesse delle zone di allerta del territorio regionale in uso al Centro Funzionale Decentrato e utilizzate nella valutazione dei livelli di allerta		1	20.000	

Measure class and typology	Measure Name	1st phase - (2016 - 2021)	2nd phase (2022 - 2027)	Cost (€)	Hazard targeted
	Sistema di monitoraggio e previsione meteo-marina ai fini dell'allertamento rispetto al rischio di inondazione costiero-lagunare e foci fluviali	1	1	350.000	S
M42_1 – Emergency plans update	Promozione dell'aggiornamento dei Piani comunali di emergenza e adeguamento dei loro contenuti in accordo con le direttive del DNPC ed in relazione alle priorità di intervento, tenendo conto, in particolare, degli scenari alluvionali	1		40.000	
	Acquisizione di una nuova piattaforma informatica di diffusione delle allerte e di gestione delle strutture operative da utilizzarsi presso il Centro Funzionale Decentrato e la Sala Operativa Regionale		1	48.190	
	Adozione di una nuova normativa regionale in materia di protezione civile e sistema di allertamento (in particolare Legge Regionale di Protezione Civile e DGR)		1	50.000	
	Attivazioni di convenzioni e accordi con le società che gestiscono i vari servizi pubblici essenziali (es. Società Autostrade, Ferrovie dello Stato, ASL...) per favorire il ripristino delle condizioni di normalità post evento		1	240.000	
	Redazione dei Piani di emergenza delle grandi dighe (PED)		1	3.900	R - F
	Redazione del Piano di protezione civile regionale per rischio idraulico		1	50.000	R - F
	Redazione di Linee guida regionali inerenti la pianificazione di protezione civile per rischio idraulico a livello locale in linea con la relativa Direttiva del Presidente del Consiglio dei Ministri 30 aprile 2021		1	800	R - F
M42_10 – Information platform on polluting sources.	Predisposizione di una piattaforma informativa ai fini di tutela ambientale condivisa tra tutti i gestori coinvolti nella gestione del'emergenza, con l'inserimento dei dati relativi alle potenziali fonti di inquinamento legati ad eventi alluvionali	1	1	30.000 50.000	
M42_2 – Emergency intervention protocols for cultural heritage	Predisposizione di protocolli di intervento da adottare in caso di emergenza per la salvaguardia del patrimonio culturale	1	1	3.000	
M42_3 – Emergency intervention protocols for environmental heritage	Predisposizione protocolli operativi di intervento da adottare in caso di emergenza per la salvaguardia dell'ambiente	1	1	4.000 20.000	
M42_4 – Emergency protocols guidelines for cultural heritage protection	Elaborazione di linee guida sulle operazioni da effettuare in caso di emergenza per la salvaguardia del patrimonio culturale	1	1	6.000 10.000	
M42_5 – Safe shelters for cultural heritage assets	Coordinamento per l'Individuazione di depositi sicuri che possano diventare ricoveri di beni culturali mobili per affrontare un primo intervento di messa in sicurezza	1		20.000	

Measure class and typology	Measure Name	1st phase - (2016 - 2021)	2nd phase (2022 - 2027)	Cost (€)	Hazard targeted
	Individuazione di depositi sicuri che possano diventare ricoveri di beni culturali mobili per affrontare un primo intervento di messa in sicurezza	1	1	65.000	
M42_6 – Rescue teams' preparation for cultural heritage protection	Preparazione e formazione di squadre di soccorso, con specifico riferimento alla salvaguardia del patrimonio culturale, a seconda delle diverse categorie (cose immobili o cose mobili) e tipologie, nonché in base alla proprietà (pubblica o privata)	1	1	10.000 20.000	
	Supporto alla preparazione e formazione di squadre di soccorso per la salvaguardia del patrimonio culturale in caso di eventi calamitosi	1	1	6.000	
M42_7 – Rescue teams' preparation for environmental heritage protection	Formazione e preparazione di squadre di soccorso con specifico riferimento alla salvaguardia ambientale, con il coinvolgimento di tutti i soggetti coinvolti nella gestione dell'emergenza e della tutela ambientale	1	1	13.000 30.000	
	Corsi di formazione per Sindaci e Tecnici comunali inerenti le linee guida sulla pianificazione di protezione civile		1	1.000	
	Corsi di formazione per Sindaci e Tecnici comunali, componenti e strutture operative del sistema regionale di PC inerenti il sistema di allertamento per rischio idraulico		1	6.000	
	Corso QGIS per sindaci/tecnici comunali ai fini della redazione dei piani di protezione civile per rischio idraulico		1	1.000	
M42_8 –Rescue teams (volunteers) preparation and training	Formazione e preparazione di squadre di soccorso, in particolare volontarie, con specifica formazione per le attività di monitoraggio e di gestione del rischio idraulico	1	1	20.000 25.000	
M42_9 – Civil Protection Department information platform	Assegnazione di codici di relazione dei campi significativi tra le varie piattaforme del MIBACT e la piattaforma informativa condivisibile tra il Dipartimento di protezione civile e varie Amministrazioni pubbliche	1	1	150.000	
	Predisposizione di una piattaforma informativa condivisibile tra il Dipartimento di protezione civile e varie Amministrazioni pubbliche, in cui sono inseriti dati utili all'attuazione di azioni e misure di protezione dai rischi legati ad eventi calamitosi	1		75.000	
M43_2 – District level citizens' observatory	Definizione di linee guida per sviluppare l'osservatorio dei cittadini al fine di incrementare le banche dati e i canali di comunicazione durante gli eventi alluvionali anche attraverso l'utilizzo di modelli di resilienza.Applicazione a scala distrettuale		1	0	
M43_3 – Technical and citizen education campaigns	Miglioramento della consapevolezza pubblica delle condizioni di rischio del proprio territorio e dei comportamenti da adottare in caso di calamità attraverso specifiche campagne di educazione di tecnici e cittadini	1	1	6.000 5.900	

Measure class and typology	Measure Name	1st phase - (2016 - 2021)	2nd phase (2022 - 2027)	Cost (€)	Hazard targeted
M43_4 – "Io non rischio" (I don't take risks) citizen education campaigns	Campagna di educazione ed informazione alla popolazione "io non rischio" finalizzata alla conoscenza dei rischi territoriali e alle misure previste nei piani locali di protezione civile, al fine di sviluppare la capacità di resilienza in caso di emergenza	1		1.000	
M43_5 – Population behaviour flood risk models	Sviluppo di modelli integrati di valutazione del rischio con particolare riferimento al comportamento della popolazione in occasione di eventi alluvionali (esposizione)	1		4.000	R - F
M43_6 – Cultural and landscape heritage flood risk models	Sviluppo di modelli integrati di valutazione del rischio con particolare riferimento: B) al patrimonio culturale (aggiornamento dei parametri di vulnerabilità assegnati al patrimonio culturale (beni culturali e beni paesaggistici) da parte del Distretto)	1	1	10.000	

In the previous phases of the plan (2016 – 2021), preparedness to disaster has been addressed through floods forecasting and early warning initiatives (M41_1) as:

- Marine weather monitoring and forecasting, using national and regional data, to support early warning and alerts in case of coastal flooding of the lagoon and river outlets;
- Local scale meteorological modelling for the Regional Meteorological Service, specifically deemed to the aggregation of expected rainfalls within 1-hour time frame;
- Early warning systems for coastal flooding of the lagoon and river outlets;
- Development of a real-time-automatic software which, in case of heavy rainfalls, alerts responsible authorities (local civil protection authorities, firefighters, etc.) in the affected areas;
- Warning messages homogenization to national protocols;
- Acquisition of a software platform for the unified visualization of hydrological and hydraulic models at the regional level.

To these floods forecasting and early warning measures (M41_1), new ones were planned for the 2022 – 2027 period, concerning particularly Veneto Region's Civil Protection "Decentralized Functional Centres" (CFD):

- Rivers' flow and discharge rates measurements and definition;
- Waterflow of the flow scales of the main watercourses of the Veneto
- Integration of the Upper Adriatic storm forecasting system in the Decentralized Functional Centre's activities;
- Increasing Civil Protection Regional Operations Centre's operators, both in peacetime and during flood emergencies;

- Decentralized Functional Centre's warning system procedures review;
- Review of regional warning zones thresholds and related warning level assessment in use by the Decentralized Functional Centre.

Another substantial preparedness section refers to civil protection's emergency plans update (M42_1), which planned for the 2022 – 2027:

- Adoption of a new civil protection and early warning system regional legislation;
- Drafting of the regional civil protection plan for hydrometeorological hazards;
- Drafting of sectoral emergency plans for large dams;
- Drafting of regional guidelines concerning civil protection planning for hydrometeorological hazards at the local level in line with the relative national Directive;
- Municipal emergency plans update, in line to national directives and to flood risk scenarios;
- IT platform acquisition for disseminating warnings and the management of operational structures, to support the Decentralized Functional Centre and the Regional Operations Centre;
- Conventions and agreements with public services and transportation companies, supporting recoveries back to normal after flood events.

Further civil protection related measures, planned particularly for the 2022 – 2027 period, focus on the preparedness of specific exposed elements: population and its behaviour during floods, but most of all the monitoring, safeguarding and preservation of both the cultural and environmental heritage.

- Development of integrated flood risk assessment models, particularly targeting population behaviour during flood events (M43_5), and cultural and landscape heritage vulnerability parameters update (M43_6);
- Guidelines definition and development of a citizens' observatory to increase databases and communication channels during flood events (M43_2);
- Technical and citizen education campaigns to improve flood risk public awareness, disseminating the local civil protection plans measures (M43_4), and informing on appropriate emergency behaviours (M43_3);
- Definition of emergency intervention protocols for cultural (M42_2) and environmental (M42_3) heritage protection;
- Emergency protocols guidelines for cultural heritage protection (M42_4), identifying also safe deposits location for safely sheltering assets (M42_4);
- Rescue teams preparation and training, with specific reference to hydrometeorological risk monitoring and management (M42_8), and to cultural heritage safeguarding (M42_6), considering the different categories, types, and ownership;

- Rescue team's preparation and training specifically targeting environmental protection (M42_7), with training courses for all the personnel involved, particularly mayors and municipal technicians;
- Adoption of information platforms between the Civil Protection Department and local administrations for coordinating flood risk management interventions (M42_9), cultural heritage assets' codes and identifications (M42_9), pollution sources that might be exposed or relevant in case of flooding events (M42_10).

This set of preparedness measures, often planned for either the whole hydrographic district or Veneto Region, covers floods, tides and storm surges forecasting, early warning systems, emergency plans and protocols, awareness and preparedness campaign. The budget for such wide variety of interventions is set around the 2,5 million euros.

Targeted Hazard				
Severe rainfalls (R)	Floods (F)	Severe winds (W)	High tides (T)	Coastal storm surges (S)
Contribution to FRM and CCA				
Understanding and assessing DR	Forecasting and assessing hazards	Reducing DR impacts	Hazard mitigation and dispersion	
Protecting exposed elements	DR informed governance	Awareness and preparedness	Emergency procedures	
Progress of implementation				
Proposed	Not Started	Planning Ongoing	On Going Construction	Completed

Implementation timeframes	Cost	Responsible bodies
2016 – 2021 2022 – 2027	/	Veneto Region, National Environmental Agency (ISPRA), Eastern Alps District Basin Authority

Measure description

M41_1 – Flood forecasting and early warning.

Marine weather monitoring and forecasting, based on the agreement between the National Environmental Agency (ISPRA) and the Veneto Region for sharing the needed data, so to support early warning and alerts in case of coastal flooding of the lagoon and of river outlets.

Measure location

Veneto's coastal areas

Targeted Hazard				
Severe rainfalls (R)	Floods (F)	Severe winds (W)	High tides (T)	Coastal storm surges (S)
Contribution to FRM and CCA				
Understanding and assessing DR	Forecasting and assessing hazards	Reducing DR impacts	Hazard mitigation and dispersion	
Protecting exposed elements	DR informed governance	Awareness and preparedness	Emergency procedures	
Progress of implementation				
Proposed	Not Started	Planning Ongoing	On Going Construction	Completed

Implementation timeframes	Cost	Responsible bodies
2016 – 2021 2022 – 2027	€ 30.000	Veneto Region

Measure description

M41_1 – Flood forecasting and early warning.

Equip the Regional Meteorological Service with local scale meteorological modelling, specifically deemed to the aggregation of expected rainfalls within 1-hour time frame.

Measure location

Veneto's regional basins

Targeted Hazard				
Severe rainfalls (R)	Floods (F)	Severe winds (W)	High tides (T)	Coastal storm surges (S)

Measure description

M41_1 – Flood forecasting and early warning.

Contribution to FRM and CCA			
Understanding and assessing DR	Forecasting and assessing hazards	Reducing DR impacts	Hazard mitigation and dispersion
Protecting exposed elements	DR informed governance	Awareness and preparedness	Emergency procedures

Progress of implementation				
Proposed	Not Started	Planning Ongoing	On Going Construction	Completed

Implementation timeframes	Cost	Responsible bodies
2016 – 2021 2022 – 2027	€ 30.000	Veneto Region

Adoption of a meteorological micro-radar and related development of a real-time-automatic software which, in case of heavy rainfalls, alerts responsible authorities (local civil protection authorities, firefighters, etc.) in the affected areas.

Measure location

Veneto's regional basins

Targeted Hazard				
Severe rainfalls (R)	Floods (F)	Severe winds (W)	High tides (T)	Coastal storm surges (S)

Contribution to FRM and CCA			
Understanding and assessing DR	Forecasting and assessing hazards	Reducing DR impacts	Hazard mitigation and dispersion
Protecting exposed elements	DR informed governance	Awareness and preparedness	Emergency procedures

Progress of implementation				
Proposed	Not Started	Planning Ongoing	On Going Construction	Completed

Implementation timeframes	Cost	Responsible bodies
2016 – 2021 2022 – 2027	€ 10.000	Veneto Region

Measure description

M41_1 – Flood forecasting and early warning.

Warning messages homogenization to national protocols.

Measure location

Veneto's regional basins

Targeted Hazard				
Severe rainfalls (R)	Floods (F)	Severe winds (W)	High tides (T)	Coastal storm surges (S)

Contribution to FRM and CCA			
Understanding and assessing DR	Forecasting and assessing hazards	Reducing DR impacts	Hazard mitigation and dispersion
Protecting exposed elements	DR informed governance	Awareness and preparedness	Emergency procedures

Measure description

M41_1 – Flood forecasting and early warning.

Acquisition of a software platform for the unified visualization of hydrological and hydraulic models at the regional level.

Measure location

Veneto's regional basins

Progress of implementation				
Proposed	Not Started	Planning Ongoing	On Going Construction	Completed

Implementation timeframes	Cost	Responsible bodies
2016 – 2021 2022 – 2027	€ 30.000 (P1) € 10.000 (P2)	Veneto Region

Targeted Hazard				
Severe rainfalls (R)	Floods (F)	Severe winds (W)	High tides (T)	Coastal storm surges (S)

Contribution to FRM and CCA			
Understanding and assessing DR	Forecasting and assessing hazards	Reducing DR impacts	Hazard mitigation and dispersion
Protecting exposed elements	DR informed governance	Awareness and preparedness	Emergency procedures

Progress of implementation				
Proposed	Not Started	Planning Ongoing	On Going Construction	Completed

Implementation timeframes	Cost	Responsible bodies
2016 – 2021 2022 – 2027	€ 900.000	Veneto Region

Measure description

M41_1 – Flood forecasting and early warning.

Initiative for rivers' flow and discharge rates measurements and definition of Veneto main watercourses.

Measure location

Veneto's regional basins

Targeted Hazard				
Severe rainfalls (R)	Floods (F)	Severe winds (W)	High tides (T)	Coastal storm surges (S)

Contribution to FRM and CCA			
Understanding and assessing DR	Forecasting and assessing hazards	Reducing DR impacts	Hazard mitigation and dispersion
Protecting exposed elements	DR informed governance	Awareness and preparedness	Emergency procedures

Progress of implementation				
Proposed	Not Started	Planning Ongoing	On Going Construction	Completed

Implementation timeframes	Cost	Responsible bodies

Measure description

M41_1 – Flood forecasting and early warning.

Integration of the Upper Adriatic storm forecasting system in the Decentralized Functional Centre's activities.

Measure location

Veneto's regional basins

2016 – 2021 2022 – 2027	€ 60.000	Veneto Region	

Targeted Hazard				
Severe rainfalls (R)	Floods (F)	Severe winds (W)	High tides (T)	Coastal storm surges (S)
Contribution to FRM and CCA				
Understanding and assessing DR	Forecasting and assessing hazards	Reducing DR impacts	Hazard mitigation and dispersion	
Protecting exposed elements	DR informed governance	Awareness and preparedness	Emergency procedures	
Progress of implementation				
Proposed	Not Started	Planning Ongoing	On Going Construction	Completed

Implementation timeframes	Cost	Responsible bodies
2016 – 2021 2022 – 2027	€ 166.164	Veneto Region

Measure description

M41_1 – Flood forecasting and early warning.

Increase the number of Civil Protection Regional Operations Centre's operators, both in peacetime and during flood emergencies.

Measure location

Veneto's regional basins

Targeted Hazard				
Severe rainfalls (R)	Floods (F)	Severe winds (W)	High tides (T)	Coastal storm surges (S)
Contribution to FRM and CCA				
Understanding and assessing DR	Forecasting and assessing hazards	Reducing DR impacts	Hazard mitigation and dispersion	
Protecting exposed elements	DR informed governance	Awareness and preparedness	Emergency procedures	
Progress of implementation				
Proposed	Not Started	Planning Ongoing	On Going Construction	Completed

Implementation timeframes	Cost	Responsible bodies
2016 – 2021 2022 – 2027	€ 10.000	Veneto Region

Measure description

M41_1 – Flood forecasting and early warning.

Review of the Decentralized Functional Centre's warning system procedures.

Measure location

Veneto's regional basins

Targeted Hazard	Measure description

<table>
<tr><td>Severe rainfalls (R)</td><td>Floods (F)</td><td>Severe winds (W)</td><td>High tides (T)</td><td>Coastal storm surges (S)</td></tr>
<tr><td colspan="5">Contribution to FRM and CCA</td></tr>
<tr><td>Understanding and assessing DR</td><td>Forecasting and assessing hazards</td><td>Reducing DR impacts</td><td colspan="2">Hazard mitigation and dispersion</td></tr>
<tr><td>Protecting exposed elements</td><td>DR informed governance</td><td>Awareness and preparedness</td><td colspan="2">Emergency procedures</td></tr>
<tr><td colspan="5">Progress of implementation</td></tr>
<tr><td>Proposed</td><td>Not Started</td><td>Planning Ongoing</td><td>On Going Construction</td><td>Completed</td></tr>
<tr><td colspan="2">Implementation timeframes</td><td colspan="2">Cost</td><td>Responsible bodies</td></tr>
<tr><td colspan="2">2016 – 2021
2022 – 2027</td><td colspan="2">€ 20.000</td><td>Veneto Region</td></tr>
</table>

M41_1 – Flood forecasting and early warning.

Review of regional warning zones thresholds and related warning level assessment in use by the Decentralized Functional Centre.

Measure location

Veneto's regional basins

<table>
<tr><td colspan="5">Targeted Hazard</td></tr>
<tr><td>Severe rainfalls (R)</td><td>Floods (F)</td><td>Severe winds (W)</td><td>High tides (T)</td><td>Coastal storm surges (S)</td></tr>
<tr><td colspan="5">Contribution to FRM and CCA</td></tr>
<tr><td>Understanding and assessing DR</td><td>Forecasting and assessing hazards</td><td>Reducing DR impacts</td><td colspan="2">Hazard mitigation and dispersion</td></tr>
<tr><td>Protecting exposed elements</td><td>DR informed governance</td><td>Awareness and preparedness</td><td colspan="2">Emergency procedures</td></tr>
<tr><td colspan="5">Progress of implementation</td></tr>
<tr><td>Proposed</td><td>Not Started</td><td>Planning Ongoing</td><td>On Going Construction</td><td>Completed</td></tr>
<tr><td colspan="2">Implementation timeframes</td><td colspan="2">Cost</td><td>Responsible bodies</td></tr>
<tr><td colspan="2">2016 – 2021
2022 – 2027</td><td colspan="2">€ 350.000</td><td>National Environmental Agency (ISPRA), Eastern Alps District Basin Authority</td></tr>
</table>

Measure description

M41_1 – Flood forecasting and early warning.

Meteorological and marine monitoring and forecasting system for early warnings in case of storm surges and riverine floods.

Measure location

Veneto's coastal areas

<table>
<tr><td colspan="5">Targeted Hazard</td></tr>
<tr><td>Severe rainfalls (R)</td><td>Floods (F)</td><td>Severe winds (W)</td><td>High tides (T)</td><td>Coastal storm surges (S)</td></tr>
<tr><td colspan="5">Contribution to FRM and CCA</td></tr>
</table>

Measure description

M42_1 – Emergency plans update.

Promotion of municipal emergency plans contents update in compliance with national

Understanding and assessing DR	Forecasting and assessing hazards	Reducing DR impacts	Hazard mitigation and dispersion	directives and prioritization, in line with flood risk scenarios.
Protecting exposed elements	DR informed governance	Awareness and preparedness	Emergency procedures	**Measure location**
Progress of implementation				Veneto's regional basins
Proposed	Not Started	Planning Ongoing	On Going Construction	Completed
Implementation timeframes	**Cost**	**Responsible bodies**		
2016 – 2021 2022 – 2027	€ 40.000	Veneto Region		

Targeted Hazard				**Measure description**
Severe rainfalls (R)	Floods (F)	Severe winds (W)	High tides (T)	Coastal storm surges (S)	M42_1 – Emergency plans update.
Contribution to FRM and CCA				Acquisition of an IT platform for disseminating alerts and warnings and for the management of operational structures, so as to support the Decentralized Functional Centre and the Regional Operations Centre.
Understanding and assessing DR	Forecasting and assessing hazards	Reducing DR impacts	Hazard mitigation and dispersion	
Protecting exposed elements	DR informed governance	Awareness and preparedness	Emergency procedures	**Measure location**
Progress of implementation				Veneto's regional basins
Proposed	Not Started	Planning Ongoing	On Going Construction	Completed
Implementation timeframes	**Cost**	**Responsible bodies**		
2016 – 2021 2022 – 2027	€ 48.190	Veneto Region		

Targeted Hazard				**Measure description**
Severe rainfalls (R)	Floods (F)	Severe winds (W)	High tides (T)	Coastal storm surges (S)	M42_1 – Emergency plans update.
Contribution to FRM and CCA				Adoption of a new regional legislation for civil protection and early warning system matters.
Understanding and assessing DR	Forecasting and assessing hazards	Reducing DR impacts	Hazard mitigation and dispersion	
Protecting exposed elements	DR informed governance	Awareness and preparedness	Emergency procedures	**Measure location**
Progress of implementation				Veneto's regional basins

Proposed	Not Started	Planning Ongoing	On Going Construction	Completed	
Implementation timeframes		**Cost**		**Responsible bodies**	
2016 – 2021 2022 – 2027		€ 50.000		Veneto Region	

Targeted Hazard					**Measure description** M42_1 – Emergency plans update. Conventions and agreements with public services and transportation companies, to support recoveries back to normal after flood events. **Measure location** Veneto's regional basins
Severe rainfalls (R)	Floods (F)	Severe winds (W)	High tides (T)	Coastal storm surges (S)	
Contribution to FRM and CCA					
Understanding and assessing DR	Forecasting and assessing hazards	Reducing DR impacts	Hazard mitigation and dispersion		
Protecting exposed elements	DR informed governance	Awareness and preparedness	Emergency procedures		
Progress of implementation					
Proposed	Not Started	Planning Ongoing	On Going Construction	Completed	
Implementation timeframes		**Cost**		**Responsible bodies**	
2016 – 2021 2022 – 2027		€ 240.000		Veneto Region	

Targeted Hazard					**Measure description** M42_1 – Emergency plans update. Drafting of sectoral emergency plans for large dams. **Measure location** Veneto's regional basins
Severe rainfalls (R)	Floods (F)	Severe winds (W)	High tides (T)	Coastal storm surges (S)	
Contribution to FRM and CCA					
Understanding and assessing DR	Forecasting and assessing hazards	Reducing DR impacts	Hazard mitigation and dispersion		
Protecting exposed elements	DR informed governance	Awareness and preparedness	Emergency procedures		
Progress of implementation					
Proposed	Not Started	Planning Ongoing	On Going Construction	Completed	
Implementation timeframes		**Cost**		**Responsible bodies**	
2016 – 2021		€ 3.900		Veneto Region	

2022 – 2027			

Targeted Hazard					**Measure description** M42_1 – Emergency plans update. Drafting of the regional civil protection plan for hydrometeorological hazards. **Measure location** Veneto's regional basins
Severe rainfalls (R)	Floods (F)	Severe winds (W)	High tides (T)	Coastal storm surges (S)	
Contribution to FRM and CCA					
Understanding and assessing DR	Forecasting and assessing hazards	Reducing DR impacts	Hazard mitigation and dispersion		
Protecting exposed elements	DR informed governance	Awareness and preparedness	Emergency procedures		
Progress of implementation					
Proposed	Not Started	Planning Ongoing	On Going Construction	Completed	
Implementation timeframes		**Cost**		**Responsible bodies**	
2016 – 2021 2022 – 2027		€ 50.000		Veneto Region	

Targeted Hazard					**Measure description** M42_1 – Emergency plans update. Drafting of regional guidelines concerning civil protection planning for hydrometeorological hazards at the local level, in line with the relative national Directive. **Measure location** Veneto's regional basins
Severe rainfalls (R)	Floods (F)	Severe winds (W)	High tides (T)	Coastal storm surges (S)	
Contribution to FRM and CCA					
Understanding and assessing DR	Forecasting and assessing hazards	Reducing DR impacts	Hazard mitigation and dispersion		
Protecting exposed elements	DR informed governance	Awareness and preparedness	Emergency procedures		
Progress of implementation					
Proposed	Not Started	Planning Ongoing	On Going Construction	Completed	
Implementation timeframes		**Cost**		**Responsible bodies**	
2016 – 2021 2022 – 2027		€ 800		Veneto Region	

Targeted Hazard	**Measure description**

Severe rainfalls (R)	Floods (F)	Severe winds (W)	High tides (T)	Coastal storm surges (S)
Contribution to FRM and CCA				
Understanding and assessing DR	Forecasting and assessing hazards	Reducing DR impacts	Hazard mitigation and dispersion	
Protecting exposed elements	DR informed governance	Awareness and preparedness	Emergency procedures	
Progress of implementation				
Proposed	Not Started	Planning Ongoing	On Going Construction	Completed

Implementation timeframes	Cost	Responsible bodies
2016 – 2021 2022 – 2027	€ 3.000	MIBACT

M42_2 – Emergency intervention protocols for cultural heritage.

Definition of intervention protocols to adopt in case of an emergency for the protection of cultural heritage assets. This should also support the test of emergency plans' general procedures' effective efficiency.

Measure location

Veneto's regional basins

Targeted Hazard				
Severe rainfalls (R)	Floods (F)	Severe winds (W)	High tides (T)	Coastal storm surges (S)
Contribution to FRM and CCA				
Understanding and assessing DR	Forecasting and assessing hazards	Reducing DR impacts	Hazard mitigation and dispersion	
Protecting exposed elements	DR informed governance	Awareness and preparedness	Emergency procedures	
Progress of implementation				
Proposed	Not Started	Planning Ongoing	On Going Construction	Completed

Implementation timeframes	Cost	Responsible bodies
2016 – 2021 2022 – 2027	€ 4.000 (P1) € 20.000 (P2)	Veneto Region

Measure description

M42_3 – Emergency intervention protocols for environmental heritage.

Definition of intervention protocols to adopt in case of an emergency for the protection of environmental heritage; protocols to be defined involving all environmental protection relevant institutions and bodies.

Measure location

Veneto's regional basins

Targeted Hazard				
Severe rainfalls (R)	Floods (F)	Severe winds (W)	High tides (T)	Coastal storm surges (S)
Contribution to FRM and CCA				
Understanding and assessing DR	Forecasting and assessing hazards	Reducing DR impacts	Hazard mitigation and dispersion	

Measure description

M42_4 – Emergency protocols guidelines for cultural heritage protection.

This measure aims at establishing, for the various types of cultural heritage assets, the guidelines, based on specific protocols, for their protection in case of flooding events.

Protecting exposed elements	DR informed governance	Awareness and preparedness	Emergency procedures	**Measure location** Veneto's regional basins
Progress of implementation				
Proposed	Not Started	Planning Ongoing	On Going Construction	Completed
Implementation timeframes	**Cost**	**Responsible bodies**		
2016 – 2021 2022 – 2027	€ 6.000 (P1) € 10.000 (P2)	Ministry of Culture (MIBACT)		

Targeted Hazard				**Measure description** M42_5 – Safe shelters for cultural heritage assets. Coordination for the identification of safe deposits location for sheltering movable assets in case of an emergency. **Measure location** Veneto's regional basins
Severe rainfalls (R)	Floods (F)	Severe winds (W)	High tides (T)	Coastal storm surges (S)
Contribution to FRM and CCA				
Understanding and assessing DR	Forecasting and assessing hazards	Reducing DR impacts	Hazard mitigation and dispersion	
Protecting exposed elements	DR informed governance	Awareness and preparedness	Emergency procedures	
Progress of implementation				
Proposed	Not Started	Planning Ongoing	On Going Construction	Completed
Implementation timeframes	**Cost**	**Responsible bodies**		
2016 – 2021 2022 – 2027	€ 20.000	Ministry of Culture (MIBACT), Veneto Region		

Targeted Hazard				**Measure description** M42_5 – Safe shelters for cultural heritage assets. Identification of safe deposits location for initially sheltering movable assets after an emergency. **Measure location** Veneto's regional basins
Severe rainfalls (R)	Floods (F)	Severe winds (W)	High tides (T)	Coastal storm surges (S)
Contribution to FRM and CCA				
Understanding and assessing DR	Forecasting and assessing hazards	Reducing DR impacts	Hazard mitigation and dispersion	
Protecting exposed elements	DR informed governance	Awareness and preparedness	Emergency procedures	
Progress of implementation				
Proposed	Not Started	Planning Ongoing	On Going Construction	Completed

Implementation timeframes	Cost	Responsible bodies	
2016 – 2021 2022 – 2027	€ 65.000	Ministry of Culture (MIBACT), Veneto Region	

Targeted Hazard				
Severe rainfalls (R)	Floods (F)	Severe winds (W)	High tides (T)	Coastal storm surges (S)
Contribution to FRM and CCA				
Understanding and assessing DR	Forecasting and assessing hazards	Reducing DR impacts	Hazard mitigation and dispersion	
Protecting exposed elements	DR informed governance	Awareness and preparedness	Emergency procedures	
Progress of implementation				
Proposed	Not Started	Planning Ongoing	On Going Construction	Completed

Implementation timeframes	Cost	Responsible bodies
2016 – 2021 2022 – 2027	€ 10.000 (P1) € 20.000 (P2)	Veneto Region

Measure description

M42_6 – Rescue teams' preparation for cultural heritage protection.

Rescue teams' preparation and training, with specific reference to cultural heritage safeguarding, considering the assets' different categories, types, and ownership.

Measure location

Veneto's regional basins

Targeted Hazard				
Severe rainfalls (R)	Floods (F)	Severe winds (W)	High tides (T)	Coastal storm surges (S)
Contribution to FRM and CCA				
Understanding and assessing DR	Forecasting and assessing hazards	Reducing DR impacts	Hazard mitigation and dispersion	
Protecting exposed elements	DR informed governance	Awareness and preparedness	Emergency procedures	
Progress of implementation				
Proposed	Not Started	Planning Ongoing	On Going Construction	Completed

Implementation timeframes	Cost	Responsible bodies
2016 – 2021 2022 – 2027	€ 6.000	MIBACT

Measure description

M42_6 – Rescue teams' preparation for cultural heritage protection.

Support to rescue teams' preparation and training, with specific reference to cultural heritage safeguarding in case of disasters.

Measure location

Veneto's regional basins

<table>
<tr><td colspan="5">Targeted Hazard</td><td rowspan="6">Measure description
M42_7 – Rescue teams' preparation for environmental heritage protection.
Rescue team's preparation and training specifically targeting environmental protection, with training courses for all the personnel involved both on the environmental and civil protection side.

Measure location
Veneto's regional basins</td></tr>
<tr><td>Severe rainfalls (R)</td><td>Floods (F)</td><td>Severe winds (W)</td><td>High tides (T)</td><td>Coastal storm surges (S)</td></tr>
<tr><td colspan="5">Contribution to FRM and CCA</td></tr>
<tr><td>Understanding and assessing DR</td><td>Forecasting and assessing hazards</td><td>Reducing DR impacts</td><td colspan="2">Hazard mitigation and dispersion</td></tr>
<tr><td>Protecting exposed elements</td><td>DR informed governance</td><td>Awareness and preparedness</td><td colspan="2">Emergency procedures</td></tr>
<tr><td colspan="5">Progress of implementation</td></tr>
<tr><td>Proposed</td><td>Not Started</td><td>Planning Ongoing</td><td>On Going Construction</td><td>Completed</td></tr>
<tr><td colspan="2">Implementation timeframes</td><td colspan="2">Cost</td><td>Responsible bodies</td></tr>
<tr><td colspan="2">2016 – 2021
2022 – 2027</td><td colspan="2">€ 13.000 (P1)
€ 30.000 (P2)</td><td>Veneto Region</td></tr>
</table>

<table>
<tr><td colspan="5">Targeted Hazard</td><td rowspan="6">Measure description
M42_7 – Rescue teams' preparation for environmental heritage protection.
Training courses for mayors and municipal technicians regarding civil protection planning guidelines.

Measure location
Veneto's regional basins</td></tr>
<tr><td>Severe rainfalls (R)</td><td>Floods (F)</td><td>Severe winds (W)</td><td>High tides (T)</td><td>Coastal storm surges (S)</td></tr>
<tr><td colspan="5">Contribution to FRM and CCA</td></tr>
<tr><td>Understanding and assessing DR</td><td>Forecasting and assessing hazards</td><td>Reducing DR impacts</td><td colspan="2">Hazard mitigation and dispersion</td></tr>
<tr><td>Protecting exposed elements</td><td>DR informed governance</td><td>Awareness and preparedness</td><td colspan="2">Emergency procedures</td></tr>
<tr><td colspan="5">Progress of implementation</td></tr>
<tr><td>Proposed</td><td>Not Started</td><td>Planning Ongoing</td><td>On Going Construction</td><td>Completed</td></tr>
<tr><td colspan="2">Implementation timeframes</td><td colspan="2">Cost</td><td>Responsible bodies</td></tr>
<tr><td colspan="2">2016 – 2021
2022 – 2027</td><td colspan="2">€ 1.000</td><td>Veneto Region</td></tr>
</table>

<table>
<tr><td colspan="5">Targeted Hazard</td><td rowspan="3">Measure description
M42_7 – Rescue teams' preparation for environmental heritage protection.</td></tr>
<tr><td>Severe rainfalls (R)</td><td>Floods (F)</td><td>Severe winds (W)</td><td>High tides (T)</td><td>Coastal storm surges (S)</td></tr>
<tr><td colspan="5">Contribution to FRM and CCA</td></tr>
</table>

Understanding and assessing DR	Forecasting and assessing hazards	Reducing DR impacts	Hazard mitigation and dispersion
Protecting exposed elements	DR informed governance	Awareness and preparedness	Emergency procedures

Progress of implementation				
Proposed	Not Started	Planning Ongoing	On Going Construction	Completed

Implementation timeframes	Cost	Responsible bodies
2016 – 2021 2022 – 2027	€ 6.000	Veneto Region

Training courses for mayors and municipal technicians regarding Civil Protection's warning systems in case of flooding events.

Measure location

Veneto's regional basins

Targeted Hazard				
Severe rainfalls (R)	Floods (F)	Severe winds (W)	High tides (T)	Coastal storm surges (S)

Contribution to FRM and CCA			
Understanding and assessing DR	Forecasting and assessing hazards	Reducing DR impacts	Hazard mitigation and dispersion
Protecting exposed elements	DR informed governance	Awareness and preparedness	Emergency procedures

Progress of implementation				
Proposed	Not Started	Planning Ongoing	On Going Construction	Completed

Implementation timeframes	Cost	Responsible bodies
2016 – 2021 2022 – 2027	€ 1.000	Veneto Region

Measure description

M42_7 – Rescue teams' preparation for environmental heritage protection.

GIS training courses for mayors and municipal technicians for the redaction of flood risk civil protection plans.

Measure location

Veneto's regional basins

Targeted Hazard				
Severe rainfalls (R)	Floods (F)	Severe winds (W)	High tides (T)	Coastal storm surges (S)

Contribution to FRM and CCA			
Understanding and assessing DR	Forecasting and assessing hazards	Reducing DR impacts	Hazard mitigation and dispersion
Protecting exposed elements	DR informed governance	Awareness and preparedness	Emergency procedures

Progress of implementation

Measure description

M42_8 –Rescue teams (volunteers) preparation and training

Preparation and training of the volunteers taking part to rescue teams with specific reference to hydrometeorological risk monitoring and management and the related Civil Protection protocols.

Measure location

Proposed	Not Started	Planning Ongoing	On Going Construction	On Going Maintenance	Veneto's regional basins
Implementation timeframes	**Cost**	**Responsible bodies**			
2016 – 2021 2022 – 2027	€ 20.000 (P1) € 25.000 (P2)	Veneto Region			

Targeted Hazard					**Measure description** M42_9 – Civil Protection Department information platform Definition and coordination of cultural heritage assets' codes and identifications bridging the gaps between the National Cultural Heritage platform and the Civil Protection one, to the benefit of local administrations. **Measure location** Veneto's regional basins
Severe rainfalls (R)	Floods (F)	Severe winds (W)	High tides (T)	Coastal storm surges (S)	
Contribution to FRM and CCA					
Understanding and assessing DR	Forecasting and assessing hazards	Reducing DR impacts	Hazard mitigation and dispersion		
Protecting exposed elements	DR informed governance	Awareness and preparedness	Emergency procedures		
Progress of implementation					
Proposed	Not Started	Planning Ongoing	On Going Construction	Completed	
Implementation timeframes	**Cost**	**Responsible bodies**			
2016 – 2021 2022 – 2027	€ 150.000	Ministry of Culture (MIBACT), Civil Protection National Department			

Targeted Hazard					**Measure description** M42_9 – Civil Protection Department information platform Preparation and adoption of an information platform to be shared between the Civil Protection Department and local administrations, providing data (and optimizing local unshared knowledge) useful for implementing and coordinating flood risk management interventions. **Measure location** Veneto's regional basins
Severe rainfalls (R)	Floods (F)	Severe winds (W)	High tides (T)	Coastal storm surges (S)	
Contribution to FRM and CCA					
Understanding and assessing DR	Forecasting and assessing hazards	Reducing DR impacts	Hazard mitigation and dispersion		
Protecting exposed elements	DR informed governance	Awareness and preparedness	Emergency procedures		
Progress of implementation					
Proposed	Not Started	Planning Ongoing	On Going Construction	Completed	
Implementation timeframes	**Cost**	**Responsible bodies**			

2016 – 2021 2022 – 2027	€ 75.000	Veneto Region, Civil Protection National Department, Public Works Superintendency	

Targeted Hazard				
Severe rainfalls (R)	Floods (F)	Severe winds (W)	High tides (T)	Coastal storm surges (S)
Contribution to FRM and CCA				
Understanding and assessing DR	Forecasting and assessing hazards	Reducing DR impacts	Hazard mitigation and dispersion	
Protecting exposed elements	DR informed governance	Awareness and preparedness	Emergency procedures	
Progress of implementation				
Proposed	Not Started	Planning Ongoing	On Going Construction	Completed

Implementation timeframes	Cost	Responsible bodies
2016 – 2021 2022 – 2027	€ 30.000 (P1) € 50.000 (P2)	Veneto Region

Measure description

M42_10 – Information platform on polluting sources.

Adoption of an information platform and related database aimed at environmental protection shared between all the institutions involved in the emergency management, regarding polluting sources that might be exposed or relevant in case of flooding events. The coordination of this information requires better analysis targeting the potentially polluting locations so as to plan their delocalization or other tailored interventions to prevent cascading disasters.

Measure location

Veneto's regional basins

Targeted Hazard				
Severe rainfalls (R)	Floods (F)	Severe winds (W)	High tides (T)	Coastal storm surges (S)
Contribution to FRM and CCA				
Understanding and assessing DR	Forecasting and assessing hazards	Reducing DR impacts	Hazard mitigation and dispersion	
Protecting exposed elements	DR informed governance	Awareness and preparedness	Emergency procedures	
Progress of implementation				
Proposed	Not Started	Planning Ongoing	On Going Construction	Completed

Implementation timeframes	Cost	Responsible bodies
2016 – 2021 2022 – 2027	€ 0	Eastern Alps District Basin Authority, Veneto Region

Measure description

M43_2 – District-level citizens' observatory.

Guidelines definition and development of a district-level citizens' observatory to increase databases and communication channels during flood events, directly involving and coordinating citizens and local organizations in environmental flood-related monitoring.

Measure location

Veneto's regional basins

<table>
<tr><td colspan="5">Targeted Hazard</td><td rowspan="8">Measure description
M43_3 – Technical and citizen education campaigns.
Specific education campaigns informing and improving technicians' and citizens' public awareness of the territory's risk conditions and their preparedness in case of flooding. The periodic and systematic update of technicians allows to maintain and increase their competences and preparation, that of citizens shall raise awareness of the possible hazardous situations to which they are exposed.

Measure location
Veneto's regional basins</td></tr>
<tr><td>Severe rainfalls (R)</td><td>Floods (F)</td><td>Severe winds (W)</td><td>High tides (T)</td><td>Coastal storm surges (S)</td></tr>
<tr><td colspan="5">Contribution to FRM and CCA</td></tr>
<tr><td>Understanding and assessing DR</td><td>Forecasting and assessing hazards</td><td>Reducing DR impacts</td><td colspan="2">Hazard mitigation and dispersion</td></tr>
<tr><td>Protecting exposed elements</td><td>DR informed governance</td><td>Awareness and preparedness</td><td colspan="2">Emergency procedures</td></tr>
<tr><td colspan="5">Progress of implementation</td></tr>
<tr><td>Proposed</td><td>Not Started</td><td>Planning Ongoing</td><td>On Going Construction</td><td>On Going Maintenance</td></tr>
<tr><td colspan="2">Implementation timeframes</td><td colspan="2">Cost</td><td>Responsible bodies</td></tr>
<tr><td colspan="2">2016 – 2021
2022 – 2027</td><td colspan="2">€ 6.000 (P1)
€ 5.900 (P2)</td><td>Veneto Region</td></tr>
</table>

<table>
<tr><td colspan="5">Targeted Hazard</td><td rowspan="8">Measure description
M43_4 – "Io non rischio" (I don't take risks) citizen education campaigns.
Educational and awareness campaign for the population to improve and enhance their resilience to flood risk emergencies through local Civil Protection offices.

Measure location
Veneto's regional basins</td></tr>
<tr><td>Severe rainfalls (R)</td><td>Floods (F)</td><td>Severe winds (W)</td><td>High tides (T)</td><td>Coastal storm surges (S)</td></tr>
<tr><td colspan="5">Contribution to FRM and CCA</td></tr>
<tr><td>Understanding and assessing DR</td><td>Forecasting and assessing hazards</td><td>Reducing DR impacts</td><td colspan="2">Hazard mitigation and dispersion</td></tr>
<tr><td>Protecting exposed elements</td><td>DR informed governance</td><td>Awareness and preparedness</td><td colspan="2">Emergency procedures</td></tr>
<tr><td colspan="5">Progress of implementation</td></tr>
<tr><td>Proposed</td><td>Not Started</td><td>Planning Ongoing</td><td>On Going Construction</td><td>On Going Maintenance</td></tr>
<tr><td colspan="2">Implementation timeframes</td><td colspan="2">Cost</td><td>Responsible bodies</td></tr>
<tr><td colspan="2">2016 – 2021
2022 – 2027</td><td colspan="2">€ 1.000</td><td>Veneto Region, Civil Protection National Department</td></tr>
</table>

<table>
<tr><td colspan="5">Targeted Hazard</td><td rowspan="3">Measure description
M43_5 – Population behaviour flood risk models.</td></tr>
<tr><td>Severe rainfalls (R)</td><td>Floods (F)</td><td>Severe winds (W)</td><td>High tides (T)</td><td>Coastal storm surges (S)</td></tr>
<tr><td colspan="5">Contribution to FRM and CCA</td></tr>
</table>

Understanding and assessing DR	Forecasting and assessing hazards	Reducing DR impacts	Hazard mitigation and dispersion
Protecting exposed elements	DR informed governance	Awareness and preparedness	Emergency procedures

Progress of implementation				
Proposed	Not Started	Planning Ongoing	On Going Construction	Completed

Implementation timeframes	Cost	Responsible bodies
2016 – 2021 2022 – 2027	€ 4.000	Veneto Region

Development of integrated flood risk assessment models, particularly targeting population behaviour and exposure during flood events. This measure aims at improving population behaviour and patterns during flood emergencies so to limit their exposure, both transferring best practices and formalizing relevant procedures already in place.

Measure location

Veneto's regional basins

Targeted Hazard				
Severe rainfalls (R)	Floods (F)	Severe winds (W)	High tides (T)	Coastal storm surges (S)

Understanding and assessing DR	Forecasting and assessing hazards	Reducing DR impacts	Hazard mitigation and dispersion
Protecting exposed elements	DR informed governance	Awareness and preparedness	Emergency procedures

Progress of implementation				
Proposed	Not Started	Planning Ongoing	On Going Construction	Completed

Implementation timeframes	Cost	Responsible bodies
2016 – 2021 2022 – 2027	€ 10.000	Eastern Alps District Basin Authority, Ministry of Culture (MIBACT)

Measure description

M43_6 – Cultural and landscape heritage flood risk models.

Development of integrated flood risk assessment models, particularly targeting and updating cultural and landscape heritage's vulnerability parameters, in coordination with hazard maps update.

Measure location

Veneto's regional basins

3.2. Venice watershed and lagoon

Measure class and typology	Measure Name	Measure Location	1st phase - (2016 - 2021)	2nd phase (2022 - 2027)	Cost (€)	Hazard targeted
M41_1 – Flood forecasting and early warning	Creazione di una piattaforma di supporto alle decisioni basata su un modello numerico per la simulazione in tempo reale della risposta idrologica e idraulica agli eventi meteorici nel bacino del Fiume Marzenego	Mestre, Martellago, Salzano, Noale, Trebaseleghe, Piombino Dese, Loreggia, Resana, Massanzago	1		250.000	R - F
	Monitoraggio e previsione del Sistema MOSE	Bocche di porto, sistema MOSE	1		15.000.000	T
				1	0	T

Preparedness at the local level has been addressed through floods and tides forecasting platforms and early warning systems (M41_1) for the Marzanego River and for the lagoon MOSE System. MOSE System's monitoring and forecasting platform costs 15 million euros alone.

Targeted Hazard				
Severe rainfalls (R)	Floods (F)	Severe winds (W)	High tides (T)	Coastal storm surges (S)
Contribution to FRM and CCA				
Understanding and assessing DR	Forecasting and assessing hazards	Reducing DR impacts	Hazard mitigation and dispersion	
Protecting exposed elements	DR informed governance	Awareness and preparedness	Emergency procedures	
Progress of implementation				
Proposed	Not Started	Planning Ongoing	On Going Construction	Completed

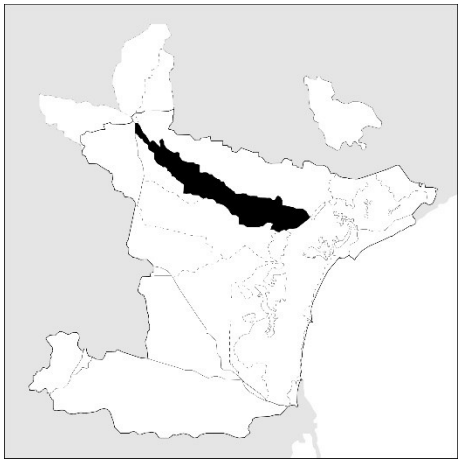
Implementation timeframes	Cost	Responsible bodies
2016 – 2021 2022 – 2027	€ 250.000	Veneto Region

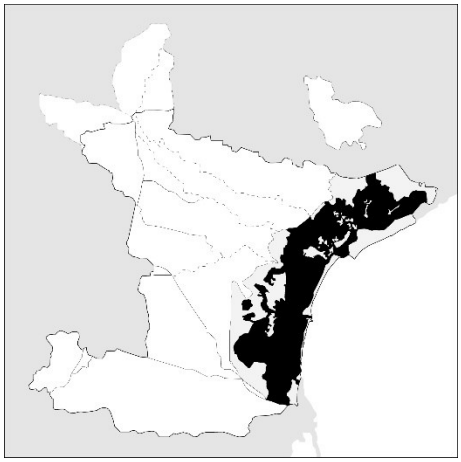
Measure description

M41_1 – Floods and tides forecasting and warning.

Decision support system based on the real time simulation of responses to hydrometeorological hazards in the Marzenego basin.

Measure location



<table>
<tr><td colspan="5">Targeted Hazard</td><td rowspan="10">Measure description
M41_1 – Floods and tides forecasting and warning.
Monitoring and forecasting for the MOSE systems.
Measure location
  </td></tr>
<tr><td>Severe rainfalls (R)</td><td>Floods (F)</td><td>Severe winds (W)</td><td>High tides (T)</td><td>Coastal storm surges (S)</td></tr>
<tr><td colspan="5">Contribution to FRM and CCA</td></tr>
<tr><td>Understanding and assessing DR</td><td>Forecasting and assessing hazards</td><td>Reducing DR impacts</td><td colspan="2">Hazard mitigation and dispersion</td></tr>
<tr><td>Protecting exposed elements</td><td>DR informed governance</td><td>Awareness and preparedness</td><td colspan="2">Emergency procedures</td></tr>
<tr><td colspan="5">Progress of implementation</td></tr>
<tr><td>Proposed</td><td>Not Started</td><td>Planning Ongoing</td><td>On Going Construction</td><td>Completed</td></tr>
<tr><td>Implementation timeframes</td><td colspan="2">Cost</td><td colspan="2">Responsible bodies</td></tr>
<tr><td>2016 – 2021
2022 – 2027</td><td colspan="2">€ 15.000.000</td><td colspan="2">Public Works Superintendency</td></tr>
</table>

4. Recovery measures (M5)

The planned recovery measures amount to 5 in total at the sole regional level: 1 of 30 thousand euros for the first period (2016-2021), 1 that will continue in the second phase of the plan (2022-2027) for 129,6 thousand euros, 3 new ones for 585 thousand euros.

4.1. Regional scale

Measure class and typology	Measure Name	1st phase - (2016 - 2021)	2nd phase (2022 - 2027)	Cost (€)	Hazard targeted
M53_1 – Insurance policies	Studio per l'adozione di politiche assicurative	1		30.000	
M53_2 – Flooding events cadastre	Catalogo degli eventi alluvionali significativi	1	1	129.600	F

M53_3 – Other recovery measures	Implementazione di un sistema rapido di raccolta dati di danno post-evento alluvionale a supporto della richiesta dello stato di emergenza		1	102.480	F
	Redazione Piano degli interventi urgenti di cui alle OPCM di Protezione Civile in seguito a dichiarazione dello stato di emergenza		1	480.000	
	Sistematizzazione dell'attività istruttoria relativa alla richiesta dello stato di emergenza in caso di eventi alluvionali rilevanti		1	2.400	R - F

The last section of the planned measures covers recovery measures and needs, impacts and damages evaluations after flood events. The interventions planned for the 2022 – 2027 period foresee to continue the redaction of a flood cadastre database (M53_2), collecting data and information from past flood events so to support and feed in the FRMP update.

Furthermore, in case of flood event the following measures (M53_3) are planned to support the emergency status declaration:

- Post-event rapid damage data collection system;
- Civil Protection Emergency Intervention Plan drafting;
- Systematization of preliminary activities.

The study and adoption of appropriate insurance policies (M53_1) addressing vulnerabilities to flood events remains yet to be implemented from the previous phases of the plan.

Targeted Hazard				
Severe rainfalls (R)	Floods (F)	Severe winds (W)	High tides (T)	Coastal storm surges (S)
Contribution to FRM and CCA				
Understanding and assessing DR	Forecasting and assessing hazards	Reducing DR impacts	Hazard mitigation and dispersion	
Protecting exposed elements	DR informed governance	Awareness and preparedness	Emergency procedures	
Progress of implementation				
Proposed	Not Started	Planning Ongoing	On Going Construction	Completed
Implementation timeframes	**Cost**	**Responsible bodies**		

Measure description

M53_1 – Insurance policies.

The study and adoption of appropriate insurance policies in case of flooding events, in line with EU requests and standards.

Measure location

Veneto's regional basins

2016 – 2021 2022 – 2027	€ 30.000	Eastern Alps District Basin Authority	

Targeted Hazard				
Severe rainfalls (R)	Floods (F)	Severe winds (W)	High tides (T)	Coastal storm surges (S)
Contribution to FRM and CCA				
Understanding and assessing DR	Forecasting and assessing hazards	Reducing DR impacts	Hazard mitigation and dispersion	
Protecting exposed elements	DR informed governance	Awareness and preparedness	Emergency procedures	
Progress of implementation				
Proposed	Not Started	Planning Ongoing	On Going Construction	Ongoing Maintenance
Implementation timeframes	**Cost**	**Responsible bodies**		
2016 – 2021 2022 – 2027	€ 129.600	Veneto Region, Civil Protection National Department		

Measure description

M53_2 – Flooding events cadastre.

Redaction of a flood cadastre database as foreseen at the National level, providing information regarding past flooding events (time, locations, consequences…) on the FloodCAT online platform. This catalogue should support also the update and redaction of the FRMP itself.

Measure location

Veneto's regional basins

Targeted Hazard				
Severe rainfalls (R)	Floods (F)	Severe winds (W)	High tides (T)	Coastal storm surges (S)
Contribution to FRM and CCA				
Understanding and assessing DR	Forecasting and assessing hazards	Reducing DR impacts	Hazard mitigation and dispersion	
Protecting exposed elements	DR informed governance	Awareness and preparedness	Emergency procedures	
Progress of implementation				
Proposed	Not Started	Planning Ongoing	On Going Construction	Completed
Implementation timeframes	**Cost**	**Responsible bodies**		
2016 – 2021 2022 – 2027	€ 102.480	Veneto Region		

Measure description

M53_3 – Other recovery measures.

Adoption of a post-event rapid damage data collection system supporting the definition of the Emergency Status for most critical affected areas.

Measure location

Veneto's regional basins

Targeted Hazard				
Severe rainfalls (R)	Floods (F)	Severe winds (W)	High tides (T)	Coastal storm surges (S)
Contribution to FRM and CCA				
Understanding and assessing DR	Forecasting and assessing hazards	Reducing DR impacts	Hazard mitigation and dispersion	
Protecting exposed elements	DR informed governance	Awareness and preparedness	Emergency procedures	
Progress of implementation				
Proposed	Not Started	Planning Ongoing	On Going Construction	Completed
Implementation timeframes	**Cost**	**Responsible bodies**		
2016 – 2021 2022 – 2027	€ 480.000	Veneto Region		

Measure description

M53 3 – Other recovery measures.

Redaction of a Civil Protection Emergency Intervention Plan guiding with the urgent measures to be implemented in case of an Emergency Status declaration.

Measure location

Veneto's regional basins

Targeted Hazard				
Severe rainfalls (R)	Floods (F)	Severe winds (W)	High tides (T)	Coastal storm surges (S)
Contribution to FRM and CCA				
Understanding and assessing DR	Forecasting and assessing hazards	Reducing DR impacts	Hazard mitigation and dispersion	
Protecting exposed elements	DR informed governance	Awareness and preparedness	Emergency procedures	
Progress of implementation				
Proposed	Not Started	Planning Ongoing	On Going Construction	Completed
Implementation timeframes	**Cost**	**Responsible bodies**		
2016 – 2021 2022 – 2027	€ 2.400	Veneto Region		

Measure description

M53 3 – Other recovery measures.

Systematization of preliminary activities required in case of an Emergency Status declaration following a severe flooding event.

Measure location

Veneto's regional basins

5. References

- Distretto Idrografico delle Alpi Orientali (2016). “Piano di Gestione del Rischio di Alluvioni. Relazione di piano e allegati I, II, III e V”
- Distretto Idrografico delle Alpi Orientali (2016). “Piano di Gestione del Rischio di Alluvioni. Allegato IV - Schede interventi”;
- Autorità di bacino distrettuale delle Alpi Orientali (2021). “Aggiornamento e revisione del Piano di Gestione del Rischio di Alluvioni. Relazione Generale”;
- Autorità di bacino distrettuale delle Alpi Orientali (2021). “Aggiornamento e revisione del Piano di Gestione del Rischio di Alluvioni. ALLEGATO II - Schema delle Schede interventi (reporting)”;
- Autorità di bacino distrettuale delle Alpi Orientali (2021). “Aggiornamento e revisione del Piano di Gestione del Rischio di Alluvioni. ALLEGATO III - Tabellone interventi”;
- Autorità di bacino distrettuale delle Alpi Orientali (2021). “Aggiornamento e revisione del Piano di Gestione del Rischio di Alluvioni. ALLEGATO V - Norme tecniche di attuazione”.

REPORT ON THE PROGRESS OF A FLOOD RISK MANAGEMENT AND CLIMATE CHANGE ADAPTATION MUNICIPAL PLANNING EXPERIENCE IN ITALY

This report presents Venice Municipality's Climate Adaptation Plan (CCAP), an endeavour of IUAV University of Venice in collaboration with CORILA Consortium that thrives to address present and future challenges related to the changing climate in the field of urban planning, disaster risk management and civil protection.

The planning process relied on a convergence of research projects and funding projects at the local, municipal, regional and international levels: the Rockefeller Foundation 100 Resilient Cities, the EU Covenant of Mayors SECAP initiative, Venezia2021 program, Life VenetoAdapt, DG-ECHO Savemedcosts-2, and Interreg Stream research projects.

Within this thriving research context, the plan has been developed in a multi and transdisciplinary perspective, responding to various evaluation panels and to different stakeholder groups, involving a plurality of Municipal services and regulatory bodies.

The Plan's climatic risk assessment phase presents an articulated understanding of the Venetian territory, considering climate-related hazards and risks for Venice's inland, islands, and coastal zones while bearing in mind interrelated coastal and lagoon's natural and anthropogenic peculiarities, e.g., seabed heights, currents directions, mitigation works already in place such as the MOSE system.

The strategic planning phase took into high consideration the many projects and initiatives already in progress in the area, short and long-term sectoral objectives, as well as the different interests at stake.

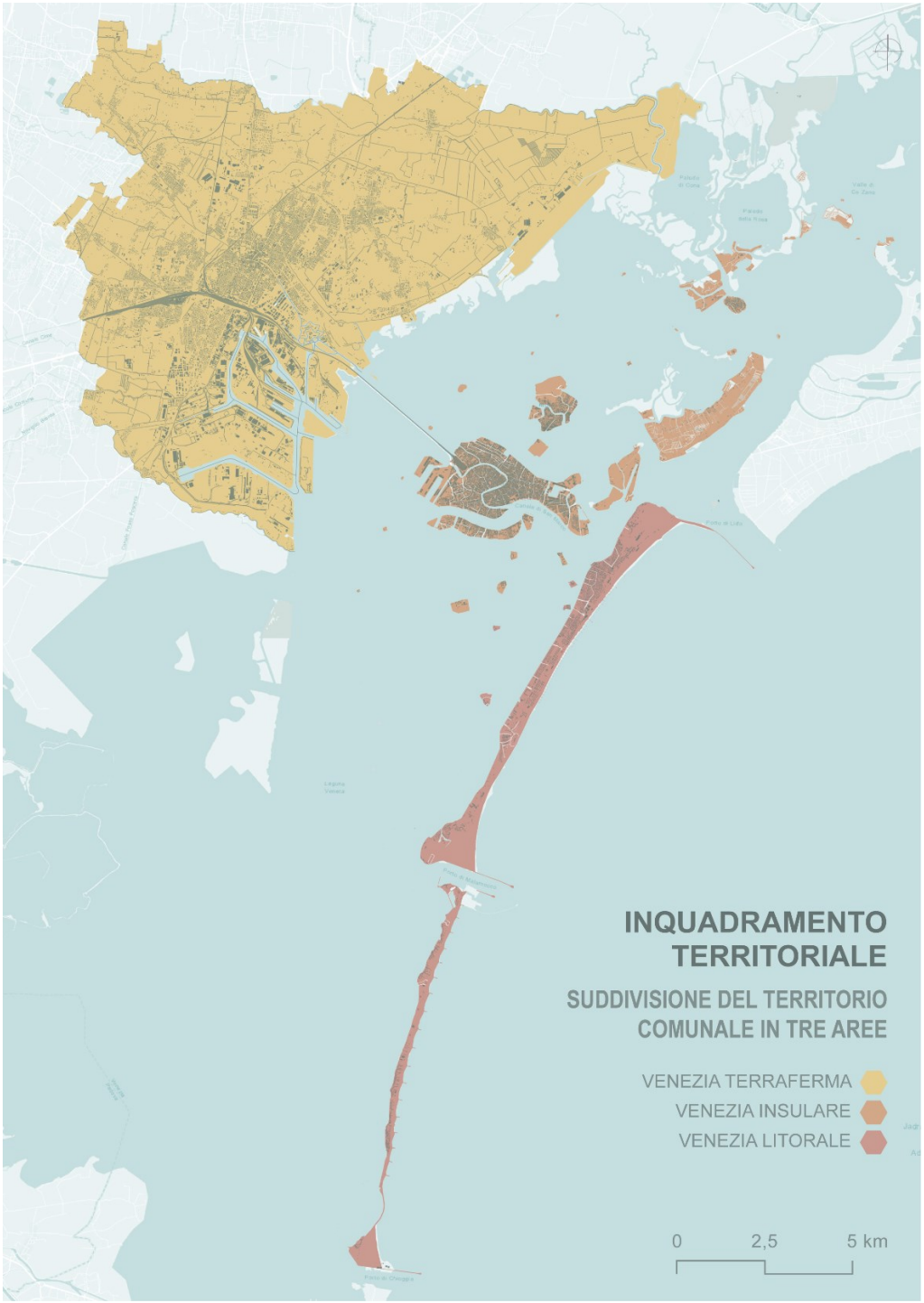


Figure 4. Venice Municipality's peculiar territory: inland, islands, and coastal zones.

As a first implementation of the Climate Adaptation Plan, a strategic policy document has been developed by IUAV University of Venice specifically targeting the Municipal Civil Protection Plan. These Climate-informed Civil Protection Municipal Guidelines (CiCPMG) mainstream the broader CCAP focus, knowledge, and understanding of climate risks, to emergency management and civil protection matters, aiming for acclimate-proofing of the adopted plan. Such a survey aimed at

identifying coping tools that may already be in place, understanding the underlying planning strategy and culture, and harmonizing the planned measures.

Once completed the CCAP, the assessed climate risks were transferred from the adaptation to the Civil Protection plan. The risk analyses were aimed at understanding the needed coping capacities (new and already existing) and rapid intervention procedures, particularly during the implementation of adaptation measures and in the event of their failures.

This led to a second evaluation of the adopted Civil Protection Plan, considering foreseen scenarios and actions through the lens of the new Disaster Risk Assessment information, thus considering hazards, exposures and vulnerabilities already assessed in the past, those exacerbated by climate change effects, as well as some that were acknowledged just in part or not expected.

Once this investigation process was completed, the group met with the Venice Municipality's Civil Protection sector delegates for a broad and detailed discussion on the adaptation planning foreseen outcomes. The discussion covered different matters, hazards, scenarios, actions, communication tools, procedures, emergency locations, etc. This discussion led to the definition of a strategic approach which then guided the research group in drafting the CiCPMG. Regardless of the Venice Civil Protection sector involvement, these guidelines constitute a strategic document supporting local emergency planning but are not to be considered a product nor a strategy of the Venice Municipality.

The main goal of the present deliverable has been to reorder and evaluate the measures highlighted by these two planning experiences, so as to present them following the Flood Directive's structure and measure types. The measures taken into consideration address urgent and complex matters related to both the Flood Risk Management and Climate Change Adaptation realms in a paradigmatic territory driven by land-lagoon-sea interactions.

Strategic Vision and Pillars

Climate Adaptation Plan

The CCAP guiding principles focus on connecting green and blue corridors in the Venetian territory as a strategic opportunity to promote sustainability on three levels: ecological, social, and economic. These reconnections require a profound understanding of the lagoon ecosystem, of the significant works that transformed it during the past centuries (river diversion, canals excavation, artificial islands, etc.), and of processes and events that affect it in the present and the future.

The plan envisions three cross-cutting objectives:

- To reduce disaster risk, considering climate change as a pejorative driver of existing hazards and threats;

- To develop a territory with a high ecosystemic value, shifting from the anthropocentric vision;
- To increase urban safety perception, making these corridors an opportunity for a new social balance.

The planned actions are grouped into three pillars:

- Pillar 1 - New low-impact economies. The plan aims at closing short-range economic cycles and at releasing high-added value intangible products connecting a wider territorial context. This implies avoiding economies and interventions with great environmental impacts by bringing Venice back to production models with a high technological and cultural value.
- Pillar 2 - Green and blue inclusion. The plan aims at transforming the urban perception of beauty, well-being, and safety in the ecological corridors' reconnection, an opportunity to rethink spatial relationships and uses and to overcome the cumulated and neglected social marginalities and degradation.
- Pillar 3 - Ecological Venice. Rethinking Venice's ecosystem relationships by overcoming the man-nature dichotomy, guaranteeing its quality, and promoting biodiversity growth.

Starting from the plan's extensive risk analysis, the adaptation strategy vision and pillars were directed into 14 action lines and 56 implementation measures. These strategic lines of action are dedicated to

- climate-informed direct interventions on the structural and infrastructural heritage (existing building stock and new urban transformations);
- hydraulic defences, active, i.e., addressing the hydraulic hazard, and passive, i.e., intervening on exposed and vulnerable elements;
- climatic requalification of the agricultural and environmental system;
- the management of climate-related data, knowledge, perceptions, and awareness;
- territorial planning and governance.

Climate-informed Civil Protection Guidelines

The key areas of intervention recognized for the climate-informed review of the Civil Protection Plan are five, all of which target the assessed risks of the Venetian territory: scenarios and analyses; information and communication; intersectoral coordination; maintenance; first emergency interventions.

These strategic areas of intervention might support the Civil Protection Plan update in all its dimensions and phases:

- Scenarios and analysis (10 actions) – revision of risk understanding, assessment, and scenarios in the territory, so as to update and redefine Civil Protection's needs of personnel, tools, vehicles, and secure locations in the event of an emergency.

- Information and communication (7 actions) – citizenship involvement in disaster risk understanding and assessment as well as in the preparation for hazardous events, thus raising awareness, enhancing their training, self-protection behaviours, and understanding of information and alerts.
- Intersectoral coordination (5 actions) – coordination and support between the Civil Protection, the other Municipal sectors and governmental authorities before, during and after emergencies in terms of common data, tools, interventions, and practices.
- Maintenance (2 actions) – territory maintenance operations needed to support more effective emergency management.
- Emergency intervention (5 actions) – reorienting first emergency operational aspects and phases not sufficiently updated in relation to the extreme events expected increase.

Targeted Hazards and Risks

The hazards targeted in Venice Municipal area for the Climate Adaptation Plan, and consequently also valid for the Civil Protection Plan, have been: intense rainfall, severe wind, heat waves and waves, wildfires, droughts, floods and storm surges, coastal erosion, chemical-physical variation of the sea, of lightning activity, wind and of tidal regimes.

Out of all the hazards, this deliverable focuses only on hydrometeorological ones:

- Severe and heavy rainfalls (R), which will increase runoff in urban areas, flooding of public and private infrastructures, flooding of underpasses and private underground floors;
- Severe winds (W), increase that may cause infrastructural damages, walls collapse, public and private superfetation, high waves even in the lagoon, tree materials collapse, services and navigability interruption.
- High tides (T), coastal storm surges (S), and floods (F) increases resulting from the compounding of the previous components with sea level rises and water networks' unstable flows.

These hazards have been cross-referenced with the exposed and vulnerable assets of the territory, in terms of anthropogenic land uses (residential, cultural, agriculture and fishing, industrial, trade and crafts, tourism, arts and professions, health) and environmental ones (water, air, soil, biodiversity status and quality).

The CCAP produced a substantial detailed cartographic apparatus for identifying and mapping the risks resulting from each hazard, vulnerability, and exposed elements, linking the resulting climatic risk conditions to each of the planned actions.

For each hazard, The Civil Protection Plan requires analogue risk mapping, scenarios and interventions reorganization.

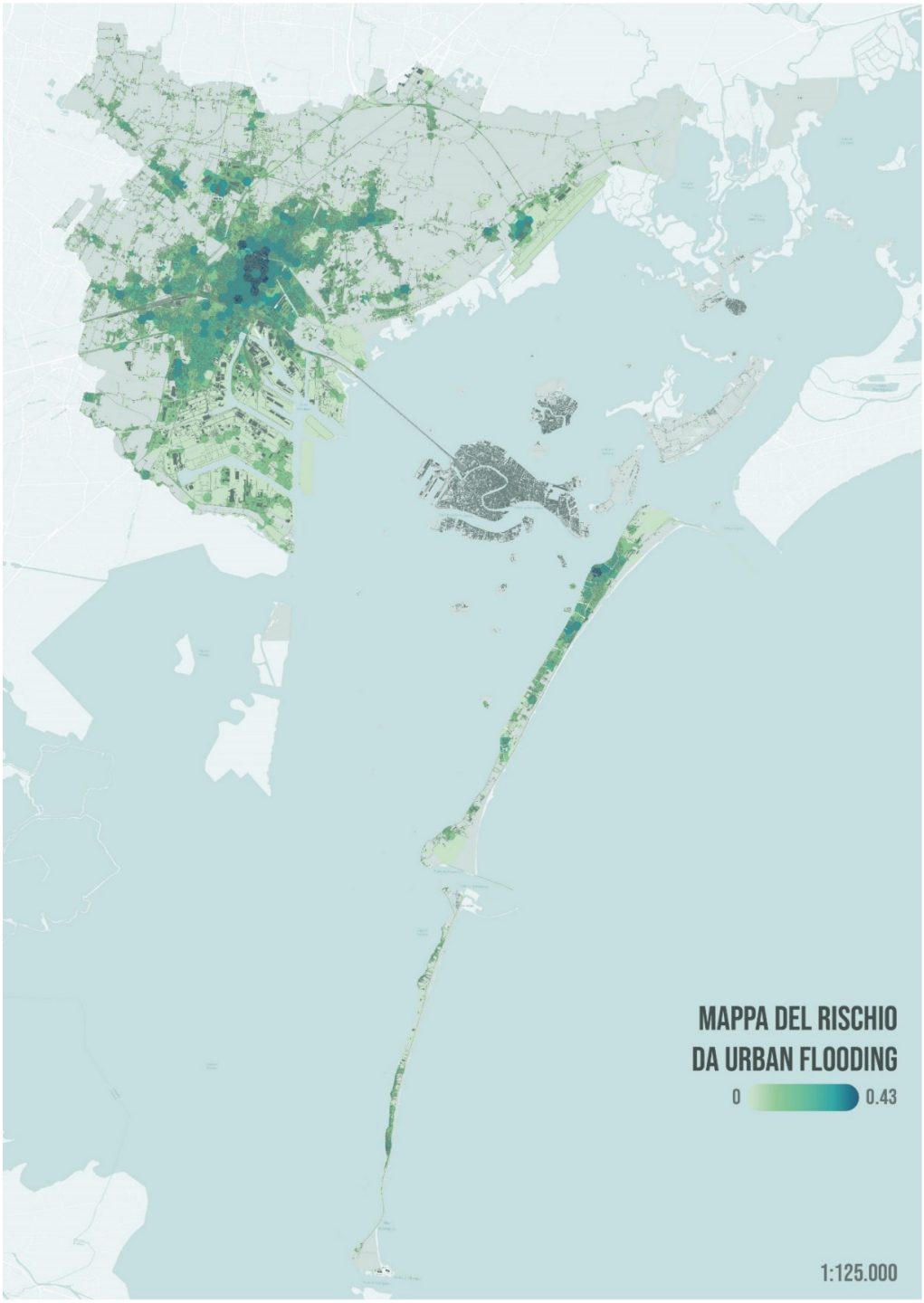


Figure 5. Urban flood risk map for Venice Municipality

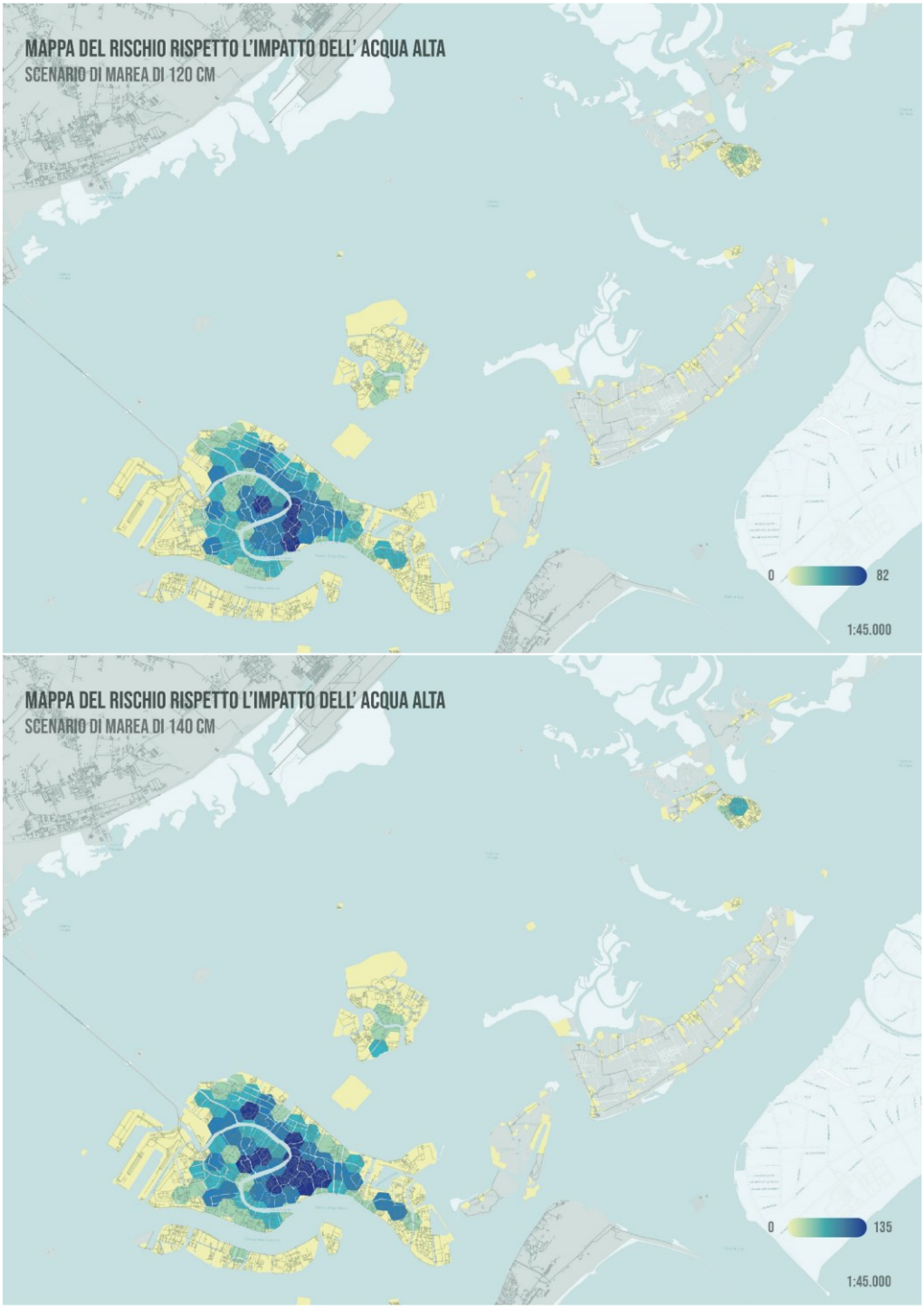


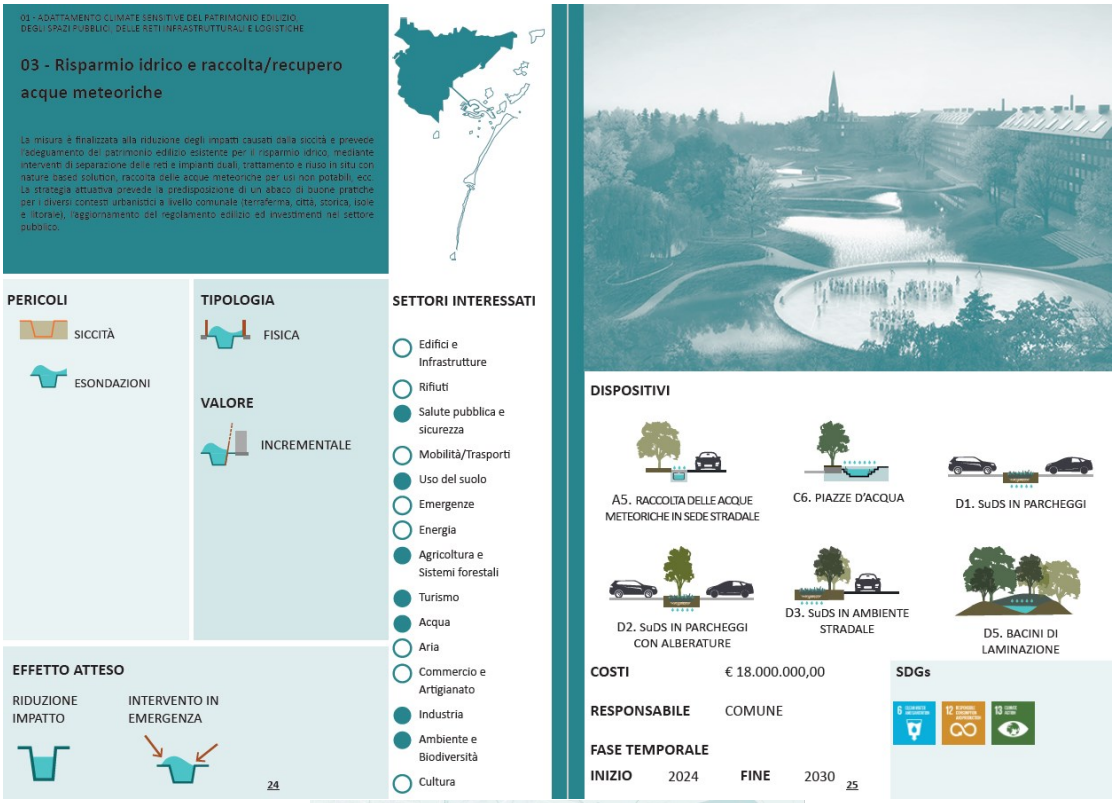
Figure 6. Sea level rise risk maps (120 and 140 cm) for Venice Municipality

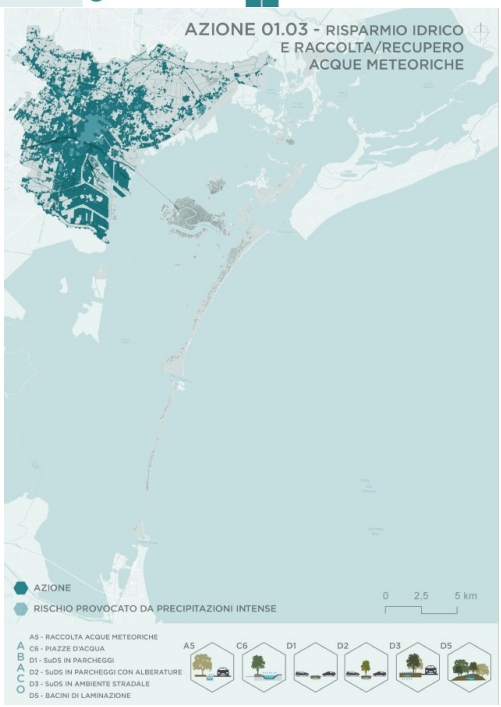
Measures: table of contents and reordering matrix

Each implementation measure of the CCAP is presented in a form reporting the following information:

- brief description;
- addressed hazard;
- type of action, understood as physical, governance, or economic macro-typologies;
- measure's value, which can be
  - reactive - emergency response strategies;
  - incremental - adaptation measures planned for controlling the phenomenon, developed to maintain or recover a pre-existing safety level;
  - transformative - systemic transformation interventions of the territory to adapt the landscape to future events;
- contribution to the adaptation strategy, i.e., expected effect in addressing climate risks,
  - impacts reduction;
  - citizen self-protection;
  - monitoring and mapping;
  - mitigation and dispersion of the phenomenon;
  - emergency intervention;
- tools and devices needed for the implementation;
- municipal sectors concerned;
- costs and financial coverage;
- responsible bodies,
- implementation timeframes;
- needed tools for the implementation;
- measure location.

Below is a sample extract of CCAP's measures table of contents as presented and described in the plan.





As for the CiCPMG, the briefer form presenting the proposed measures covers the targeted hazards, the typology, and expected effects, the description,n and the implementation phase, as pictured in the extract below

Ricaduta: Coordinamento con altri settori
Cartografia unificata per l'emergenza

Tipologia:
Studio/scenario
monitoraggio/mappatura

Pericoli:

Descrizione:
I sistemi GIS consentono visione unificata delle cartografie e rapido confronto tra i progetti e i piani. È necessario sviluppare una cartografia unificata, multiscalare e modulare per rischio, comprensiva del valore peggiorativo del rischio per il cambiamento climatico. Tutti i settori devono rendere interoperative le carte e i dati per permettere un'interrogazione orientata agli obiettivi territoriali e non ai settori, riducendo la perdita di informazione in emergenza.

Avanzamento: da realizzare

All CCAP and CiCPMG relevant measures have been reordered and presented in this deliverable following the Flood Directive structure and definitions of Flood Risk Management measures (see the table below for definitions).

No Action	
M11	No Action, No measure is proposed to reduce the flood risk in the APSFR or other defined area,
Prevention	
M21	Prevention, Avoidance, Measure to prevent the location of new or additional receptors in flood prone areas, such as land use planning policies or regulation
M22	Prevention, Removal or relocation, Measure to remove receptors from flood prone areas, or to relocate receptors to areas of lower probability of flooding and/or of lower hazard

M23	Prevention, Reduction, Measure to adapt receptors to reduce the adverse consequences in the event of a flood actions on buildings, public networks, etc...
M24	Prevention, Other prevention, Other measure to enhance flood risk prevention (may include, flood risk modelling and assessment, flood vulnerability assessment, maintenance programmes or policies etc...)
Protection	
M31	Protection Natural flood management / runoff and catchment management, Measures to reduce the flow into natural or artificial drainage systems, such as overland flow interceptors and / or storage, enhancement of infiltration, etc and including in-channel, floodplain works and the reforestation of banks, that restore natural systems to help slow flow and store water.
M32	Protection, Water flow regulation, Measures involving physical interventions to regulate flows, such as the construction, modification or removal of water retaining structures (e.g., dams or other on-line storage areas or development of existing flow regulation rules), and which have a significant impact on the hydrological regime.
M33	Protection, Channel, Coastal and Floodplain Works, Measures involving physical interventions in freshwater channels, mountain streams, estuaries, coastal waters and flood-prone areas of land, such as the construction, modification or removal of structures or the alteration of channels, sediment dynamics management, dykes, etc.
M34	Protection, Surface Water Management, Measures involving physical interventions to reduce surface water flooding, typically, but not exclusively, in an urban environment, such as enhancing artificial drainage capacities or though sustainable drainage systems (SuDS).
M35	Protection, Other Protection, Other measure to enhance protection against flooding, which may include flood defence asset maintenance programmes or policies
Preparedness	
M41	Preparedness, Flood Forecasting and Warning, Measure to establish or enhance a flood forecasting or warning system
M42	Preparedness, Emergency Event Response Planning / Contingency planning, Measure to establish or enhance flood event institutional emergency response planning
M43	Preparedness, Public Awareness and Preparedness, Measure to establish or enhance the public awareness or preparedness for flood events
M44	Preparedness, Other preparedness, Other measure to establish or enhance preparedness for flood events to reduce adverse consequences
Recovery & Review	
M51	Recovery and Review (Planning for the recovery and review phase is in principle part of preparedness), Individual and societal recovery, Clean-up and restoration activities (buildings, infrastructure, etc), Health and mental health supporting actions, incl. managing stress Disaster financial assistance (grants, tax), incl. disaster legal assistance, disaster unemployment assistance, Temporary or permanent relocation, Other
M52	Recovery and Review, Environmental recovery, Clean-up and restoration activities (with several sub-topics as mould protection, well-water safety and securing hazardous materials containers)
M53	Recovery and Review, Other, Other recovery and review Lessons learnt from flood events Insurance policies
Other	
M61	Other

The Flood Directive structure and definitions constituted the analytical filter for assessing each CCAP and CiCPMG measure, defining their pertinence to one or more of the Flood Directive measure types (with primary and secondary effects). Furthermore, this content analysis of both strategic documents highlighted the targeted hazard and the strategic contribution to Flood Risk Management (FRM) and Climate Change Adaptation.

The underlying goal of this analytical and reordering process has been to reach an overall strategic assessment entailing:

- measures multiple values addressing different FRM life cycle phases;
- measures different scales of intervention, from the metropolitan to the building level, in a field (FRM) that in Italy mainly focuses on Regional scale strategies;
- measures addressing different hazards;
- measures' approach in addressing disaster and climate risk complexity, targeting hazard mitigation, rather than exposed elements' protection or preparedness;
- most and less beaten phases and areas of intervention;
- urban and regional development projects' positive outcomes and contributions in terms of FRM and CCA.

In order to better appreciate all these components, each measure is presented here with a brief profile (see the sample table below). Measures were reordered following their primary value in the Flood Directive structure and nomenclature, and clustered according to their typology.

Below, is a sample table describing each measure.

Targeted Hazard				
Severe rainfalls (R)	Floods (F)	Severe winds (W)	High tides (T)	Coastal storm surges (S)
Contribution to FRM and CCA				
Understanding and assessing DR	Forecasting and assessing hazards	Reducing DR impacts	Hazard mitigation and dispersion	
Protecting exposed elements	DR informed governance	Awareness and preparedness	Emergency procedures	
Progress of implementation				
Proposed	Not Started	Planning Ongoing	On Going Construction	Completed
Implementation timeframes	**Cost**	**Responsible bodies**		
FRMP value				
M2-Prevention				M3-Protection
M21	M22	M23	M24	M31	M32	M33	M34	M35
M4-Preparation				M5-Reconstruction				
M41	M42	M43	M44	M51	M52	M53		

Measure Location

1. Prevention (M2)

1.1. Removal or relocation

1.1.1. [M22_a New urban development projects]

CCAP - 01.10 Fusina Integrated Project completion - R - W – F

The measure provides for the Fusina Integrated Project completion and related testing, a strategic technological asset devoted to the Porto Marghera industrial area drainage water, wastewater, and rainwater run-off treatment.

Targeted Hazard				
Severe rainfalls (R)	Floods (F)	Severe winds (W)	High tides (T)	Coastal storm surges (S)

Contribution to FRM and CCA			
Understanding and assessing DR	Forecasting and assessing hazards	Reducing DR impacts	Hazard mitigation and dispersion
Protecting exposed elements	DR informed governance	Awareness and preparedness	Emergency procedures

Progress of implementation				
Proposed	Not Started	Planning Ongoing	On Going Construction	Completed

Implementation timeframes	Cost	Responsible bodies
2022 - 2026	€ 194.000.000,00	SIFA ScPA

FRMP value								
M2-Prevention				M3-Protection				
M21	M22	M23	M24	M31	M32	M33	M34	M35
M4-Preparation				M5-Reconstruction				
M41	M42	M43	M44	M51	M52	M53		

Measure Location

CCAP - 01.11 Construction of the new, climate-proof, Mestre railway station - R

The Mestre train station, one of Italy's largest in terms of traffic and importance, divides today's Mestre from the neighbouring Marghera, with pedestrian and service incommunicability. The new station, built in a raised and covered plate, following climate change adaptation building criteria, will allow an improvement in users' comfort with atmospheric agents, and will have an endowment of greenery and trees capable of reducing warmth impacts and offering well-being.

Targeted Hazard				
Severe rainfalls (R)	Floods (F)	Severe winds (W)	High tides (T)	Coastal storm surges (S)

Contribution to FRM and CCA			
Understanding and assessing DR	Forecasting and assessing hazards	Reducing DR impacts	Hazard mitigation and dispersion
Protecting exposed elements	DR informed governance	Awareness and preparedness	Emergency procedures

Progress of implementation				
Proposed	Not Started	Planning Ongoing	On Going Construction	Completed

Implementation timeframes	**Cost**	**Responsible bodies**
2022 - 2025	€ 50.000.000,00	Fs Sistemi E Territorio

FRMP value								
M2-Prevention				M3-Protection				
M21	M22	M23	M24	M31	M32	M33	M34	M35
M4-Preparation				M5-Reconstruction				
M41	M42	M43	M44	M51	M52	M53		

Measure Location

CCAP - 02.02 Construction of a new residential area following Climate Sensitive criteria - R

The Favaro area, the terminus of the Venice tram line, is becoming a place of great attraction for young professionals, students, and families with a focus on living in the green. The vision for this and other new residential areas, is that of climate-sensitive districts, in terms of urban planning and building criteria, benefitting green and sustainable mobility, favouring local food productions and circular economies.

Targeted Hazard				
Severe rainfalls (R)	Floods (F)	Severe winds (W)	High tides (T)	Coastal storm surges (S)

Contribution to FRM and CCA			
Understanding and assessing DR	Forecasting and assessing hazards	Reducing DR impacts	Hazard mitigation and dispersion
Protecting exposed elements	DR informed governance	Awareness and preparedness	Emergency procedures

Progress of implementation				
Proposed	Not Started	Planning Ongoing	On Going Construction	Completed

Implementation timeframes	**Cost**	**Responsible bodies**
2023 - 2026	€ 3.000.000,00	Istituto Della Pietà, Ames Spa

FRMP value								
M2-Prevention				M3-Protection				
M21	M22	M23	M24	M31	M32	M33	M34	M35
M4-Preparation				M5-Reconstruction				
M41	M42	M43	M44	M51	M52	M53		

Measure Location

CCAP - 02.01 Mapping urban planning equalization's potentials aiming for a "zero land consumption" - **R**

The measure aims to reduce anthropic elements' exposure to climate change effects, providing a diagnostic tool to the Venice Municipality capable of mapping areas and defining appropriate equalization solutions for new urban transformations, so as to reduce significantly land consumption. The mapping tool will allow to associate each urban transformation with an appropriate redevelopment intervention for disused or no longer functional spaces, so as to improve the city's physiognomic and functional quality without aggravating the impacts of climate change.

Targeted Hazard				
Severe rainfalls (R)	Floods (F)	Severe winds (W)	High tides (T)	Coastal storm surges (S)

Contribution to FRM and CCA			
Understanding and assessing DR	Forecasting and assessing hazards	Reducing DR impacts	Hazard mitigation and dispersion
Protecting exposed elements	DR informed governance	Awareness and preparedness	Emergency procedures

Progress of implementation				
Proposed	Not Started	Planning Ongoing	On Going Construction	Completed

Implementation timeframes	**Cost**	**Responsible bodies**
2023 - 2024	€ 50.000,00	Venice Municipality, Venis Spa

FRMP value								
M2-Prevention				M3-Protection				
M21	M22	M23	M24	M31	M32	M33	M34	M35
M4-Preparation				M5-Reconstruction				
M41	M42	M43	M44	M51	M52	M53		

Measure Location

1.2. Reduction (M23)

1.2.1. [M23_a Reducing hazards' impacts and effects on exposed elements]

CCAP - 01.01 Lightning strikes' impacts reduction - **R**

The measure builds on the application of the new European standard (CEI EN 62305 - CEI 81-10) for lightning strikes protection in the construction sector, updating public building regulations and implementing specific interventions on public assets. Public and private interventions are encouraged, among these: revision and adaptation of electrical systems, construction of lightning and fire protection systems, updating of emergency and evacuation plans, and specific preparedness trainings.

Targeted Hazard				
Severe rainfalls (R)	Floods (F)	Severe winds (W)	High tides (T)	Coastal storm surges (S)
Contribution to FRM and CCA				
Understanding and assessing DR	Forecasting and assessing hazards	Reducing DR impacts	Hazard mitigation and dispersion	
Protecting exposed elements	DR informed governance	Awareness and preparedness	Emergency procedures	
Progress of implementation				
Proposed	Not Started	Planning Ongoing	On Going Construction	Completed
Implementation timeframes	**Cost**	**Responsible bodies**		
2024 - 2030	€ 2.000.000,00	Venice Municipality		
FRMP value				
M2-Prevention				M3-Protection
M21	M22	M23	M24	M31	M32	M33	M34	M35
M4-Preparation				M5-Reconstruction
M41	M42	M43	M44	M51	M52	M53		

Measure Location

CCAP - 01.02 Severe wind' impacts reduction - **R – W**

In compliance with 2018 building technical standards, constructions of unusual type or shape (e.g., in terms of height or length, slenderness and lightness, flexibility and dissipative capacity, …) require more restrictive assessment methodologies and related interventions for severe wind, considering present and future climate dynamics and trends.

The measure foresees buildings retrofitting and adaptation according to anemometric forcing characteristics.

<table>
<tr><td colspan="5">Targeted Hazard</td><td rowspan="15">Measure Location
  </td></tr>
<tr><td>Severe rainfalls (R)</td><td>Floods (F)</td><td>Severe winds (W)</td><td>High tides (T)</td><td>Coastal storm surges (S)</td></tr>
<tr><td colspan="5">Contribution to FRM and CCA</td></tr>
<tr><td colspan="2">Understanding and assessing DR</td><td colspan="2">Forecasting and assessing hazards</td><td>Reducing DR impacts</td></tr>
<tr><td colspan="2">Protecting exposed elements</td><td colspan="2">DR informed governance</td><td>Awareness and preparedness</td></tr>
<tr><td colspan="5">Progress of implementation</td></tr>
<tr><td>Proposed</td><td>Not Started</td><td>Planning Ongoing</td><td>On Going Construction</td><td>Completed</td></tr>
<tr><td colspan="2">Implementation timeframes</td><td colspan="2">Cost</td><td>Responsible bodies</td></tr>
<tr><td colspan="2">2024 - 2030</td><td colspan="2">€ 12.600.000,00</td><td>Venice Municipality</td></tr>
<tr><td colspan="5">FRMP value</td></tr>
<tr><td colspan="4">M2-Prevention</td><td colspan="5">M3-Protection</td></tr>
<tr><td>M21</td><td>M22</td><td>M23</td><td>M24</td><td>M31</td><td>M32</td><td>M33</td><td>M34</td><td>M35</td></tr>
<tr><td colspan="4">M4-Preparation</td><td colspan="5">M5-Reconstruction</td></tr>
<tr><td>M41</td><td>M42</td><td>M43</td><td>M44</td><td>M51</td><td>M52</td><td>M53</td></tr>
</table>

CiCPMG - 4.1. Coordination with the Green Public Sector for tree falls and collapses R - W

The management of tree falls and related material collapses should be coordinated with the Public Soil and Green Protection Municipal Service in a permanent and standardized way. It is therefore advisable to set intervention objectives, mapping tasks, and risk communication tools between the two sectors.

Targeted Hazard				
Severe rainfalls (R)	Floods (F)	Severe winds (W)	High tides (T)	Coastal storm surges (S)
Contribution to FRM and CCA				
Understanding and assessing DR	Forecasting and assessing hazards	Reducing DR impacts	Hazard mitigation and dispersion	
Protecting exposed elements	DR informed governance	Awareness and preparedness	Emergency procedures	
Progress of implementation				
Proposed	Not Started	Planning Ongoing	On Going Construction	Completed
Implementation timeframes	**Cost**	**Responsible bodies**		
/	/	/		
FRMP value				
M2-Prevention				M3-Protection
M21	M22	M23	M24	M31	M32	M33	M34	M35
M4-Preparation				M5-Reconstruction
M41	M42	M43	M44	M51	M52	M53		

Measure Location

CCAP - 04.01 Hydraulic insulation from high tides below 130 cm level - T

Elevations of pedestrian areas most subject to high tides' flooding, with construction techniques capable of counteracting the loss of shores' fine materials due to tidal washout phenomena. The measure includes sewer adaptation to regulations' requirements.

Targeted Hazard				
Severe rainfalls (R)	Floods (F)	Severe winds (W)	High tides (T)	Coastal storm surges (S)
Contribution to FRM and CCA				
Understanding and assessing DR	Forecasting and assessing hazards	Reducing DR impacts	Hazard mitigation and dispersion	
Protecting exposed elements	DR informed governance	Awareness and preparedness	Emergency procedures	
Progress of implementation				
Proposed	Not Started	Planning Ongoing	On Going Construction	Completed
Implementation timeframes	**Cost**	**Responsible bodies**		
2022 - 2024	€ 190.000.000,00	Venice Municipality, Emergency Deputy Commissioner, Public Works Superintendency		
FRMP value				
M2-Prevention				M3-Protection
M21	M22	M23	M24	M31	M32	M33	M34	M35
M4-Preparation				M5-Reconstruction
M41	M42	M43	M44	M51	M52	M53		

Measure Location

CCAP - 04.02 Hydraulic insulation from high tides below 130 cm level for the Castello Insula - T

Due to its position with respect to the Lido harbour entrance's inlets and its conformation, the Castello Insula hydraulic insulation requires an in-depth study and innovative design. The intervention will be an opportunity for researching protection techniques from extraordinary high tides, so as to capitalize on this pilot for similar areas of intervention.

Targeted Hazard				
Severe rainfalls (R)	Floods (F)	Severe winds (W)	High tides (T)	Coastal storm surges (S)

Contribution to FRM and CCA			
Understanding and assessing DR	Forecasting and assessing hazards	Reducing DR impacts	Hazard mitigation and dispersion
Protecting exposed elements	DR informed governance	Awareness and preparedness	Emergency procedures

Progress of implementation				
Proposed	Not Started	Planning Ongoing	On Going Construction	Completed

Implementation timeframes	**Cost**	**Responsible bodies**
2022 - 2024	Part of CCAP - 04.01	Venice Municipality, Emergency Deputy Commissioner, Public Works Superintendency

FRMP value								
M2-Prevention				M3-Protection				
M21	M22	M23	M24	M31	M32	M33	M34	M35
M4-Preparation				M5-Reconstruction				
M41	M42	M43	M44	M51	M52	M53		

Measure Location

CCAP - 04.03 Hydraulic insulation and regeneration of the St. Marco's Basilica area - T

St. Marco's Basilica in recent decades has been subject to increasing and more severe tides. The measure consists of a large intervention, already ongoing, involving the Basilica's safety from medium and high tides on one side, and to minor tidal levels on the Piazza St. Marco side. Additional protection is foreseen with the construction of transparent barriers along the perimeter of the Basilica's facade towards the square. The square's defence is planned to remain dry up to a tidal level of +110 cm, beyond which the intervention of the MOSE system is expected.

Targeted Hazard				
Severe rainfalls (R)	Floods (F)	Severe winds (W)	High tides (T)	Coastal storm surges (S)

Contribution to FRM and CCA			
Understanding and assessing DR	Forecasting and assessing hazards	Reducing DR impacts	Hazard mitigation and dispersion
Protecting exposed elements	DR informed governance	Awareness and preparedness	Emergency procedures

Progress of implementation				
Proposed	Not Started	Planning Ongoing	On Going Construction	Completed

Implementation timeframes	**Cost**	**Responsible bodies**
2022 - 2024	€ 30.000.000,00	Venice Municipality, Emergency Deputy Commissioner, Public Works Superintendency

FRMP value								
M2-Prevention				M3-Protection				
M21	M22	M23	M24	M31	M32	M33	M34	M35
M4-Preparation				M5-Reconstruction				
M41	M42	M43	M44	M51	M52	M53		

Measure Location

CCAP - 04.04 Hydraulic insulation of private dwellings - T

To give redundancy to the high tide defence systems, and also to guarantee safety directly to private individuals, the Municipality has favoured the construction of private defence works on a building scale. These works ensure continuity of usability to homes and businesses in the event of high tide levels lower than the opening of the Mose system.

Targeted Hazard				
Severe rainfalls (R)	Floods (F)	Severe winds (W)	High tides (T)	Coastal storm surges (S)
Contribution to FRM and CCA				
Understanding and assessing DR	Forecasting and assessing hazards	Reducing DR impacts	Hazard mitigation and dispersion	
Protecting exposed elements	DR informed governance	Awareness and preparedness	Emergency procedures	
Progress of implementation				
Proposed	Not Started	Planning Ongoing	On Going Construction	Completed
Implementation timeframes	**Cost**	**Responsible bodies**		
2022 - 2030	€ 10.000.000,00	Private households		
FRMP value				
M2-Prevention				M3-Protection
M21	M22	M23	M24	M31	M32	M33	M34	M35
M4-Preparation				M5-Reconstruction
M41	M42	M43	M44	M51	M52	M53		

Measure Location

1.2.2. [M23_b Business and service continuity]

CCAP - 01.05 Completion of the historic city optical fibre - T

Given the frequency increase of extraordinary high tides and heat waves, with the consequent interruption of urban mobility, the capillary extension of the optical fiber network will support citizens and economic activities distributed within the historic city to limit work interruptions.

Targeted Hazard				
Severe rainfalls (R)	Floods (F)	Severe winds (W)	High tides (T)	Coastal storm surges (S)
Contribution to FRM and CCA			
Understanding and assessing DR	Forecasting and assessing hazards	Reducing DR impacts	Hazard mitigation and dispersion
Protecting exposed elements	DR informed governance	Awareness and preparedness	Emergency procedures
Progress of implementation				
Proposed	Not Started	Planning Ongoing	On Going Construction	Completed
Implementation timeframes	**Cost**	**Responsible bodies**
2022 - 2024	€ 40.000.000,00	FLASH FIBER SRL, TIM
FRMP value								
M2-Prevention				M3-Protection				
M21	M22	M23	M24	M31	M32	M33	M34	M35
M4-Preparation				M5-Reconstruction				
M41	M42	M43	M44	M51	M52	M53		

Measure Location

CCAP - 04.05 Electric power units' relocations for water pumps - T - F

The relocation to higher positions of hydraulic pumps' electric power systems is foreseen and encouraged to ensure an effective lifting of flood waters outside buildings during and after high tides and flooding. Currently, these power systems are often located on ground floors in locations potentially vulnerable to flooding, risking long periods of decommissioning and greater exposures to goods and properties.

Targeted Hazard				
Severe rainfalls (R)	Floods (F)	Severe winds (W)	High tides (T)	Coastal storm surges (S)

Contribution to FRM and CCA			
Understanding and assessing DR	Forecasting and assessing hazards	Reducing DR impacts	Hazard mitigation and dispersion
Protecting exposed elements	DR informed governance	Awareness and preparedness	Emergency procedures

Progress of implementation				
Proposed	Not Started	Planning Ongoing	On Going Construction	Completed

Implementation timeframes	**Cost**	**Responsible bodies**
2022 - 2025	€ 1.600.000,00	Venice Municipality, Private households

FRMP value								
M2-Prevention				M3-Protection				
M21	M22	M23	M24	M31	M32	M33	M34	M35
M4-Preparation				M5-Reconstruction				
M41	M42	M43	M44	M51	M52	M53		

Measure Location

1.2.3. [M23_c NBS reducing adverse consequences, urban + rural]

CCAP - 01.07 Establishment of a green and fresh roads network - R - W - F

For an effective and complete transformation of the city into a system resilient to climate change, the punctual elements and interventions will be connected through green and blue infrastructures (trees, open canals, green canopies, and roofs). The Municipality has organized a vision and a strategy for this transformation in the 2020 Urban Reforestation Document.

Targeted Hazard				
Severe rainfalls (R)	Floods (F)	Severe winds (W)	High tides (T)	Coastal storm surges (S)
Contribution to FRM and CCA				
Understanding and assessing DR	Forecasting and assessing hazards	Reducing DR impacts	Hazard mitigation and dispersion	
Protecting exposed elements	DR informed governance	Awareness and preparedness	Emergency procedures	
Progress of implementation				
Proposed	Not Started	Planning Ongoing	On Going Construction	Completed
Implementation timeframes	**Cost**	**Responsible bodies**		
2023 - 2026	€ 7.000.000,00	Venice Municipality, Soc. Di Gestione Del Verde		
FRMP value				
M2-Prevention				M3-Protection
M21	M22	M23	M24	M31	M32	M33	M34	M35
M4-Preparation				M5-Reconstruction
M41	M42	M43	M44	M51	M52	M53		

Measure Location

CCAP - 01.08 Establishment of a green roofs and walls - R - W

Building regulations have been updated in relation to the need to create "green roofs and walls", to be designed according to the particular climatic vulnerability, building context, and uses, so as to increase green spaces, favour sustainable water management and microclimatic mitigation, as well as energy efficiency, carbon absorption, and fine dust capture.

Targeted Hazard				
Severe rainfalls (R)	Floods (F)	Severe winds (W)	High tides (T)	Coastal storm surges (S)

Contribution to FRM and CCA			
Understanding and assessing DR	Forecasting and assessing hazards	Reducing DR impacts	Hazard mitigation and dispersion
Protecting exposed elements	DR informed governance	Awareness and preparedness	Emergency procedures

Progress of implementation				
Proposed	Not Started	Planning Ongoing	On Going Construction	Completed

Implementation timeframes	**Cost**	**Responsible bodies**
2022 - 2030	1.350.000,00	Private households

FRMP value								
M2-Prevention				M3-Protection				
M21	M22	M23	M24	M31	M32	M33	M34	M35
M4-Preparation				M5-Reconstruction				
M41	M42	M43	M44	M51	M52	M53		

Measure Location

CCAP - 08.01 Irrigation systems efficiency - F

Awareness-raising, information and training initiatives for agricultural workers on irrigation and precision agriculture techniques and technologies aimed at optimizing and saving water, also identifying opportunities for investments' financial support, and consequent infrastructural interventions for irrigation efficiency.

Targeted Hazard				
Severe rainfalls (R)	Floods (F)	Severe winds (W)	High tides (T)	Coastal storm surges (S)
Contribution to FRM and CCA				
Understanding and assessing DR	Forecasting and assessing hazards	Reducing DR impacts	Hazard mitigation and dispersion	
Protecting exposed elements	DR informed governance	Awareness and preparedness	Emergency procedures	
Progress of implementation				
Proposed	Not Started	Planning Ongoing	On Going Construction	Completed
Implementation timeframes	**Cost**	**Responsible bodies**		
2024 - 2027	€ 1.500.000,00	Consorzio Di Bonifica Acque Risorgive		
FRMP value				
M2-Prevention				M3-Protection
M21	M22	M23	M24	M31 M32 M33 M34 M35
M4-Preparation				M5-Reconstruction
M41	M42	M43	M44	M51 M52 M53

Measure Location

1.3. Other prevention (M24)

1.3.1. [M24_a DR assessment and mapping update: evaluating exposed elements, new or unforeseen hazards]

CiCPMG - 2.2. Evaluation of tourist and commuter transportation flows - **T - R - W**

Commuter and tourist mobility in Venice is complex for several reasons: the daily amount of users, the network's fragility, and the multiplicity of involved transport operators. From the point of view of users' quantity, a flow forecasting model is needed to develop exposure studies concerning the communication of an expected impact. From the point of view of the networks, there are several aspects to consider: transit difficulties for water lines in the event of severe wind, heavy rainfall or

storm surges; the presence of a single railway-road connection system between Venice historic city and Mestre; the airport's vulnerability to severe winds and storm surges. Several actors are responsible for managing these transportation flows and, therefore, challenged by these threats, which requires a plural concertation of tasks and communications.

Targeted Hazard				
Severe rainfalls (R)	Floods (F)	Severe winds (W)	High tides (T)	Coastal storm surges (S)
Contribution to FRM and CCA				
Understanding and assessing DR	Forecasting and assessing hazards	Reducing DR impacts	Hazard mitigation and dispersion	
Protecting exposed elements	DR informed governance	Awareness and preparedness	Emergency procedures	
Progress of implementation				
Proposed	Not Started	Planning Ongoing	On Going Construction	Completed
Implementation timeframes	**Cost**	**Responsible bodies**		
/	/	/		
FRMP value				
M2-Prevention				M3-Protection
M21	M22	M23	M24	M31 M32 M33 M34 M35
M4-Preparation				M5-Reconstruction
M41	M42	M43	M44	M51 M52 M53

Measure Location

CiCPMG - 2.1. Acqua Alta system failure criticality assessment

The Civil Protection system needs to develop an ad hoc scenario and identify the related procedures in the event of a Mose System failure. It is necessary to understand the Mose gates collapse' effects in terms of hydraulic flows generated and debris transport. Even though the event is set as unlikely, it is still necessary to have the relevant documentation given its potentially disruptive effects. It is also necessary to assess the induced cascading effects on the surrounding gates and define appropriate emergency tools for high tide management in the event of a system failure.

Targeted Hazard					Measure Location
Severe rainfalls (R)	Floods (F)	Severe winds (W)	High tides (T)	Coastal storm surges (S)	
Contribution to FRM and CCA					
Understanding and assessing DR	Forecasting and assessing hazards	Reducing DR impacts	Hazard mitigation and dispersion		

<table>
<tr><td>Protecting exposed elements</td><td>DR informed governance</td><td>Awareness and preparedness</td><td>Emergency procedures</td><td rowspan="13">  </td></tr>
<tr><td colspan="4">Progress of implementation</td></tr>
<tr><td>Proposed</td><td>Not Started</td><td>Planning Ongoing</td><td>On Going Construction</td><td>Completed</td></tr>
<tr><td colspan="2">Implementation timeframes</td><td>Cost</td><td colspan="2">Responsible bodies</td></tr>
<tr><td colspan="2">/</td><td>/</td><td colspan="2">/</td></tr>
<tr><td colspan="5">FRMP value</td></tr>
<tr><td colspan="3">M2-Prevention</td><td colspan="2">M3-Protection</td></tr>
<tr><td>M21</td><td>M22</td><td>M23</td><td>M24</td><td>M31</td><td>M32</td><td>M33</td><td>M34</td><td>M35</td></tr>
<tr><td colspan="4">M4-Preparation</td><td colspan="5">M5-Reconstruction</td></tr>
<tr><td>M41</td><td>M42</td><td>M43</td><td>M44</td><td>M51</td><td>M52</td><td>M53</td></tr>
</table>

CiCPMG - 2.3. Evaluation of severe wind-related collapses increase - S - T - **R - W** - F

Severe wind can cause artifacts (roof terraces / gutters / historic walls / chimney pots / plasters, etc.) and tree material collapses, with direct damaging effects on people and things, increasing the risk of road network blockage and service networks disruptions and failures. A targeted and detailed assessment is needed for areas exposed to greater risk, developing tools for closing down unsafe routes where possible (e.g., parks or beaches) and deciding where and how to introduce risk communication systems. It is also necessary to evaluate routes' potential impracticability in the event of collapses, so as to produce alternative road maps.

Targeted Hazard				
Severe rainfalls (R)	Floods (F)	Severe winds (W)	High tides (T)	Coastal storm surges (S)
Contribution to FRM and CCA				
Understanding and assessing DR	Forecasting and assessing hazards	Reducing DR impacts	Hazard mitigation and dispersion	
Protecting exposed elements	DR informed governance	Awareness and preparedness	Emergency procedures	
Progress of implementation				
Proposed	Not Started	Planning Ongoing	On Going Construction	Completed
Implementation timeframes	**Cost**	**Responsible bodies**		
/	/	/		
FRMP value				
M2-Prevention				M3-Protection
M21	M22	M23	M24	M31	M32	M33	M34	M35
M4-Preparation				M5-Reconstruction
M41	M42	M43	M44	M51	M52	M53		

Measure Location

CiCPMG - 2.4. Assessment of unmanned vessels shipwreck increased risk - S - R - T

Wave movement intensification, due to storm surges, heavy rainfall, or severe wind, can cause an increase in unmanned vessel shipwrecks-related risks. By sinking, these vessels can pose various risks and complications. The first is the occlusion of channel networks, which can slowdowns ordinary and emergency road systems. The second risk is that of damage to other boats. The third refers to the lagoon basin pollution increase. An in-depth analysis of these three risks is needed, so to develop ad hoc mapping practices and intervention protocols.

<table>
<tr><td colspan="9">Targeted Hazard</td><td rowspan="15">Measure Location
  </td></tr>
<tr><td colspan="2">Severe rainfalls (R)</td><td colspan="2">Floods (F)</td><td colspan="2">Severe winds (W)</td><td colspan="2">High tides (T)</td><td>Coastal storm surges (S)</td></tr>
<tr><td colspan="9">Contribution to FRM and CCA</td></tr>
<tr><td colspan="3">Understanding and assessing DR</td><td colspan="3">Forecasting and assessing hazards</td><td colspan="2">Reducing DR impacts</td><td>Hazard mitigation and dispersion</td></tr>
<tr><td colspan="3">Protecting exposed elements</td><td colspan="3">DR informed governance</td><td colspan="2">Awareness and preparedness</td><td>Emergency procedures</td></tr>
<tr><td colspan="9">Progress of implementation</td></tr>
<tr><td colspan="2">Proposed</td><td colspan="2">Not Started</td><td colspan="2">Planning Ongoing</td><td colspan="2">On Going Construction</td><td>Completed</td></tr>
<tr><td colspan="3">Implementation timeframes</td><td colspan="3">Cost</td><td colspan="3">Responsible bodies</td></tr>
<tr><td colspan="3">/</td><td colspan="3">/</td><td colspan="3">/</td></tr>
<tr><td colspan="9">FRMP value</td></tr>
<tr><td colspan="4">M2-Prevention</td><td colspan="5">M3-Protection</td></tr>
<tr><td>M21</td><td>M22</td><td>M23</td><td>M24</td><td>M31</td><td>M32</td><td>M33</td><td>M34</td><td>M35</td></tr>
<tr><td colspan="4">M4-Preparation</td><td colspan="5">M5-Reconstruction</td></tr>
<tr><td>M41</td><td>M42</td><td>M43</td><td>M44</td><td>M51</td><td colspan="2">M52</td><td colspan="2">M53</td></tr>
</table>

CiCPMG - 2.5. Severe storm risk assessment on Lido and Pellestrina islands - S - T

The risk of a severe storm on Venice's islands of Lido and Pellestrina is quite low. The submerged dam offers an effective defence tool in this regard, and the sloping seabed allows a mitigation of the phenomenon. For these reasons, a substantial impact growth is not expected. Nevertheless, given the 1966 exceptional high tides, storm surges, and floods, and the presence of exposed elements with few tools for rapid intervention, it would be appropriate to develop specific scenarios and risk assessments for these coastal areas.

Targeted Hazard				
Severe rainfalls (R)	Floods (F)	Severe winds (W)	High tides (T)	Coastal storm surges (S)

Contribution to FRM and CCA			
Understanding and assessing DR	Forecasting and assessing hazards	Reducing DR impacts	Hazard mitigation and dispersion
Protecting exposed elements	DR informed governance	Awareness and preparedness	Emergency procedures

Progress of implementation				
Proposed	Not Started	Planning Ongoing	On Going Construction	Completed

Implementation timeframes	**Cost**	**Responsible bodies**
/	/	/

FRMP value								
M2-Prevention				M3-Protection				
M21	M22	M23	M24	M31	M32	M33	M34	M35
M4-Preparation				M5-Reconstruction				
M41	M42	M43	M44	M51	M52	M53		

Measure Location

CiCPMG - 2.6. Assessing and regulating high and extreme waves coastal impacts - S - W

As a result of storm surges and severe winds, particularly high and extreme waves can arise along Venice's coast. A thorough risk assessment is needed to alert and protect citizens and tourists. These evaluations should define intervention areas for prevention, protection, and preparedness measures.

Targeted Hazard				
Severe rainfalls (R)	Floods (F)	Severe winds (W)	High tides (T)	Coastal storm surges (S)
Contribution to FRM and CCA				
Understanding and assessing DR	Forecasting and assessing hazards	Reducing DR impacts	Hazard mitigation and dispersion	
Protecting exposed elements	DR informed governance	Awareness and preparedness	Emergency procedures	
Progress of implementation				
Proposed	Not Started	Planning Ongoing	On Going Construction	Completed
Implementation timeframes	**Cost**	**Responsible bodies**		
/	/	/		
FRMP value				
M2-Prevention				M3-Protection
M21	M22	M23	M24	M31	M32	M33	M34	M35
M4-Preparation				M5-Reconstruction
M41	M42	M43	M44	M51	M52	M53		

Measure Location

CiCPMG - 2.8. Lightning strike risk scenarios for Seveso Directive companies - R

Lightning strike risk is potentially significant for the area. Temperature rises lead to an increase of available energy in the atmosphere, with consequent strong increases in lightning risk. It is therefore needed to carry out an in-depth recognition of exposed industries regulated by the Seveso Directive for major accidents hazards, so as to orient a detailed revision of their company and emergency plans. Furthermore, it would be of great support to develop lightning strikes' induced risk scenarios for those companies that are more vulnerable or more characterized by the presence of pollutants or fuels.

Targeted Hazard				
Severe rainfalls (R)	Floods (F)	Severe winds (W)	High tides (T)	Coastal storm surges (S)
Contribution to FRM and CCA				
Understanding and assessing DR	Forecasting and assessing hazards	Reducing DR impacts	Hazard mitigation and dispersion	
Protecting exposed elements	DR informed governance	Awareness and preparedness	Emergency procedures	
Progress of implementation				
Proposed	Not Started	Planning Ongoing	On Going Construction	Completed
Implementation timeframes	**Cost**	**Responsible bodies**		
/	/	/		
FRMP value				
M2-Prevention				M3-Protection
M21	M22	M23	M24	M31	M32	M33	M34	M35
M4-Preparation				M5-Reconstruction
M41	M42	M43	M44	M51	M52	M53		

Measure Location

1.3.2. [M24_b Disaster and climate data collection, analysis, update, and sharing]

CCAP - 11.01 Climate Change Adaptation Research Centre - S - T - R - W - F

Venice's peculiar lagoon-coastal-land systems and related climate change challenges is well-suited for hosting a global reference research centre on climate change adaptation in coastal cities.

Targeted Hazard				
Severe rainfalls (R)	Floods (F)	Severe winds (W)	High tides (T)	Coastal storm surges (S)

Contribution to FRM and CCA			
Understanding and assessing DR	Forecasting and assessing hazards	Reducing DR impacts	Hazard mitigation and dispersion
Protecting exposed elements	DR informed governance	Awareness and preparedness	Emergency procedures

Progress of implementation				
Proposed	Not Started	Planning Ongoing	On Going Construction	Completed

Implementation timeframes	**Cost**	**Responsible bodies**
2022 - 2024	€ 600.000,00	Italian Government

FRMP value								
M2-Prevention				M3-Protection				
M21	M22	M23	M24	M31	M32	M33	M34	M35
M4-Preparation				M5-Reconstruction				
M41	M42	M43	M44	M51	M52	M53		

Measure Location

CCAP - 11.02 Venice Climate Cadastre and Library - **S - T - R - W - F**

Venice will host a digital and physical database (data, evidences, studies, and chronicles related to climate events and dynamics), accessible to scholars from all over the world, for the study of Venice's climate and its effects.

Targeted Hazard				
Severe rainfalls (R)	Floods (F)	Severe winds (W)	High tides (T)	Coastal storm surges (S)

Contribution to FRM and CCA			
Understanding and assessing DR	Forecasting and assessing hazards	Reducing DR impacts	Hazard mitigation and dispersion
Protecting exposed elements	DR informed governance	Awareness and preparedness	Emergency procedures

Progress of implementation				
Proposed	Not Started	Planning Ongoing	On Going Construction	Completed

Implementation timeframes	**Cost**	**Responsible bodies**
2024 onwards	€ 60.000,00	Centro Studi Int. Su Cambiamenti Climatici

FRMP value								
M2-Prevention				M3-Protection				
M21	M22	M23	M24	M31	M32	M33	M34	M35
M4-Preparation				M5-Reconstruction				
M41	M42	M43	M44	M51	M52	M53		

Measure Location

CCAP - 11.03 Climate risk analyses update and integration - **S - T - R - W - F**

Periodic review of the Plan, updating and integrating climate risk analyses (hazards, vulnerabilities, exposed elements, impacts, etc.) with the available data over time, surveying and monitoring on local climate change effects and on implemented adaptation actions effectiveness.

Targeted Hazard				
Severe rainfalls (R)	Floods (F)	Severe winds (W)	High tides (T)	Coastal storm surges (S)

Contribution to FRM and CCA			
Understanding and assessing DR	Forecasting and assessing hazards	Reducing DR impacts	Hazard mitigation and dispersion
Protecting exposed elements	DR informed governance	Awareness and preparedness	Emergency procedures

Progress of implementation				
Proposed	Not Started	Planning Ongoing	On Going Construction	Completed

Implementation timeframes	**Cost**	**Responsible bodies**
2022 - 2025	€ 120.000,00	Venice Municipality

FRMP value								
M2-Prevention				M3-Protection				
M21	M22	M23	M24	M31	M32	M33	M34	M35
M4-Preparation				M5-Reconstruction				
M41	M42	M43	M44	M51	M52	M53		

Measure Location

CiCPMG - 4.3. Cartography update- S - T - R - W - F

The continuously increasing spatial data and information load needed for an accurate disaster risk assessment and reduction became unsustainable for a central management. A standardized and periodic involvement of data authors is therefore necessary, with precise periodic goals and with ciphered collection systems, with particular attention to exposed sensitive buildings.

Targeted Hazard				
Severe rainfalls (R)	Floods (F)	Severe winds (W)	High tides (T)	Coastal storm surges (S)
Contribution to FRM and CCA			
Understanding and assessing DR	Forecasting and assessing hazards	Reducing DR impacts	Hazard mitigation and dispersion
Protecting exposed elements	DR informed governance	Awareness and preparedness	Emergency procedures
Progress of implementation				
Proposed	Not Started	Planning Ongoing	On Going Construction	Completed
Implementation timeframes	**Cost**	**Responsible bodies**
/	/	/
FRMP value								
M2-Prevention				M3-Protection				
M21	M22	M23	M24	M31	M32	M33	M34	M35
M4-Preparation				M5-Reconstruction				
M41	M42	M43	M44	M51	M52	M53		

Measure Location

CiCPMG - 4.4. Cooperation with the Fire Brigades' portal - S - T - R - W - F

It is necessary to develop a cartographic collaboration with the Fire Brigade portal to support joint interventions cooperation and to receive information related to most frequently affected locations.

Targeted Hazard				
Severe rainfalls (R)	Floods (F)	Severe winds (W)	High tides (T)	Coastal storm surges (S)
Contribution to FRM and CCA				
Understanding and assessing DR	Forecasting and assessing hazards	Reducing DR impacts	Hazard mitigation and dispersion	
Protecting exposed elements	DR informed governance	Awareness and preparedness	Emergency procedures	
Progress of implementation				
Proposed	Not Started	Planning Ongoing	On Going Construction	Completed
Implementation timeframes	**Cost**	**Responsible bodies**		
/	/	/		
FRMP value				
M2-Prevention				M3-Protection
M21	M22	M23	M24	M31	M32	M33	M34	M35
M4-Preparation				M5-Reconstruction
M41	M42	M43	M44	M51	M52	M53		

Measure Location

1.3.3. [M24_b Monitoring sustainability and mainstreaming climate risk]

CCAP - 09.02 “Insula” project interventions monitoring - T

Update and monitor the “Insula” project implementation’s state of the art, verifying, through satellite imageries, the relationship between redeveloped/raised areas and the simulated/measured high tides’ impacts. Thanks to this type of comparison it will be possible to update the work timeline and interventions’ prioritization in the medium to long term, also considering climate change trends and the needed adaptation.

Targeted Hazard				
Severe rainfalls (R)	Floods (F)	Severe winds (W)	High tides (T)	Coastal storm surges (S)

Contribution to FRM and CCA			
Understanding and assessing DR	Forecasting and assessing hazards	Reducing DR impacts	Hazard mitigation and dispersion
Protecting exposed elements	DR informed governance	Awareness and preparedness	Emergency procedures

Progress of implementation				
Proposed	Not Started	Planning Ongoing	On Going Construction	Completed

Implementation timeframes	**Cost**	**Responsible bodies**
2024 onwards	€ 50.000,00	Veritas Spa

FRMP value								
M2-Prevention				M3-Protection				
M21	M22	M23	M24	M31	M32	M33	M34	M35
M4-Preparation				M5-Reconstruction				
M41	M42	M43	M44	M51	M52	M53		

Measure Location

CCAP - 09.03 Monitoring of MOSE system environmental effects - **S - T**

The Mose project building implicates significant systemic and environmental transformations for both the lagoon and the city. A monitoring program is underway to continuously assess this work's sustainability. This monitoring program will support future decisions regarding its use also in terms of climate change responses.

Targeted Hazard				
Severe rainfalls (R)	Floods (F)	Severe winds (W)	High tides (T)	Coastal storm surges (S)
Contribution to FRM and CCA			
Understanding and assessing DR	Forecasting and assessing hazards	Reducing DR impacts	Hazard mitigation and dispersion
Protecting exposed elements	DR informed governance	Awareness and preparedness	Emergency procedures
Progress of implementation				
Proposed	Not Started	Planning Ongoing	On Going Construction	Completed
Implementation timeframes	**Cost**	**Responsible bodies**
2022 - 2024	€ 2.000.000,00	Corila
FRMP value								
M2-Prevention				M3-Protection				
M21	M22	M23	M24	M31	M32	M33	M34	M35
M4-Preparation				M5-Reconstruction				
M41	M42	M43	M44	M51	M52	M53		

Measure Location

CCAP - 13.02 Climate informed management objectives definition for Natura 2000 Sites - **S - R - W**

Venice's NATURA 2000 sites are sensitive areas to climate change effects, whose biodiversity is exposed and vulnerable to various current and upcoming hazards and stresses. Considering these climate threats, the Municipality of Venice and the Veneto Region will identify general and specific management objectives, and develop appropriate adaptation measures aimed at preserving affected habitats and species.

Targeted Hazard				
Severe rainfalls (R)	Floods (F)	Severe winds (W)	High tides (T)	Coastal storm surges (S)

Contribution to FRM and CCA			
Understanding and assessing DR	Forecasting and assessing hazards	Reducing DR impacts	Hazard mitigation and dispersion
Protecting exposed elements	DR informed governance	Awareness and preparedness	Emergency procedures

Progress of implementation				
Proposed	Not Started	Planning Ongoing	On Going Construction	Completed

Implementation timeframes	**Cost**	**Responsible bodies**
2022	/	Venice Municipality

FRMP value								
M2-Prevention				M3-Protection				
M21	M22	M23	M24	M31	M32	M33	M34	M35
M4-Preparation				M5-Reconstruction				
M41	M42	M43	M44	M51	M52	M53		

Measure Location

CCAP - 13.03 Climate informed update of Municipal urban planning tools - **S - R - W**

Mainstreaming available climate risk analysis in Municipal planning tools in the occasion of their update, particularly the “Piano di Assetto del Territorio” (Territorial Development Plan) and the “Piano degli interventi” (Interventions Plan).

Targeted Hazard				
Severe rainfalls (R)	Floods (F)	Severe winds (W)	High tides (T)	Coastal storm surges (S)

Contribution to FRM and CCA			
Understanding and assessing DR	Forecasting and assessing hazards	Reducing DR impacts	Hazard mitigation and dispersion
Protecting exposed elements	DR informed governance	Awareness and preparedness	Emergency procedures

Progress of implementation				
Proposed	Not Started	Planning Ongoing	On Going Construction	Completed

Implementation timeframes	**Cost**	**Responsible bodies**
2023 - 2024	/	Venice Municipality

FRMP value								
M2-Prevention				M3-Protection				
M21	M22	M23	M24	M31	M32	M33	M34	M35
M4-Preparation				M5-Reconstruction				
M41	M42	M43	M44	M51	M52	M53		

Measure Location

CCAP - 13.04 Climate-informed and nature-based upgrade of the Water Management Plan - **S - R - F**

Venice's Water Management Plan detailed vulnerable and endangered areas for surface and underground waters, and planned measures and regulations for overcoming these conditions of risk. According to the climatic data and scenarios gradually available over time, this plan should be periodically updated.

Targeted Hazard				
Severe rainfalls (R)	Floods (F)	Severe winds (W)	High tides (T)	Coastal storm surges (S)

Contribution to FRM and CCA			
Understanding and assessing DR	Forecasting and assessing hazards	Reducing DR impacts	Hazard mitigation and dispersion
Protecting exposed elements	DR informed governance	Awareness and preparedness	Emergency procedures

Progress of implementation				
Proposed	Not Started	Planning Ongoing	On Going Construction	Completed

Implementation timeframes	**Cost**	**Responsible bodies**
2023 - 2024	/	Venice Municipality

FRMP value								
M2-Prevention				M3-Protection				
M21	M22	M23	M24	M31	M32	M33	M34	M35
M4-Preparation				M5-Reconstruction				
M41	M42	M43	M44	M51	M52	M53		

Measure Location

CCAP - 14.01 Adaptation strategies coordination with public and private subjects - **T - R - W - F**

Venice's Climate Change Adaptation Plan's effectiveness is closely interconnected with related strategies developed and implemented by other local authorities. Through appropriate, inclusive, and integrated, governance, co-planning, and co-programming processes, the Municipality of Venice intends to coordinate its adaptation initiatives with analogue ones of public and private subjects.

Targeted Hazard				
Severe rainfalls (R)	Floods (F)	Severe winds (W)	High tides (T)	Coastal storm surges (S)
Contribution to FRM and CCA				
Understanding and assessing DR	Forecasting and assessing hazards	Reducing DR impacts	Hazard mitigation and dispersion	
Protecting exposed elements	DR informed governance	Awareness and preparedness	Emergency procedures	
Progress of implementation				
Proposed	Not Started	Planning Ongoing	On Going Construction	Completed
Implementation timeframes	**Cost**	**Responsible bodies**		
2022 - onwards	/	All competent entities		
FRMP value				
M2-Prevention				M3-Protection
M21	M22	M23	M24	M31	M32	M33	M34	M35
M4-Preparation				M5-Reconstruction
M41	M42	M43	M44	M51	M52	M53		

Measure Location

2. Protection

2.1. Natural flood management / runoff and catchment management (M31)

2.1.1. [M31_a Blue and green infrastructures for rainwater harvesting]

CCAP - 01.03 Water saving and rainwater collection and reuse - **R - F**

The measure aims at reducing drought impacts and provides for existing building stock adaptation in terms of water saving, through sewage networks separation and dual systems, in situ treatment and reuse, rainwater collection for non-potable uses, etc.

Targeted Hazard				
Severe rainfalls (R)	Floods (F)	Severe winds (W)	High tides (T)	Coastal storm surges (S)

Contribution to FRM and CCA			
Understanding and assessing DR	Forecasting and assessing hazards	Reducing DR impacts	Hazard mitigation and dispersion
Protecting exposed elements	DR informed governance	Awareness and preparedness	Emergency procedures

Progress of implementation				
Proposed	Not Started	Planning Ongoing	On Going Construction	Completed

Implementation timeframes	**Cost**	**Responsible bodies**
2024 - 2030	€ 18.000.000,00	Venice Municipality

FRMP value								
M2-Prevention				M3-Protection				
M21	M22	M23	M24	M31	M32	M33	M34	M35
M4-Preparation				M5-Reconstruction				
M41	M42	M43	M44	M51	M52	M53		

Measure Location

CCAP - 05.01 Minor channels and water systems hydraulic and environmental upgrading - **R - F**

Widespread implementation of Natural Water Retention Measures (NWRM) for minor channels and water systems (of paramount importance for rainwaters and flood surface waters drainage) such as: small streams resection with naturalistic criteria, micro varices and wet areas creation, and aquatic vegetation maintenance (foreseen in the 2020 approved Water Management Plan).

Targeted Hazard				
Severe rainfalls (R)	Floods (F)	Severe winds (W)	High tides (T)	Coastal storm surges (S)

Contribution to FRM and CCA			
Understanding and assessing DR	Forecasting and assessing hazards	Reducing DR impacts	Hazard mitigation and dispersion
Protecting exposed elements	DR informed governance	Awareness and preparedness	Emergency procedures

Progress of implementation				
Proposed	Not Started	Planning Ongoing	On Going Construction	Completed

Implementation timeframes	**Cost**	**Responsible bodies**
2022 - 2030	€ 20.000.000,00	Venice Municipality, Veritas Spa, Consorzi Di Bonifica

FRMP value								
M2-Prevention				M3-Protection				
M21	M22	M23	M24	M31	M32	M33	M34	M35
M4-Preparation				M5-Reconstruction				
M41	M42	M43	M44	M51	M52	M53		

Measure Location

CCAP - 05.02 Osellino Canal hydraulic and environmental upgrading - **R - F**

The project will lead to an ecological and ecosystem improvement of the Osellino Canal's surrounding areas. A typological and morphological analysis of the canal sections was carried out, assessing environmental, hydraulic, and landscape criticalities related to flooding, high tide, and urban water management phenomena. An upgrade of the Canal as a whole is underway to reduce these criticalities with coherent tools (intervention foreseen in the 2020 approved Water Management Plan).

Targeted Hazard				
Severe rainfalls (R)	Floods (F)	Severe winds (W)	High tides (T)	Coastal storm surges (S)

Contribution to FRM and CCA			
Understanding and assessing DR	Forecasting and assessing hazards	Reducing DR impacts	Hazard mitigation and dispersion
Protecting exposed elements	DR informed governance	Awareness and preparedness	Emergency procedures

Progress of implementation				
Proposed	Not Started	Planning Ongoing	On Going Construction	Completed

Implementation timeframes	**Cost**	**Responsible bodies**
2022 - 2025	€ 24.000.000,00	Consorzi Di Bonifica

FRMP value								
M2-Prevention				M3-Protection				
M21	M22	M23	M24	M31	M32	M33	M34	M35
M4-Preparation				M5-Reconstruction				
M41	M42	M43	M44	M51	M52	M53		

Measure Location

CCAP - 05.03 Creation of the Marzenego River Park - **R - W - F**

The creation of this river park will lead to the environmental requalification of a large area of Mestre along the Marzenego river. The intervention will redesign the river course and its surroundings according to environmental requalification criteria. The transformation, of great magnitude and impact, will reduce the flooding risks, improve fauna's quality and quantity guaranteeing biodiversity, redefine the city-river relationship, and redevelop large areas currently critical (intervention foreseen in the 2020 approved Water Management Plan).

<table>
<tr><td colspan="9">Targeted Hazard</td><td rowspan="20">Measure Location
  </td></tr>
<tr><td colspan="2">Severe rainfalls (R)</td><td colspan="2">Floods (F)</td><td colspan="2">Severe winds (W)</td><td colspan="2">High tides (T)</td><td>Coastal storm surges (S)</td></tr>
<tr><td colspan="9">Contribution to FRM and CCA</td></tr>
<tr><td colspan="3">Understanding and assessing DR</td><td colspan="3">Forecasting and assessing hazards</td><td colspan="2">Reducing DR impacts</td><td>Hazard mitigation and dispersion</td></tr>
<tr><td colspan="3">Protecting exposed elements</td><td colspan="3">DR informed governance</td><td colspan="2">Awareness and preparedness</td><td>Emergency procedures</td></tr>
<tr><td colspan="9">Progress of implementation</td></tr>
<tr><td colspan="2">Proposed</td><td colspan="2">Not Started</td><td colspan="2">Planning Ongoing</td><td colspan="2">On Going Construction</td><td>Completed</td></tr>
<tr><td colspan="3">Implementation timeframes</td><td colspan="3">Cost</td><td colspan="3">Responsible bodies</td></tr>
<tr><td colspan="3">2022 - 2025</td><td colspan="3">€ 20.000.000,00</td><td colspan="3">Consorzi Di Bonifica</td></tr>
<tr><td colspan="9">FRMP value</td></tr>
<tr><td colspan="4">M2-Prevention</td><td colspan="5">M3-Protection</td></tr>
<tr><td>M21</td><td>M22</td><td>M23</td><td>M24</td><td>M31</td><td>M32</td><td>M33</td><td>M34</td><td>M35</td></tr>
<tr><td colspan="4">M4-Preparation</td><td colspan="5">M5-Reconstruction</td></tr>
<tr><td>M41</td><td>M42</td><td>M43</td><td>M44</td><td>M51</td><td colspan="2">M52</td><td colspan="2">M53</td></tr>
</table>

CCAP - 05.04 Creation of the Dese River Park - **R - W - F**

The Dese River Park will be built following the Marzenego Park pilot, adopting analogue principles and techniques. This second intervention will enhance river flooding reduction in the Mestre area and constitute another blue and green corridor accessing the city (intervention foreseen in the 2020 approved Water Management Plan).

Targeted Hazard				
Severe rainfalls (R)	Floods (F)	Severe winds (W)	High tides (T)	Coastal storm surges (S)

Contribution to FRM and CCA			
Understanding and assessing DR	Forecasting and assessing hazards	Reducing DR impacts	Hazard mitigation and dispersion
Protecting exposed elements	DR informed governance	Awareness and preparedness	Emergency procedures

Progress of implementation				
Proposed	Not Started	Planning Ongoing	On Going Construction	Completed

Implementation timeframes	**Cost**	**Responsible bodies**
2022 - 2025	€ 30.000.000,00	Consorzi Di Bonifica

FRMP value								
M2-Prevention				M3-Protection				
M21	M22	M23	M24	M31	M32	M33	M34	M35
M4-Preparation				M5-Reconstruction				
M41	M42	M43	M44	M51	M52	M53		

Measure Location

CCAP - 05.05 Creation of the Lusore River Park - **R - W - F**

The "interventions on the Lusore basin's hydraulic network" project foresees low water disposal system rationalization in the Malcontenta basin through the construction of a high transmissivity network that reduces localized and continuous losses along the project canals. The system, consisting of various Nature-Based interventions, will allow rainwater discharge during lower intensity events directly to the pertaining drainage system, guaranteeing hydraulic safety even during flood events with a 100 years return period, thanks to controlled flooding of retention basins (intervention foreseen in the 2020 approved Water Management Plan).

Targeted Hazard				
Severe rainfalls (R)	Floods (F)	Severe winds (W)	High tides (T)	Coastal storm surges (S)
Contribution to FRM and CCA				
Understanding and assessing DR	Forecasting and assessing hazards	Reducing DR impacts	Hazard mitigation and dispersion	
Protecting exposed elements	DR informed governance	Awareness and preparedness	Emergency procedures	
Progress of implementation				
Proposed	Not Started	Planning Ongoing	On Going Construction	Completed
Implementation timeframes	**Cost**	**Responsible bodies**		
2022 – 2024	€ 70.000,00	Consorzi Di Bonifica		
FRMP value				
M2-Prevention				M3-Protection
M21	M22	M23	M24	M31	M32	M33	M34	M35
M4-Preparation				M5-Reconstruction
M41	M42	M43	M44	M51	M52	M53		

Measure Location

CCAP - 07.01 San Giuliano Park expansion - **R – W**

The recovery of Bissuola Park's degraded green areas, combined with the planned improvement of green connections throughout the Osellino woods towards the lagoon waterfront, will expand significantly the current San Giuliano Park area. This new large green area candidates to become an important multifunctional ecological axis connecting the Venice lagoon to mainland municipal areas.

Targeted Hazard				
Severe rainfalls (R)	Floods (F)	Severe winds (W)	High tides (T)	Coastal storm surges (S)
Contribution to FRM and CCA				
Understanding and assessing DR	Forecasting and assessing hazards	Reducing DR impacts	Hazard mitigation and dispersion	
Protecting exposed elements	DR informed governance	Awareness and preparedness	Emergency procedures	
Progress of implementation				
Proposed	Not Started	Planning Ongoing	On Going Construction	Completed
Implementation timeframes	**Cost**	**Responsible bodies**		
2022 - 2024	€ 20.000.000,00	Venice Municipality		
FRMP value				
M2-Prevention				M3-Protection
M21	M22	M23	M24	M31	M32	M33	M34	M35
M4-Preparation				M5-Reconstruction
M41	M42	M43	M44	M51	M52	M53		

Measure Location

CCAP - 07.02 Completion of Mestre's woods green belt - **R - W - F**

The measure foresees the completion of the current forest, with the expansion of 1,258 hectares and the planting of approximately 629,000 new plants. In addition, it is planned the construction of a green areas and wetlands system structuring a green belt surrounding Mestre. This will provide great ecosystem benefits against heat waves and intense rainfall effects.

Targeted Hazard				
Severe rainfalls (R)	Floods (F)	Severe winds (W)	High tides (T)	Coastal storm surges (S)
Contribution to FRM and CCA				
Understanding and assessing DR	Forecasting and assessing hazards	Reducing DR impacts	Hazard mitigation and dispersion	
Protecting exposed elements	DR informed governance	Awareness and preparedness	Emergency procedures	
Progress of implementation				
Proposed	Not Started	Planning Ongoing	On Going Construction	Completed
Implementation timeframes	**Cost**	**Responsible bodies**		
2022 - 2023	€ 3.000.000,00	Venice Municipality		
FRMP value				
M2-Prevention				M3-Protection
M21	M22	M23	M24	M31	M32	M33	M34	M35
M4-Preparation				M5-Reconstruction
M41	M42	M43	M44	M51	M52	M53		

Measure Location

2.1.2. [M31_b Environmental restoration of the lagoon and coasts]

CCAP - 06.01 Lagoon's sandbars and seabed morphological regeneration and revegetation - **S - T**

Lagoon's sandbars and salt marshes have a great naturalistic value essential for the ecosystem's survival, but also constitute a natural infrastructure reducing strong tidal waves' impacts generated in extraordinary high tides. The environmental recovery and regeneration of these infrastructures is foreseen to decrease tidal waves.

Targeted Hazard				
Severe rainfalls (R)	Floods (F)	Severe winds (W)	High tides (T)	Coastal storm surges (S)
Contribution to FRM and CCA				
Understanding and assessing DR	Forecasting and assessing hazards	Reducing DR impacts	Hazard mitigation and dispersion	
Protecting exposed elements	DR informed governance	Awareness and preparedness	Emergency procedures	
Progress of implementation				
Proposed	Not Started	Planning Ongoing	On Going Construction	Completed
Implementation timeframes	**Cost**	**Responsible bodies**		
2022 - 2025	€ 3.000.000,00	Public Works Superintendency		

FRMP value								
M2-Prevention				M3-Protection				
M21	M22	M23	M24	M31	M32	M33	M34	M35
M4-Preparation				M5-Reconstruction				
M41	M42	M43	M44	M51	M52	M53		

Measure Location

CCAP - 06.02 Lagoon's reclaimed lands environmental restoration - **T**

Lagoon's "artificial islands" resulted from reclaimed lands that compromised the quantity and quality of external-internal lagoon water exchanges. At the same time, these artificial islands became protected naturalistic areas, habitats for flora and fauna's considerable interest. The environmental restoration in these reclaimed lands will aim both at activating the lagoon's ecological processes, including the interaction with tidal fluctuations, but also at safeguarding their ecological heritage.

Targeted Hazard				
Severe rainfalls (R)	Floods (F)	Severe winds (W)	High tides (T)	Coastal storm surges (S)

Contribution to FRM and CCA			
Understanding and assessing DR	Forecasting and assessing hazards	Reducing DR impacts	Hazard mitigation and dispersion
Protecting exposed elements	DR informed governance	Awareness and preparedness	Emergency procedures

Progress of implementation				
Proposed	Not Started	Planning Ongoing	On Going Construction	Completed

Implementation timeframes	**Cost**	**Responsible bodies**
2024 - 2027	€ 6.000.000,00	Public Works Superintendency

FRMP value								
M2-Prevention				M3-Protection				
M21	M22	M23	M24	M31	M32	M33	M34	M35
M4-Preparation				M5-Reconstruction				
M41	M42	M43	M44	M51	M52	M53		

Measure Location

CCAP - 07.06 Coastal dune systems environmental restoration - **S - R - W - F**

The plan foresees compensation, conservation, and environmental redevelopment measures for coastal Special Areas of Conservation (SACs) and Special Protection Areas (SPAs). Specific improvements concern coastal dune systems through new coastal habitats establishment, SACs expansion and SPAs designation, and coastal environmental redevelopment.

<table>
<tr><td colspan="9">Targeted Hazard</td><td rowspan="15">Measure Location
  </td></tr>
<tr><td colspan="2">Severe rainfalls (R)</td><td colspan="2">Floods (F)</td><td colspan="2">Severe winds (W)</td><td colspan="2">High tides (T)</td><td>Coastal storm surges (S)</td></tr>
<tr><td colspan="9">Contribution to FRM and CCA</td></tr>
<tr><td colspan="3">Understanding and assessing DR</td><td colspan="3">Forecasting and assessing hazards</td><td colspan="2">Reducing DR impacts</td><td>Hazard mitigation and dispersion</td></tr>
<tr><td colspan="3">Protecting exposed elements</td><td colspan="3">DR informed governance</td><td colspan="2">Awareness and preparedness</td><td>Emergency procedures</td></tr>
<tr><td colspan="9">Progress of implementation</td></tr>
<tr><td colspan="2">Proposed</td><td colspan="2">Not Started</td><td colspan="2">Planning Ongoing</td><td colspan="2">On Going Construction</td><td>Completed</td></tr>
<tr><td colspan="3">Implementation timeframes</td><td colspan="3">Cost</td><td colspan="3">Responsible bodies</td></tr>
<tr><td colspan="3">2023 - 2026</td><td colspan="3">€ 23.000.000,00</td><td colspan="3">Public Works Superintendency</td></tr>
<tr><td colspan="9">FRMP value</td></tr>
<tr><td colspan="4">M2-Prevention</td><td colspan="5">M3-Protection</td></tr>
<tr><td>M21</td><td>M22</td><td>M23</td><td>M24</td><td>M31</td><td>M32</td><td>M33</td><td>M34</td><td>M35</td></tr>
<tr><td colspan="4">M4-Preparation</td><td colspan="5">M5-Reconstruction</td></tr>
<tr><td>M41</td><td>M42</td><td>M43</td><td>M44</td><td>M51</td><td colspan="2">M52</td><td colspan="2">M53</td></tr>
</table>

2.2. Water flow regulation (M32)

CCAP - 03.01 MOSE system completion and operational management - **S - T**

The Mose - Electromechanical Experimental Module - is a mobile dams system formed by four barriers placed at the three inlets of the Venice Lagoon. The objective of the Mose is to control high tide access into the lagoon to preserve Venice's cultural and residential heritage. Experimentally operative since the summer of 2020, expected to be completed and fully operational soon for tidal events exceeding 110-130 cm.

Targeted Hazard				
Severe rainfalls (R)	Floods (F)	Severe winds (W)	High tides (T)	Coastal storm surges (S)

Contribution to FRM and CCA			
Understanding and assessing DR	Forecasting and assessing hazards	Reducing DR impacts	Hazard mitigation and dispersion
Protecting exposed elements	DR informed governance	Awareness and preparedness	Emergency procedures

Progress of implementation				
Proposed	Not Started	Planning Ongoing	On Going Construction	Completed

Implementation timeframes	**Cost**	**Responsible bodies**
2022 - 2024	€ 538.000.000	Public Works Superintendency, Mite

FRMP value								
M2-Prevention				M3-Protection				
M21	M22	M23	M24	M31	M32	M33	M34	M35
M4-Preparation				M5-Reconstruction				
M41	M42	M43	M44	M51	M52	M53		

Measure Location

CCAP - 03.02 Hydraulic defence interventions for river courses' flood risk - **R - F**

Completion and management of the foreseen protection interventions regarding rivers and canals flowing into the lagoon or concerning Venice mainland, i.e., controlled flooding areas, defence structures (e.g., embankments), mechanical defence works (e.g., water pumps).

Targeted Hazard				
Severe rainfalls (R)	Floods (F)	Severe winds (W)	High tides (T)	Coastal storm surges (S)

Contribution to FRM and CCA			
Understanding and assessing DR	Forecasting and assessing hazards	Reducing DR impacts	Hazard mitigation and dispersion
Protecting exposed elements	DR informed governance	Awareness and preparedness	Emergency procedures

Progress of implementation				
Proposed	Not Started	Planning Ongoing	On Going Construction	Completed

Implementation timeframes	**Cost**	**Responsible bodies**
2022 - 2024	€ 80.000.000,00	Consorzio Acque Risogive, Veritas Spa

FRMP value								
M2-Prevention				M3-Protection				
M21	M22	M23	M24	M31	M32	M33	M34	M35
M4-Preparation				M5-Reconstruction				
M41	M42	M43	M44	M51	M52	M53		

Measure Location

2.3. Channel, Coastal and Floodplain Works (M33)

CiCPMG - 5.1. Hydraulic mitigation interventions S - T - R - F

Hydraulic interventions planned in Venice Municipality should strongly reduce risks related to intense rainfall, floods and storm surges. These defensive projects are expected to mitigate hazards worsening and increase in frequency and will require continuous maintenance and restoration work to avoid further impacts and damages increase.

Targeted Hazard				
Severe rainfalls (R)	Floods (F)	Severe winds (W)	High tides (T)	Coastal storm surges (S)
Contribution to FRM and CCA				
Understanding and assessing DR	Forecasting and assessing hazards	Reducing DR impacts	Hazard mitigation and dispersion	
Protecting exposed elements	DR informed governance	Awareness and preparedness	Emergency procedures	
Progress of implementation				
Proposed	Not Started	Planning Ongoing	On Going Construction	Completed
Implementation timeframes	**Cost**	**Responsible bodies**		
/	/	/		
FRMP value				
M2-Prevention				M3-Protection
M21	M22	M23	M24	M31	M32	M33	M34	M35
M4-Preparation				M5-Reconstruction
M41	M42	M43	M44	M51	M52	M53		

Measure Location

CCAP - 03.03 High tide and waves surge hydraulic defences - **S - T**

Venice Lagoon's main islands constitute the most exposed elements to high tide impacts, particularly extraordinary ones. Main impacts are due to tidal floods ascent and waves, reason why protective masonry systems are required to contain and lower these stresses. This measure plans the implementation of incremental defence works to face this criticality in most sensitive areas.

Targeted Hazard				
Severe rainfalls (R)	Floods (F)	Severe winds (W)	High tides (T)	Coastal storm surges (S)

Contribution to FRM and CCA			
Understanding and assessing DR	Forecasting and assessing hazards	Reducing DR impacts	Hazard mitigation and dispersion
Protecting exposed elements	DR informed governance	Awareness and preparedness	Emergency procedures

Progress of implementation				
Proposed	Not Started	Planning Ongoing	On Going Construction	Completed

Implementation timeframes	**Cost**	**Responsible bodies**
2022 - 2026	€ 25.000.000,00	Venice Municipality, Emergency Deputy Commissioner, Public Works Superintendency

FRMP value								
M2-Prevention				M3-Protection				
M21	M22	M23	M24	M31	M32	M33	M34	M35
M4-Preparation				M5-Reconstruction				
M41	M42	M43	M44	M51	M52	M53		

Measure Location

CCAP - 03.04 Storm surge hydraulic defences - **S - T**

Past coastal defences from storm surges have been protecting the lagoon and its inhabited areas and restoring its natural defences, creating new beaches, recovering and expanding dune systems. The completion of these coastal "protected nourishment", the creation of new beaches protected with stone dams, recalls, albeit artificially, beaches' natural characteristics of flexibility and adaptation to waves.

Targeted Hazard				
Severe rainfalls (R)	Floods (F)	Severe winds (W)	High tides (T)	Coastal storm surges (S)

Contribution to FRM and CCA			
Understanding and assessing DR	Forecasting and assessing hazards	Reducing DR impacts	Hazard mitigation and dispersion
Protecting exposed elements	DR informed governance	Awareness and preparedness	Emergency procedures

Progress of implementation				
Proposed	Not Started	Planning Ongoing	On Going Construction	Completed

Implementation timeframes	**Cost**	**Responsible bodies**
2022 - 2027	€ 45.000.000,00	Public Works Superintendency

FRMP value								
M2-Prevention				M3-Protection				
M21	M22	M23	M24	M31	M32	M33	M34	M35
M4-Preparation				M5-Reconstruction				
M41	M42	M43	M44	M51	M52	M53		

Measure Location

CCAP - 04.06 Rivers excavation - **T**

The implementation of the "RII" (rivers in Italian) integrated project foresees canals hygienic, building and static arrangement, sedimented mud dredging, subsoil rearrangement, bank rehabilitation, pavements elevation, sewage drains upgrading, and bridges restoration. These maintenance interventions planned by the Municipality will allow a better connection and use of the historic city even in high tide situations.

<table>
<tr><td colspan="5">Targeted Hazard</td></tr>
<tr><td>Severe rainfalls (R)</td><td>Floods (F)</td><td>Severe winds (W)</td><td>High tides (T)</td><td>Coastal storm surges (S)</td></tr>
<tr><td colspan="5">Contribution to FRM and CCA</td></tr>
<tr><td>Understanding and assessing DR</td><td>Forecasting and assessing hazards</td><td>Reducing DR impacts</td><td colspan="2">Hazard mitigation and dispersion</td></tr>
<tr><td>Protecting exposed elements</td><td>DR informed governance</td><td>Awareness and preparedness</td><td colspan="2">Emergency procedures</td></tr>
<tr><td colspan="5">Progress of implementation</td></tr>
<tr><td>Proposed</td><td>Not Started</td><td>Planning Ongoing</td><td>On Going Construction</td><td>Completed</td></tr>
<tr><td colspan="2">Implementation timeframes</td><td colspan="2">Cost</td><td>Responsible bodies</td></tr>
<tr><td colspan="2">2022 - 2030</td><td colspan="2">€ 110.000.000,00</td><td>Venice Municipality, Veritas Spa</td></tr>
<tr><td colspan="5">FRMP value</td></tr>
<tr><td colspan="4">M2-Prevention</td><td>M3-Protection</td></tr>
<tr><td>M21</td><td>M22</td><td>M23</td><td>M24</td><td>M31</td><td>M32</td><td>M33</td><td>M34</td><td>M35</td></tr>
<tr><td colspan="4">M4-Preparation</td><td colspan="5">M5-Reconstruction</td></tr>
<tr><td>M41</td><td>M42</td><td>M43</td><td>M44</td><td>M51</td><td>M52</td><td>M53</td></tr>
</table>

Measure Location

2.4. Surface Water Management (M34)

2.4.1. [M34 SUDS and surface water drainage]

CCAP - 04.07 Sewage systems improvement - R - F

The infrastructural extension and improvement for the integrated water system and lagoon decontamination will allow greater effectiveness in surface water drainage and disposal, helping to reduce potential surface urban flooding. These works will be sided by SUDS (sustainable urban drainage systems) interventions in order to combine territory hydraulic management with environmental protection.

Targeted Hazard				
Severe rainfalls (R)	Floods (F)	Severe winds (W)	High tides (T)	Coastal storm surges (S)

Contribution to FRM and CCA			
Understanding and assessing DR	Forecasting and assessing hazards	Reducing DR impacts	Hazard mitigation and dispersion
Protecting exposed elements	DR informed governance	Awareness and preparedness	Emergency procedures

Progress of implementation				
Proposed	Not Started	Planning Ongoing	On Going Construction	Completed

Implementation timeframes	**Cost**	**Responsible bodies**
2022 - 2027	€ 146.000.000,00	Venice Municipality, Veritas Spa

FRMP value								
M2-Prevention				M3-Protection				
M21	M22	M23	M24	M31	M32	M33	M34	M35
M4-Preparation				M5-Reconstruction				
M41	M42	M43	M44	M51	M52	M53		

Measure Location

CCAP - 07.03 Strengthening the green ecological network - R

Widespread implementation of interventions completing the green ecological rural-to-urban network, strengthening and connecting among themselves green corridors such as hedges, tree rows and groves, small wetlands, etc.

Targeted Hazard				
Severe rainfalls (R)	Floods (F)	Severe winds (W)	High tides (T)	Coastal storm surges (S)
Contribution to FRM and CCA				
Understanding and assessing DR	Forecasting and assessing hazards	Reducing DR impacts	Hazard mitigation and dispersion	
Protecting exposed elements	DR informed governance	Awareness and preparedness	Emergency procedures	
Progress of implementation				
Proposed	Not Started	Planning Ongoing	On Going Construction	Completed

Implementation timeframes	**Cost**	**Responsible bodies**
2022 - 2027	€ 500.000,00	Agricoltural Farms, Consorzi Di Bonifica

FRMP value								
M2-Prevention				M3-Protection				
M21	M22	M23	M24	M31	M32	M33	M34	M35
M4-Preparation				M5-Reconstruction				
M41	M42	M43	M44	M51	M52	M53		

Measure Location

CCAP - 07.04 Creation of urban green spaces - R

The increase in urban greenery (new tree planting) aims at contributing to urban carbon footprint reduction, increasing the pollutants and micro-particulates capture and CO2 absorption, so as to mitigate urban overheating effects and increase rainwater run-off absorption and disposal. These systemic benefits also structurally contribute to the city's better landscape and ecological performance.

Targeted Hazard				
Severe rainfalls (R)	Floods (F)	Severe winds (W)	High tides (T)	Coastal storm surges (S)

Contribution to FRM and CCA			
Understanding and assessing DR	Forecasting and assessing hazards	Reducing DR impacts	Hazard mitigation and dispersion
Protecting exposed elements	DR informed governance	Awareness and preparedness	Emergency procedures

Progress of implementation				
Proposed	Not Started	Planning Ongoing	On Going Construction	Completed

Implementation timeframes	**Cost**	**Responsible bodies**
2022 - 2025	€ 25.000.000,00	Venice Municipality

FRMP value								
M2-Prevention				M3-Protection				
M21	M22	M23	M24	M31	M32	M33	M34	M35
M4-Preparation				M5-Reconstruction				
M41	M42	M43	M44	M51	M52	M53		

Measure Location

CCAP - 07.05 Making room for the green in marginalized urban areas - R

A profound transformation work is underway for Venice's inland urbanized areas, concerning especially various large abandoned buildings that the Municipality decided to remove, instead of renovating, and substitute with parks serving the Mestre and Marghera neighbourhoods. These green and blue spaces may favour ecosystem services necessary for reducing climate change associated risks as well as mitigating climate-altering emissions.

Targeted Hazard				
Severe rainfalls (R)	Floods (F)	Severe winds (W)	High tides (T)	Coastal storm surges (S)

Contribution to FRM and CCA			
Understanding and assessing DR	Forecasting and assessing hazards	Reducing DR impacts	Hazard mitigation and dispersion
Protecting exposed elements	DR informed governance	Awareness and preparedness	Emergency procedures

Progress of implementation				
Proposed	Not Started	Planning Ongoing	On Going Construction	Completed

Implementation timeframes	**Cost**	**Responsible bodies**
2022 - 2024	€ 1.500.000,00	Venice Municipality

FRMP value								
M2-Prevention				M3-Protection				
M21	M22	M23	M24	M31	M32	M33	M34	M35
M4-Preparation				M5-Reconstruction				
M41	M42	M43	M44	M51	M52	M53		

Measure Location

CCAP - 08.02 Widespread system of micro rainwater harvesting - R

Creation of small and medium-sized multifunctional wetlands, scattered throughout Venice territory, aimed at guaranteeing the runoff rainwater retention, to be carried out according to Natural Water Retention Measures principles. These solutions, in addition to providing an irrigation relief water source, allow biodiversity and landscape improvement and constitute an added value for rural residential and tourism.

Targeted Hazard				
Severe rainfalls (R)	Floods (F)	Severe winds (W)	High tides (T)	Coastal storm surges (S)
Contribution to FRM and CCA				
Understanding and assessing DR	Forecasting and assessing hazards	Reducing DR impacts	Hazard mitigation and dispersion	
Protecting exposed elements	DR informed governance	Awareness and preparedness	Emergency procedures	
Progress of implementation				
Proposed	Not Started	Planning Ongoing	On Going Construction	Completed
Implementation timeframes	**Cost**	**Responsible bodies**		
2024 - 2027	€ 1.600.000,00	Consorzio Di Bonifica Acque Risorgive		
FRMP value				
M2-Prevention				M3-Protection
M21	M22	M23	M24	M31	M32	M33	M34	M35
M4-Preparation				M5-Reconstruction
M41	M42	M43	M44	M51	M52	M53		

Measure Location

3. Preparedness (M4)

3.1. Flood Forecasting and Warning (M41)

i. [M41 Sensors, forecasting, EWS]

CCAP - 01.04 Transport and logistic floating platforms - **T**

The strengthening of water transport logistical connections and interchange points foresees the provision of specific sensors at each water transport's docking point, allowing service status, functionality, and accessibility real-time monitoring, particularly relevant during high tide events.

<table>
<tr><td colspan="9">Targeted Hazard</td><td rowspan="15">Measure Location
  </td></tr>
<tr><td colspan="2">Severe rainfalls (R)</td><td colspan="2">Floods (F)</td><td colspan="2">Severe winds (W)</td><td colspan="2">High tides (T)</td><td>Coastal storm surges (S)</td></tr>
<tr><td colspan="9">Contribution to FRM and CCA</td></tr>
<tr><td colspan="2">Understanding and assessing DR</td><td colspan="2">Forecasting and assessing hazards</td><td colspan="2">Reducing DR impacts</td><td colspan="3">Hazard mitigation and dispersion</td></tr>
<tr><td colspan="2">Protecting exposed elements</td><td colspan="2">DR informed governance</td><td colspan="2">Awareness and preparedness</td><td colspan="3">Emergency procedures</td></tr>
<tr><td colspan="9">Progress of implementation</td></tr>
<tr><td colspan="2">Proposed</td><td colspan="2">Not Started</td><td colspan="2">Planning Ongoing</td><td colspan="2">On Going Construction</td><td>Completed</td></tr>
<tr><td colspan="3">Implementation timeframes</td><td colspan="3">Cost</td><td colspan="3">Responsible bodies</td></tr>
<tr><td colspan="3">2022 - 2025</td><td colspan="3">€ 2.000.000,00</td><td colspan="3">Venice Municipality</td></tr>
<tr><td colspan="9">FRMP value</td></tr>
<tr><td colspan="4">M2-Prevention</td><td colspan="5">M3-Protection</td></tr>
<tr><td>M21</td><td>M22</td><td>M23</td><td>M24</td><td>M31</td><td>M32</td><td>M33</td><td>M34</td><td>M35</td></tr>
<tr><td colspan="4">M4-Preparation</td><td colspan="5">M5-Reconstruction</td></tr>
<tr><td>M41</td><td>M42</td><td>M43</td><td>M44</td><td>M51</td><td>M52</td><td colspan="3">M53</td></tr>
</table>

CCAP - 09.01 Smart Control Room for environmental and climatic data management and strategic planning - **T - R - W - F**

The amount of environmental, socio-economic and climatic data the Venice Municipality has to manage is very large and, up to now, fragmented between different sectors and third bodies. The Smart Control Room allows a single processing data management centre, reordering and aggregating them into macro-indicators to better support CCA decisions.

<table>
<tr><td colspan="5">Targeted Hazard</td><td rowspan="4">Measure Location</td></tr>
<tr><td>Severe rainfalls (R)</td><td>Floods (F)</td><td>Severe winds (W)</td><td>High tides (T)</td><td>Coastal storm surges (S)</td></tr>
<tr><td colspan="5">Contribution to FRM and CCA</td></tr>
<tr><td>Understanding and assessing DR</td><td>Forecasting and assessing hazards</td><td>Reducing DR impacts</td><td colspan="2">Hazard mitigation and dispersion</td></tr>
</table>

<table>
<tr><td colspan="2">Protecting exposed elements</td><td colspan="2">DR informed governance</td><td colspan="2">Awareness and preparedness</td><td colspan="2">Emergency procedures</td><td rowspan="11">  </td></tr>
<tr><td colspan="8">Progress of implementation</td></tr>
<tr><td colspan="2">Proposed</td><td colspan="2">Not Started</td><td colspan="2">Planning Ongoing</td><td colspan="2">On Going Construction</td><td>Completed</td></tr>
<tr><td colspan="3">Implementation timeframes</td><td colspan="3">Cost</td><td colspan="2">Responsible bodies</td></tr>
<tr><td colspan="3">2023 - 2029</td><td colspan="3">€ 50.000.000,00</td><td colspan="2">Venice Municipality</td></tr>
<tr><td colspan="8">FRMP value</td></tr>
<tr><td colspan="4">M2-Prevention</td><td colspan="4">M3-Protection</td></tr>
<tr><td>M21</td><td>M22</td><td>M23</td><td>M24</td><td>M31</td><td>M32</td><td>M33</td><td>M34</td><td>M35</td></tr>
<tr><td colspan="4">M4-Preparation</td><td colspan="4">M5-Reconstruction</td></tr>
<tr><td>M41</td><td>M42</td><td>M43</td><td>M44</td><td>M51</td><td colspan="2">M52</td><td colspan="2">M53</td></tr>
</table>

CiCPMG - 2.10. Enhancing the efficiency of the Smart Control Room T - R - W - F

The Control Room is an essential tool for managing the complexity of Venice in its relations with disaster risks. The climatic and environmental data collection and comparison, and its use in emergency situations will constitute a fundamental contribution for understanding and managing future events and their evolution. After the needed reinforcement of institutions' cooperation, the Control Room shall support local impact assessments and build predictive models.

Targeted Hazard				
Severe rainfalls (R)	Floods (F)	Severe winds (W)	High tides (T)	Coastal storm surges (S)
Contribution to FRM and CCA				
Understanding and assessing DR	Forecasting and assessing hazards	Reducing DR impacts	Hazard mitigation and dispersion	
Protecting exposed elements	DR informed governance	Awareness and preparedness	Emergency procedures	
Progress of implementation				
Proposed	Not Started	Planning Ongoing	On Going Construction	Completed
Implementation timeframes	**Cost**	**Responsible bodies**		
/	/	/		
FRMP value				
M2-Prevention				M3-Protection
M21	M22	M23	M24	M31	M32	M33	M34	M35
M4-Preparation				M5-Reconstruction
M41	M42	M43	M44	M51	M52	M53		

Measure Location

CCAP - 10.01/02 High tides and tornados nowcasting, alert, and communication centre - **S - T**

Creation of Italy's first, Venice-based, national civil protection centre for coastal and marine forecasting, and the related Municipal department. Once operational, the Centre will manage data and alerts in real-time, communicating it to affected communities.

Targeted Hazard				
Severe rainfalls (R)	Floods (F)	Severe winds (W)	High tides (T)	Coastal storm surges (S)

Contribution to FRM and CCA			
Understanding and assessing DR	Forecasting and assessing hazards	Reducing DR impacts	Hazard mitigation and dispersion
Protecting exposed elements	DR informed governance	Awareness and preparedness	Emergency procedures

Progress of implementation				
Proposed	Not Started	Planning Ongoing	On Going Construction	Completed

Implementation timeframes	**Cost**	**Responsible bodies**
2023 - 2025	€ 2.000.000,00	Venice Municipality, CNR-ISMAR, ARPAV

FRMP value								
M2-Prevention				M3-Protection				
M21	M22	M23	M24	M31	M32	M33	M34	M35
M4-Preparation				M5-Reconstruction				
M41	M42	M43	M44	M51	M52	M53		

Measure Location

CiCPMG - 3.1. Emergency communication broadcast via public warning system - S - T - W

The measure is aimed at reducing disasters' major impacts through early warning systems in case of violent and rapid extreme events. This measure is particularly deemed to tourists and people not attending Venice regularly, thus without access to the Municipality's alert communication channels. It is, therefore, necessary to introduce a public address system in locations of greater tourist attendance, e.g., along the Riva degli Schiavoni, loudspeakers alerting the public and informing on the most appropriate behaviours.

<table>
<tr><td colspan="9">Targeted Hazard</td><td rowspan="15">Measure Location
  </td></tr>
<tr><td colspan="2">Severe rainfalls (R)</td><td colspan="2">Floods (F)</td><td colspan="2">Severe winds (W)</td><td colspan="2">High tides (T)</td><td>Coastal storm surges (S)</td></tr>
<tr><td colspan="9">Contribution to FRM and CCA</td></tr>
<tr><td colspan="3">Understanding and assessing DR</td><td colspan="3">Forecasting and assessing hazards</td><td colspan="2">Reducing DR impacts</td><td>Hazard mitigation and dispersion</td></tr>
<tr><td colspan="3">Protecting exposed elements</td><td colspan="3">DR informed governance</td><td colspan="2">Awareness and preparedness</td><td>Emergency procedures</td></tr>
<tr><td colspan="9">Progress of implementation</td></tr>
<tr><td colspan="2">Proposed</td><td colspan="2">Not Started</td><td colspan="2">Planning Ongoing</td><td colspan="2">On Going Construction</td><td>Completed</td></tr>
<tr><td colspan="3">Implementation timeframes</td><td colspan="3">Cost</td><td colspan="3">Responsible bodies</td></tr>
<tr><td colspan="3">/</td><td colspan="3">/</td><td colspan="3">/</td></tr>
<tr><td colspan="9">FRMP value</td></tr>
<tr><td colspan="4">M2-Prevention</td><td colspan="5">M3-Protection</td></tr>
<tr><td>M21</td><td>M22</td><td>M23</td><td>M24</td><td>M31</td><td>M32</td><td>M33</td><td>M34</td><td>M35</td></tr>
<tr><td colspan="4">M4-Preparation</td><td colspan="5">M5-Reconstruction</td></tr>
<tr><td>M41</td><td>M42</td><td>M43</td><td>M44</td><td>M51</td><td>M52</td><td colspan="3">M53</td></tr>
</table>

CiCPMG - 3.5. Alarm and sign warning systems for storm surges

It is necessary to have a permanent warning system, i.e., information plaques with loudspeakers, to be activated in the event of storm surges, alerting the population and moving them away from the coast. The alarm warning system should be immediately recognizable to alert all those at risk, regardless of their language.

Targeted Hazard				
Severe rainfalls (R)	Floods (F)	Severe winds (W)	High tides (T)	Coastal storm surges (S)
Contribution to FRM and CCA				
Understanding and assessing DR	Forecasting and assessing hazards	Reducing DR impacts	Hazard mitigation and dispersion	
Protecting exposed elements	DR informed governance	Awareness and preparedness	Emergency procedures	
Progress of implementation				
Proposed	Not Started	Planning Ongoing	On Going Construction	Completed
Implementation timeframes	**Cost**	**Responsible bodies**		
/	/	/		
FRMP value				
M2-Prevention				M3-Protection
M21	M22	M23	M24	M31	M32	M33	M34	M35
M4-Preparation				M5-Reconstruction
M41	M42	M43	M44	M51	M52	M53		

Measure Location

CiCPMG - 3.6. Storm surges public forecast and warning

To date, the coastal flooding and storm surge risks are not integrated into the Municipal public warning systems. Introducing forecast and warning systems of this risk within municipal bulletins would be of great use to inform and alert residents and workers.

Targeted Hazard				
Severe rainfalls (R)	Floods (F)	Severe winds (W)	High tides (T)	Coastal storm surges (S)
Contribution to FRM and CCA				
Understanding and assessing DR	Forecasting and assessing hazards	Reducing DR impacts	Hazard mitigation and dispersion	
Protecting exposed elements	DR informed governance	Awareness and preparedness	Emergency procedures	
Progress of implementation				
Proposed	Not Started	Planning Ongoing	On Going Construction	Completed
Implementation timeframes	**Cost**	**Responsible bodies**		
/	/	/		
FRMP value				
M2-Prevention				M3-Protection
M21	M22	M23	M24	M31	M32	M33	M34	M35
M4-Preparation				M5-Reconstruction
M41	M42	M43	M44	M51	M52	M53		

Measure Location

3.2. Emergency Event Response Planning / Contingency planning (M42)

CCAP - 13.01 Civil protection emergency plan climate informed update - T - R - W - F

Provide civil protection with an updated emergency plan with new information on present and future climate risks, optimizing techniques and procedures for managing emergencies. This will incentivize experimental adaptation interventions, promote maintenance programs for most sensitive infrastructures, and set up an intersectoral and multi-stakeholder table for the definition of common criteria and intervention priorities.

Targeted Hazard				
Severe rainfalls (R)	Floods (F)	Severe winds (W)	High tides (T)	Coastal storm surges (S)
Contribution to FRM and CCA				
Understanding and assessing DR	Forecasting and assessing hazards	Reducing DR impacts	Hazard mitigation and dispersion	
Protecting exposed elements	DR informed governance	Awareness and preparedness	Emergency procedures	
Progress of implementation				
Proposed	Not Started	Planning Ongoing	On Going Construction	Completed
Implementation timeframes	**Cost**	**Responsible bodies**		
2022 - 2023	/	Venice Municipality		
FRMP value				
M2-Prevention				M3-Protection
M21	M22	M23	M24	M31	M32	M33	M34	M35
M4-Preparation				M5-Reconstruction
M41	M42	M43	M44	M51	M52	M53		

Measure Location

CiCPMG - 4.2. Unified cartography for emergency management - S - T - R - W - F

GIS systems allow a unified view of spatial information and quick comparisons between projects and plans. It is needed to develop a unified, multiscale and modular risk mapping, including climate change worsening effects on disaster risk. All sectors should contribute with interoperable data, so to allow queries oriented to territorial objectives and to reduce information losses during emergencies.

Targeted Hazard				
Severe rainfalls (R)	Floods (F)	Severe winds (W)	High tides (T)	Coastal storm surges (S)
Contribution to FRM and CCA			
Understanding and assessing DR	Forecasting and assessing hazards	Reducing DR impacts	Hazard mitigation and dispersion
Protecting exposed elements	DR informed governance	Awareness and preparedness	Emergency procedures
Progress of implementation				
Proposed	Not Started	Planning Ongoing	On Going Construction	Completed
Implementation timeframes	**Cost**	**Responsible bodies**
/	/	/
FRMP value								
M2-Prevention				M3-Protection				
M21	M22	M23	M24	M31	M32	M33	M34	M35
M4-Preparation				M5-Reconstruction				
M41	M42	M43	M44	M51	M52	M53		

Measure Location

CiCPMG - 6.1. Delocalized first aid operational centres T - R - W

Extreme events in the future may most likely prevent navigation in the lagoon, which is particularly relevant for complex emergency transport such as first aid. It is therefore advisable, looking at frosts, cold waves and severe winds, to activate first aid operational centres on each highly inhabited island.

Targeted Hazard				
Severe rainfalls (R)	Floods (F)	Severe winds (W)	High tides (T)	Coastal storm surges (S)

Contribution to FRM and CCA			
Understanding and assessing DR	Forecasting and assessing hazards	Reducing DR impacts	Hazard mitigation and dispersion
Protecting exposed elements	DR informed governance	Awareness and preparedness	Emergency procedures

Progress of implementation				
Proposed	Not Started	Planning Ongoing	On Going Construction	Completed

Implementation timeframes	**Cost**	**Responsible bodies**
/	/	/

FRMP value								
M2-Prevention				M3-Protection				
M21	M22	M23	M24	M31	M32	M33	M34	M35
M4-Preparation				M5-Reconstruction				
M41	M42	M43	M44	M51	M52	M53		

Measure Location

CiCPMG - 6.3. Definition of last mile procedures - S - T - R - W - F

Alongside the revision of the Civil Protection Plan, it is essential to develop the last-mile implementation procedures, thus addressing all those aspects and details that cannot be left to last-minute choices. This means defining well in advance locations, procedures, duties, routes and vectors to be carried out during an emergency response.

Targeted Hazard				
Severe rainfalls (R)	Floods (F)	Severe winds (W)	High tides (T)	Coastal storm surges (S)

Contribution to FRM and CCA			
Understanding and assessing DR	Forecasting and assessing hazards	Reducing DR impacts	Hazard mitigation and dispersion
Protecting exposed elements	DR informed governance	Awareness and preparedness	Emergency procedures

Progress of implementation				
Proposed	Not Started	Planning Ongoing	On Going Construction	Completed

Implementation timeframes	**Cost**	**Responsible bodies**
/	/	/

FRMP value								
M2-Prevention				M3-Protection				
M21	M22	M23	M24	M31	M32	M33	M34	M35
M4-Preparation				M5-Reconstruction				
M41	M42	M43	M44	M51	M52	M53		

Measure Location

3.3. Public Awarness and Preparedness (M43)

CCAP - 12.01 CCA permanent awareness and education campaign for local citizens - **S - T - R - W – F**

Environmental awareness and education activities organization and ad hoc informative tools regarding climate change effects on a global and local scale, and the related call for actions in terms of widespread adaptation.

<table>
<tr><td colspan="9">Targeted Hazard</td><td rowspan="20">Measure Location
  </td></tr>
<tr><td colspan="2">Severe rainfalls (R)</td><td colspan="2">Floods (F)</td><td colspan="2">Severe winds (W)</td><td colspan="2">High tides (T)</td><td>Coastal storm surges (S)</td></tr>
<tr><td colspan="9">Contribution to FRM and CCA</td></tr>
<tr><td colspan="3">Understanding and assessing DR</td><td colspan="3">Forecasting and assessing hazards</td><td colspan="2">Reducing DR impacts</td><td>Hazard mitigation and dispersion</td></tr>
<tr><td colspan="3">Protecting exposed elements</td><td colspan="3">DR informed governance</td><td colspan="2">Awareness and preparedness</td><td>Emergency procedures</td></tr>
<tr><td colspan="9">Progress of implementation</td></tr>
<tr><td colspan="2">Proposed</td><td colspan="2">Not Started</td><td colspan="2">Planning Ongoing</td><td colspan="2">On Going Construction</td><td>Completed</td></tr>
<tr><td colspan="3">Implementation timeframes</td><td colspan="3">Cost</td><td colspan="3">Responsible bodies</td></tr>
<tr><td colspan="3">2022 onwards</td><td colspan="3">€ 100.000,00</td><td colspan="3">Venice Municipality</td></tr>
<tr><td colspan="9">FRMP value</td></tr>
<tr><td colspan="4">M2-Prevention</td><td colspan="5">M3-Protection</td></tr>
<tr><td>M21</td><td>M22</td><td>M23</td><td>M24</td><td>M31</td><td>M32</td><td>M33</td><td>M34</td><td>M35</td></tr>
<tr><td colspan="4">M4-Preparation</td><td colspan="5">M5-Reconstruction</td></tr>
<tr><td>M41</td><td>M42</td><td>M43</td><td>M44</td><td>M51</td><td>M52</td><td colspan="3">M53</td></tr>
</table>

CCAP - 12.02 CCA permanent training of public and private sector technicians and personnel - **S - T - R - W – F**

The action plans to train local technicians, operating in the public and private sectors, building capacities and specific skills in the climate change adaptation field. The training initiatives will be divided into courses co-organized with pertaining professional orders and post-graduate university courses.

Targeted Hazard				
Severe rainfalls (R)	Floods (F)	Severe winds (W)	High tides (T)	Coastal storm surges (S)

Contribution to FRM and CCA			
Understanding and assessing DR	Forecasting and assessing hazards	Reducing DR impacts	Hazard mitigation and dispersion
Protecting exposed elements	DR informed governance	Awareness and preparedness	Emergency procedures

Progress of implementation				
Proposed	Not Started	Planning Ongoing	On Going Construction	Completed

Implementation timeframes	**Cost**	**Responsible bodies**
2023 onwards	€ 100.000,00	Venice Municipality

FRMP value								
M2-Prevention				M3-Protection				
M21	M22	M23	M24	M31	M32	M33	M34	M35
M4-Preparation				M5-Reconstruction				
M41	M42	M43	M44	M51	M52	M53		

Measure Location

CiCPMG - 3.2. Citizenship involvement to codevelop resilience - S - T - R - W - F

Citizenship is legally a participant in the Civil Protection system and shall therefore be involved in the emergency planning and management process. Given the expected increases in extreme events, it is appropriate to develop participatory training courses aimed at population awareness, preparedness and self-protection.

Targeted Hazard				
Severe rainfalls (R)	Floods (F)	Severe winds (W)	High tides (T)	Coastal storm surges (S)

Contribution to FRM and CCA			
Understanding and assessing DR	Forecasting and assessing hazards	Reducing DR impacts	Hazard mitigation and dispersion
Protecting exposed elements	DR informed governance	Awareness and preparedness	Emergency procedures

Progress of implementation				
Proposed	Not Started	Planning Ongoing	On Going Construction	Completed

Implementation timeframes	**Cost**	**Responsible bodies**
/	/	/

FRMP value								
M2-Prevention				M3-Protection				
M21	M22	M23	M24	M31	M32	M33	M34	M35
M4-Preparation				M5-Reconstruction				
M41	M42	M43	M44	M51	M52	M53		

Measure Location

CiCPMG - 3.3. Integration of the “io non rischio a casa mia” program - S - T - R - W - F

The “Io non rischio a casa mia” (I don’t take risk) National Civil Protection Program constitute an opportunity for integrating and disseminating civil protection best practices regarding climatic and disaster risks. The Local Civil Protection Department might benefit from these dissemination public events to share local preparedness knowledge and appropriate emergency conducts.

Targeted Hazard				
Severe rainfalls (R)	Floods (F)	Severe winds (W)	High tides (T)	Coastal storm surges (S)

Contribution to FRM and CCA			
Understanding and assessing DR	Forecasting and assessing hazards	Reducing DR impacts	Hazard mitigation and dispersion
Protecting exposed elements	DR informed governance	Awareness and preparedness	Emergency procedures

Progress of implementation				
Proposed	Not Started	Planning Ongoing	On Going Construction	Completed

Implementation timeframes	**Cost**	**Responsible bodies**
/	/	/

FRMP value								
M2-Prevention				M3-Protection				
M21	M22	M23	M24	M31	M32	M33	M34	M35
M4-Preparation				M5-Reconstruction				
M41	M42	M43	M44	M51	M52	M53		

Measure Location

CiCPMG - 3.4. Information points at parks' entrances - R - W

The frequency increase of rainfall, heat waves and wind severe events will contribute to more frequent falling trees and branches. This compounded risk is particularly relevant for parks and public green areas. For these exposed locations it is advisable to install information points and signs to inform and warn citizens and users.

Targeted Hazard				
Severe rainfalls (R)	Floods (F)	Severe winds (W)	High tides (T)	Coastal storm surges (S)

Contribution to FRM and CCA			
Understanding and assessing DR	Forecasting and assessing hazards	Reducing DR impacts	Hazard mitigation and dispersion
Protecting exposed elements	DR informed governance	Awareness and preparedness	Emergency procedures

Progress of implementation				
Proposed	Not Started	Planning Ongoing	On Going Construction	Completed

Implementation timeframes	**Cost**	**Responsible bodies**
/	/	/

FRMP value								
M2-Prevention				M3-Protection				
M21	M22	M23	M24	M31	M32	M33	M34	M35
M4-Preparation				M5-Reconstruction				
M41	M42	M43	M44	M51	M52	M53		

Measure Location

3.4. Other preparedness (M44)

CiCPMG - 5.2. Drinking water redundancy - S - T - R - F

The risks related to drinking water, i.e., pollution, shortages, mitigation and dispersion, etc., will increase significantly. It is necessary to perform maintenance and protection works to ensure supply redundancy and service continuity, especially in case of extreme events.

Targeted Hazard				
Severe rainfalls (R)	Floods (F)	Severe winds (W)	High tides (T)	Coastal storm surges (S)
Contribution to FRM and CCA				
Understanding and assessing DR	Forecasting and assessing hazards	Reducing DR impacts	Hazard mitigation and dispersion	
Protecting exposed elements	DR informed governance	Awareness and preparedness	Emergency procedures	
Progress of implementation				
Proposed	Not Started	Planning Ongoing	On Going Construction	Completed
Implementation timeframes	**Cost**	**Responsible bodies**		
/	/	/		
FRMP value				
M2-Prevention				M3-Protection
M21	M22	M23	M24	M31 M32 M33 M34 M35
M4-Preparation				M5-Reconstruction
M41	M42	M43	M44	M51 M52 M53

Measure Location

4. Recovery (M5)

4.1. Environmental recovery (M52)

CiCPMG - 6.5. Regulating and cleansing pollution in the lagoon - S - T - R - W – F

As for post-event procedures, it is advisable to have already in place agreements, contracts and rapid activation contacts for Venice Lagoon clean-up and environmental management companies. The timely and effective containment of polluting materials spills, particularly in a regulated lagoon regime, is crucial for the maintenance of its vital ecosystem state.

<table>
<tr><td colspan="5">Targeted Hazard</td><td rowspan="20">Measure Location
  </td></tr>
<tr><td>Severe rainfalls (R)</td><td>Floods (F)</td><td>Severe winds (W)</td><td>High tides (T)</td><td>Coastal storm surges (S)</td></tr>
<tr><td colspan="5">Contribution to FRM and CCA</td></tr>
<tr><td>Understanding and assessing DR</td><td>Forecasting and assessing hazards</td><td>Reducing DR impacts</td><td colspan="2">Hazard mitigation and dispersion</td></tr>
<tr><td>Protecting exposed elements</td><td>DR informed governance</td><td>Awareness and preparedness</td><td colspan="2">Emergency procedures</td></tr>
<tr><td colspan="5">Progress of implementation</td></tr>
<tr><td>Proposed</td><td>Not Started</td><td>Planning Ongoing</td><td>On Going Construction</td><td>Completed</td></tr>
<tr><td colspan="2">Implementation timeframes</td><td>Cost</td><td colspan="2">Responsible bodies</td></tr>
<tr><td colspan="2">/</td><td>/</td><td colspan="2">/</td></tr>
<tr><td colspan="5">FRMP value</td></tr>
<tr><td colspan="4">M2-Prevention</td><td colspan="5">M3-Protection</td></tr>
<tr><td>M21</td><td>M22</td><td>M23</td><td>M24</td><td>M31</td><td>M32</td><td>M33</td><td>M34</td><td>M35</td></tr>
<tr><td colspan="4">M4-Preparation</td><td colspan="5">M5-Reconstruction</td></tr>
<tr><td>M41</td><td>M42</td><td>M43</td><td>M44</td><td>M51</td><td colspan="2">M52</td><td colspan="2">M53</td></tr>
</table>

5. References

- Autorità di bacino distrettuale delle Alpi Orientali (2021). “Aggiornamento e revisione del Piano di Gestione del Rischio di Alluvioni. Relazione Generale”;
- Distretto Idrografico delle Alpi Orientali (2016). “Piano di Gestione del Rischio di Alluvioni. Relazione di piano e allegati I, II, III e V”;
- Università IUAV di Venezia (2021). “PIANO DI ADATTAMENTO CLIMATICO, Comune di Venezia, Allegato 1: Linee di azione e misure attuative”;

- Università IUAV di Venezia (2021). “PIANO DI ADATTAMENTO CLIMATICO, Comune di Venezia, Allegato 2: Analisi di rischio climatico”
- Università IUAV di Venezia (2022). “Definizione di un sistema di gestione dell’emergenza e della ricostruzione. Documento di indirizzo per la pianificazione emergenziale e della ricostruzione post-disastro in regime di Cambiamento Climatico nella Laguna di Venezia”.

CONCLUSION

The reports highlight the proactive and collaborative efforts undertaken by various stakeholders, including government agencies, research institutions, and local communities, to update the Flood Risk Management Plan and integrate climate change adaptation strategies at the municipal level. The progress made in both areas showcases Italy's commitment to enhancing resilience, reducing vulnerability, and protecting its communities and infrastructure from flood-related hazards.
The adoption of advanced technologies, such as remote sensing, data analytics, and modeling techniques, has played a significant role in improving early warning systems, flood forecasting capabilities, and decision-making processes. These advancements empower Italy to respond proactively to flood events, minimizing the potential damages and safeguarding the well-being of its citizens.