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D2.1 Organization of flood risk management report

Report

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List of abbreviations

ANO	A.N.O. SISTEMAS DE INFORMATICA E SERVICOS LDA
APSFR	Areas of Potentially Significant Flood Risk
ANPC	National Authority for Civil Protection
ANSWARE	ANSWARETECH SL
API	Application Integration Interface
BILBAO	AYUNTAMIENTO DE BILBAO
BSK	Bratislavsky Samospravny Kraj
CELLENT	CELLENT SA
CESIS	Emergency Communication and Information System
CMVNF	Municipio De Vila Nova De Famalicao
COC	Centro Operativo Comune
CCS	Centro di Coordinamento dei Soccorsi
CDOS	District Commands for Relief Operations
DDNI	INSTITUTUL NATIONAL DE CERCETARE-DEZVOLTARE DELTA DUNARII
Dow	Description of Work
ECHO	European Commission's Humanitarian Aid and Civil protection department
EMSA	European Maritime Safety Agency
ERCC	Emergency Response Coordination Centre
EU	European Union
Exdwarf	EXDWARF CONSULTING SRO
FHRM	Flood Hazard and Risk Maps
FRM	Flood risk management
GENOVA	COMUNE DI GENOVA
Gov2U	Government To You
H2020	Horizon 2020
ICT	Information and Communications Technologies
IED	Industrial Emissions Directive
IP TULCEA	INSTITUTIA PREFECTULUI JUDETUL TULCEA
MS	Member State
R&D	Research and Development
SIVECO	SIVECO Romania SA
WP	Work Package
WFD	Water Framework Directive
UoM	Units of Management
RBD	River Bed District
SRPC	Regional Services For Civil
SMPC	Municipal Services for Civil Protections
NCEPC	National Civil Emergency Planning Committee
GIES	General Inspectorate for Emengency Situations

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1. Executive summary

This report is prepared through a collective effort provided by the pilot partners, based on reviews of the scientific evidence and on an analysis of surveys and pro-forma responses applied to the five pilots, regarding the legal framework, regulation and organization of flood risk management, contingency planning and response functions in the selected regions, in order to provide key country and local characteristics and differences of the governance structure of the flood risk management. In particular, the analysis of the legal framework, regulation and organization of flood risk management, contingency planning and response functions in the selected regions, is devoted to draft a clear image of the organizational structure in implementing the requirements of the Flood Directive in Italy, Portugal, Romania, Spain and Slovakia, in order to provide a basis for the technical components analysis, which will assist the collaborative platform for flood management.

In this report we focused on the general framework, which is the implementation of the Floods Directive and narrowed the analysis as we approached the national/territorial/district/local levels. Another purpose of the report is to bring out to light the similarities and specificities, which would enable the technical partners to evaluate the current emergency management system prototype, identify the gaps of the former and the end user requirements.

Regulatory models analysis contributes to understand opportunities and constraints to take in account in the design and validation of applications and helps to identify the relations among actors and the allocation of responsibility.

The exploration of national, local and subsequent legislation allows to clearly identifying which institution or administrative structure has the responsibility of providing information and managing communication flows and establishes the implementation instruments.

The administrative architecture provides a clear image of the responsibilities, inter-operability, and communication flows between different layers of administration. We also identified an intermediary administrative structure (Basinal Water Management, Romania) with specific role in establishing the defence strategy against floods. The similarities identified in civil protection regulatory model, do not apply in establishing the interventions in case of emergencies. Adopting applied methodology for flood risk management for both territorial and local administrative authorities, is also a similarity between the pilots.

Exploration of the Floods Directive three stages, provided an insight of the pilot natural constraints and contributed to identify the characteristic flood type, the limitations due to the lack of unitary methodologies in elaboration of the flood risk /hazard maps and the flood management plans.

Different governance structure indicates a common characteristic of the implementation of Floods Directive, regarding the approach of the environmental policies, shifting from centric models to sub-national model, demonstrated by the presence in the decision and communication flow of inter-institutional structures.

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2. Introduction

The present report opens the list of the work package and project deliverables. The overall objective of Public FLOOD Emergency and Awareness SERvice project is to develop and to provide a pro-active and personalized citizen-centric public service application that will enhance the involvement of the citizen and will harness the collaborative power of ICT networks (networks of people, of knowledge, of sensors) to raise awareness on flood risks and to enable collective risk mitigation solutions and response actions.

The objectives of WP2 are to describe and compare the characteristics and specifications of flood risk management public services in different European countries and especially in the selected regions, focusing on:

- *the governance structure at and between different levels (institutional capacity)*
- *the strategic use of ICT*
- *the level of participation among stakeholders and the public*
- *the usage of open services and the involvement of different other actors, including NGOs and users, to create or coproduce new public services in the flood management field*
- *the usage of new, smart and mobile public services in the project's domain*
- *the way transparency tools bring benefit to different sections of the population and establishing practices to challenge emerging inequalities*

Internally, on project level, WP2 tasks and deliverables contribute to a better understanding of the pilots, their organizational architectures, the specificities of the flood risk management governance, the current situation in terms of ICT use/ the citizen involvement in the decision making processes, and also the aspects that can be improved using the innovative combination of internet-mediated interaction and collectively generated knowledge that the technical component of the project is going to develop during the 36 months of the project.
In terms of connectivity, WP2 transfers the conclusions and the collection of the qualitative and quantitative information to the WP3, WP4 and WP5, thus contributing to the development, integration and validation of the Flood-serv system components and collaborative platform.
Within the work package, D2.1 –organization of flood risk management report, illustrates the European and national key concepts, the pilot flooding history and how it is reflected in the decision making process, the levels of authority and responsibility and the governance structure of each pilot.
The document is organized under the subsequent structure:

- *Section 1 presents regulatory models for Floods Directive transposition in the national legislation and the legislative analisys.*
- *Section 2 presents an analysis of the flood management governance structures in the selected areas - GENOVA, CMVNF, IP TULCEA, BILBAO and BSK;*
- *Section 3 presents an analysis of the national legislations that transpose the Floods Directive.*

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The work performed in the current task and deliverable provides outputs to and it is instrumental in organizing deliverable D2.2 Analysis on Emergency flood management public services and D2.3 Report on the public participation procedures and citizen involvement.

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3. Methodological approach

The structure of the Floods Directive itself provided the structure of the report. Each key concept of the Directive stands for a section. Based on the fact that the municipality, as a local level stakeholder in the flood risk management stakeholder, can provide the necessary expertise to collect, select and synthetize data regarding the legislation they are enforcing, the legislative analysis uses the information collected by the project implementation teams, in cooperation with the generic legal departments.. The advantages of this approach was that it provided access to real and original documents and reflected the horizontal ambition of the project, which is to contribute to a transparent approach of the decision making process. The project pilot partners received pro-forma, tables and instructions on how to select the information that could serve the deliverable purposes, e.g.: indicatives of the legislation title and the elements for proper identification, the source of the legislation, reasonable standards for the translation from the original language into English, type of data to be used for the description, elements to identify the level of decision, type of flood management actions or processes to be described, etc.

After the D2.1 responsible received the standardized information, the collection was corroborated with the specialized literature. The elements that mainly contributed in providing the present study are mainly the quality/quantity indicators of the evaluation documents that the European Commission used to monitor and report the implementation stages of the Member States, thus, ensuring the standardization character.

Using this approach we could identify the similarities, the differences and the specificities of the 5 partner municipalities and provide key elements for the technical partners in establishing the end-users requirements and also in drafting the piloting strategy. Each partner was recommended to provide a list of internal references. The pilot individualization elements that served the purpose of this deliverable are as follows: the hydrological basin to which the pilot belongs to as location (this is actually the Floods Directive recommendation as UoM), the circumstances in establishing the objectives of the local flood management plan, the status of the flood risk preliminary evaluation and the structural measures. Some of these elements were developed in parallel with the questionnaire utilized by the WP3 partners to establish the users' requirements. We also used the European legislation monitoring instruments in exploring the risk and hazard maps.

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4. Organization of flood risk management report

4.1 Regulatory models

4.1.1 European Context

The severe floods produced in the first half of 2002 costed central Europe 100 fatalities and approximately 14.5 billion EUR (Ulbrich et al. 2003), mobilizing the EU towards a new type of approach in terms of sustainable development. After the Communication on Flood risk management; Flood prevention, protection and mitigation (COM(2004) 472final of 12.7.2004) and the Informal Environment Council on 18 July 2004 and at the Environment Council on 14 October 2004, the Commission developed a proposal for a directive on flood risk management, including extensive consultations with stakeholders and the public, in the context of the regular meetings of the EU Water Directors in co-operation with other stakeholders and relevant parties.

It was expected that the proper implementation of the two major directives in water and flood management will prevent the estimated cost from the current 5.3 billion EUR to up to 40 billion EUR in 2050 and reach 100 billion EUR by 2080, due to the combined effect of climatic change and socio-economic growth. These estimations were published in a JRC study on future flood risk assessment in Europe (http://publications.jrc.ec.europa.eu/repository/handle/JRC95475).

On November 26th 2007, Floods Directive 2007/60/EC on the assessment and management of flood risks entered into force, changing the approach from water and floods defense management to risk management, reinforcing the rights of the public access to information and to have a say in the planning process. The Floods Directive aims to reduce and manage the risks that floods pose to human health, the environment, cultural heritage and economic activity It was carried out in close coordination with the Water Framework Directive 2000/60/EC, by flood risk management plans and river basin management plans, through coordination of the public participation procedures in the preparation of these plans. All assessments, maps and plans prepared are available to the public.

The Directive 2007/60/EC set a series of reporting deadlines regarding the following issues: transposition into the national legislations (26.11.2007), the reporting format for the preliminary flood risk assessment (22.12.2009), notify the Commission on the administrative arrangements (26.5.2010), preliminary flood risk assessment (22.12.2011), the start of the public participation process (22.12.2012 *[1]), elaboration of the flood hazard and risk maps (22.12.2013 **), the elaboration of the flood risk management plans (22.12.2015 ***) offering the member states strong instruments to implement the concept of risk management, social resilience and absorb & recover (Alexander et al. 2016).

[1] * coordination with article 14 (WFD) requirements
** date of 1st review of pressure and impact analysis under the WFD
*** date of 1st review of WFD river basin management plans

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4.1.2 Comparative analysis of legislative models in the selected regions of Flood-serv project

The elements subjected to the analysis of the characteristics of the legal framework aimed to stress the main characteristics of the regulatory models implemented in the five pilot cities- Genova, Vila Nova de Famalicao, Tulcea, Bilbao, Bratislava- are as follows:

- *legislation (Act/Law/Decision) that provides the transposition of the Floods Directive and the short description;*
- *issuing authority*
- *subsequent legislation .*

In order to understand the opportunities and constraints to be take in account in the design and validation of applications, we performed an exploration of the regulatory models that would contribute to a better representation of the relations among actors and the allocation of responsibility.

The exploration of national, local and subsequent legislation allows to clearly identifying which or administrative structure has the responsibility of providing information and managing communication flows and establishes the implementation and monitoring instruments.

4.1.2.1. Italy

National legislation (Act/Law/Decision)	*Issuing authority*	*Subsequent legislation*	*Short description*
Rules on first assistance and help to people under natural disaster emergency – Civil Protection L. n.996 08/12/1970	National Authority	• Implementation rules of the L. 8/12/1970, n. 996 - Rules on first assistance and help to people under natural disaster emergency – Civil Protection DPR n.66 06/02/1981	First law related civil protection in Italy. Roles and responsibilities of public institution in order to act in natural disaster
Implementation of the Civil Protection national service L. n.225 24/02/1992	National Authority	• Guidelines to assure operative coordination of civil protection structures and activities in need situations - Dl n.343 07/09/2001 turned into L. n.401 09/11/2001 • Operative guidelines to manage the national, regional and local warning system in the field of hydro geological risk for civil protection - Dpcm 27/02/2004 • Operative handbook to define a municipal or inter-municipal civil	Established the "Servizio Nazionale di Protezione - **Civil Protection National Service** and created a system of competences and tasks shared among different government levels, according to the kind of situation they are asked to face.

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		protection plan - Decree n.2 18/10/2007 • Operative guidelines to manage emergency situations - PCM Directive 03/12/2008 • Organization of the Operative Room "Italia" at the Civil Protection Department - Dpcm 03/12/2008 • Operative guidelines for preventing and facing emergency situations linked to hydrogeological events - Dip.Prot.Civ. Circular 19/10/2011 • Rules for Civil Protection re-organization - Dl n.59 15/05/2012 turned into L. n.100 12/07/2012 • Rules […] in the field of civil protection […] Dl n.93 14/08/2013 turned into L. n.119 15/10/2013 • Definition of the general criteria through which Operative Coordination Centres and Emergency Areas have to be set up - Dip.Prot.Civ. Guide Line 31/03/2015	

Table 1: Italian flood management legal framework

4.1.2.2. Portugal

National legislation (Act/Law/Decision)	Issuing authority (please check)	Short description (1 paragraph, max. 50 words)
Decree-Law n. º 115/2010 of October 2nd	Portuguese State	Establishes a national framework for assessment and management of flood risks, aiming to reduce the harmful consequences associated with this phenomenon to human health (including human losses), the environment, cultural heritage, infrastructure and economic activities. Creates the National Commission of the Flood Risk Management (CNGRI)
law No. 58/2005 of 29 December	Portuguese State	Identifies the Hydrographic Regions
Decree-law No. 130/2012 of 22 June		
Law No. 31/2014 of 30 May, of General Basic Law Public Policy Soils of Spatial Planning and Urban Development	Portuguese State	Establish, at the national level and in accordance with the sectoral policies of the European Union, the territorial impact of the programming or implementation of public policies of the central administration of the State, particularly in the field of water resources and risk prevention and simultaneously plans, which provide options and concrete actions in the planning and organization of the territory.
Decree-Law No.. 80/2015 of 14 May	Portuguese State	Defines the system of national coordination, regional and inter-municipal, the general system of land use and development regime,

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		approval, implementation and evaluation of IGT
Joint Order A-114/87-X, June 30 -	Portuguese State	Creates the "Flood Control Project in Lisbon Region" that works in the Directorate - General for Natural Resources in conjunction with the Integrated Project Management of Water Resources Tejo (PGIRHT) and aims to equate the problems and propose structural solutions to be implemented urgently in control of the field of floods, giving priority to areas that present the biggest problems
Decree-Law No. 21/98 of 3 February -	Portuguese State	Creates the Commission Reservoirs Management, whose mission down the technical regulation laying down rules for drawing up exploration programs, assess, evaluate and approve the various programs. In emergency situations arising from floods or breakage of dams, decide and take appropriate action fitting or extraordinary discharge of the relevant reservoirs;
Decree-Law No. 364/98 of 21 November -	Portuguese State	Imposes "municipalities with Urban clusters hit by floods over a period of time, at least, include the year 1967 and that are not yet covered by the Contiguous Zone classified under Article 14 of Decree-Law No. 468/71 of 5 November, in the wording of Decree-Law No. 89/87 of 26 February, "the drafting of a letter of floodplains, which demarcate within the urban perimeters, areas affected by known most crowded", and these areas will have to be included in PMOT;
Decree-Law No. 89/87 of 26 February-	Portuguese State	Aims to delimit within the Contiguous Zone occupied areas built prohibited and conditional occupation built by changing the wording of Decree-Law No. 468/71 of 5 November, on the adjacent areas (repealed by Law No. 54/2005 of 15 November, and 58/2005 of 29 December) making them even more relevant, integrating them in the Management Plan territory and increasing the restrictions associated with these areas;
Decree-Law No. 112/2002, April 17	Portuguese State	Approves the National Water Plan (PNA);
Law No. 54/2005, of 15 November,	Portuguese State	Establishes the ownership of water resources
Law 58/2005 of 29 December as amended and republished by No.130 Decree-Law / 2012, of June 22 - the Water Act, which transposes Directive 2000/60 /CE of 23 October,)	Portuguese State	Establishes the basis and institutional framework for sustainable water management. The Water Act is expected to delimitation of Threatened zones by Flood or Flooding zones (Article 40.
Decree-Law No. 226-A / 2007 of 31 May -	Portuguese State	Establishes the rules for the uses of water and respective titles resources
Assembly of the Republic Resolution No. 15/2008 of April 3 -	Portuguese State	Recommended to the government to implement a number of measures aiming to reduce the harmful consequences resulting from the occurrence of floods
Decree-Law No. 166/2008 of 22 August, amended	Portuguese State	Legal rules National Ecological Reserve (REN), which helps to protect natural resources, especially water and soil, to safeguard the processes essential to the successful management of the territory

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and republished by Decree-Law No. 239/2012 of 2 November - will It should also consider the Decree-Law No. 93/90 of March 19, which is the legal framework that supported most REN published;		and to favor nature conservation and biodiversity, components essential to the physical country support. This provides for the delimitation of Threatened by Floods zones and zones of Threatened by Sea

Table 2: Portugal flood management legal framework

4.1.2.3 Romania

National legislation (Act/Law/Decision)	Issuing authority	Important subsequent legislation	Short description (1 paragraph, max. 50 words)
Government Decizion No. 846/2010 approving the National Strategy for flood risk management in the medium and long term	Romanian Government	Framework methodology for flood risk management Plans developed by the National Institute of Hydrology and Water Management Flood Risk Management Plans for 12 Basin Water Administrations	In order to manage flood risk, the National Strategy sets out a set of policies, procedures and practices with the objectives of risk identification, analysis and evaluation, treatment, monitoring and reassessment of risks to reduce them, so that human communities and all citizens can live, work and satisfy their needs and aspirations in a sustainable physical and social environment.
Government Decizion No. 1854/2005 to approve Short-term Flood Risk National Strategy Management	Romanian Government		The national plan for prevention, protection and mitigation of floods basis for future work to promote prevention and defense in all river basins.
Government Decizion No. 1309/2005 for the approval and financing of the implementation of the National Plan for prevention, protection and mitigation of floods	Romanian Government		Financing and implementation of the National Plan for prevention, protection and mitigation of floods
Water Law No. 107/1996 amended and completed	Romanian Parliament	Emergency Ordinance of the Government No. 12 /2007 for amending and	Conservation, development and protection of water resources and ensure free water flow and

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		supplementing certain acts transposing the acquis communautaire in the field of environmental protection Emergency Ordinance of the Government No. 3 / 2010 for amending and supplementing Water Law No. 107/1996 Emergency Ordinance of the Government No. 69/2013 for amending and supplementing Water Law No. 107/1996	protection against all forms of pollution and changes in the nature of water resources, river banks and river beds or their basins;
Ordinance No. 1422/192/2012 approving the Regulation on management of emergencies caused by floods, hazardous weather, hydraulic structures accidents, accidental pollution in waterways and marine pollution along the coastline *)	Ministry of Environment and Forests Ministry of Interior		Established attributions for all the structures involved in the management of emergencies arising from the specific risk types.
Law No. 481/2004 on civil protection	Romanian Parliament		An integrated set of specific measures and tasks of organizational, technical, operational, humanitarian and public information, planned, organized and conducted under this law to prevent and reduce the risks of disasters, to protect people, property and the environment adverse effects of emergencies, armed conflicts and their aftermath and eliminating operational conditions necessary to ensure the survival of those affected.
OUG nr. 21/2004 on National System of Emergencies Management	Romanian Government	OUG nr. 1/2014 on measures in the field of emergency management	Establishes a legal framework and modern mechanisms of improved management, designed to ensure a professional defense of life and human health, the environment, material and important cultural legacy, during the production of emergencies, allowing rapid restoration of normality.

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Ordinance No. 330/44/2178/2013 approving textbooks Mayor's Crisis Management Manual and Prefect's Crisis Management Manual for the emergency situations in case of floods and drought hydrological	Ministry of Environment and Climate Change Ministry of Interior Ministry of Regional Development and Public Administration	Mayor's Crisis Management Manual for the emergency situations in case of floods and drought hydrological Prefect's Crisis Management Guide for the emergency situations in case of floods and drought hydrological	These manuals summarizes preventive, operative and rehabilitation measures undertaken locally in emergency situations arising from floods and hydrological drought.
Government Decision No. 762/2008 for approving the National Strategy of Emergency Situations Prevention			National Strategy for Emergency Prevention is a document for the long-term and medium assessing the current state of presence and manifestation of risk factors in Romania, formulates principles and priorities for action and provides the necessary resources for emergency management.

Table 3: Romanian flood management legal framework

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4.1.2.4 Spain

National legislation (Act/Law/Decision)	Issuing authority	Important subsequent legislation	Short description
Resolution 3/2015, of 14 January, of the Government and Parliament Relations Secretary Director, setting forth the publication of the agreement made by the governing council to approve the Basque Country special flood risk emergency plan	Spanish Government		Sets basic functions covered by the Basque Special Flood Emergency Plan, the competent authorities to implement it, the measures taken in different stages of the flood management (prevention, protection, preparation and recovery/ assessment)
Royal Decree 20/2016, of 15 January, approving the flood risk management plans for the river basin districts of Cantábrico Occidental and Cantábrico Oriental (Spanish side) in the bay of Biscay-	Spanish Royalty		The Flood Risk Management Plan (FRMP) for the river basin district of Cantábrico Oriental (East Bay of Biscay) for the 2015-2021 period is a key tool for the implementation of 2007/60/EC Directive, aimed to achieving the flood risk management targets for each zone identified in the preliminary risk assessment of the river basin area, based on the following general principles: a) Solidarity b)Co-ordination among the different Public Administrations and institutions c) Co-ordination with other sector policies d) Respect for the environment: e) Strategic initiative with long-term sustainable criteria.
Decree of Bizkaia Provincial Council 130/2010, of 23rd November, provincial council emergency plan for the historical territory of Biskaya	Provincial Council		Sets forth the preparation of prepares the Provincial Council Emergency Plan for Bizkaia Historical Territory organisation of services , its geographical characteristics, limits and area.
Decree 277/2010,	Basque		Defines and develops self-

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of 2nd November, regulating self-protection obligations required for certain activities, centres or establishments to address emergency situations	Government		protection and establishes the control mechanisms provided by Public Administrations providing the minimum contents envisaged in the Spanish Basic Self-protection Regulations, while dealing with self-protection duties in greater depth, both extending the range of activities and establishments subject to it as well as taking those duties beyond the minimum provisions of the abovementioned Spanish regulations. Extends the self-protection obligation to include activities and centre which are initially not included in the basic self-protection regulation, provided by the Spanish regulation.
Decree 153/1997 of 24th June, approving The Civil Protection Plan For The Basque Country «larrialdiei aurregiteko bidea-labi» and regulating the integration mechanisms of the Basque emergency response	Basque Government		Sets forth the approval of the Basque Country Civil Protection Plan as a global organisational tool to respond to civil protection situations
Act 1/1996 of 3rd April, on emergency management	Basque Government		Plans and co-ordinates the actions undertaken by the Basque Country public administrations to prevent and manage emergencies aimed at protecting people, goods and collective heritage against severe collective risk situations, catastrophes and public disasters, as well as other emergency situations which may require the involvement or co-ordination of different services and operative systems.
Order of 1st August 2001, of the Councillor for the Interior, approving the operational strategies of the Basque emergency	Basque Government	Order of 1st February 2016, of the Security Councillor, of third Order amendment approving operational strategies for the Basque emergency response system and creating the co-ordinated	Defines the operational strategies are the response mechanism of the emergency response system to non-catastrophic accident situations and the basic instrument of the SOS-Deiak Emergency Co-

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response system and creating the co-ordinated emergency action service- Basque Official Gazette (BOPV) - Thursday 13th September 2001		emergency action service Basque Official Gazette (BOPV) Tuesday 9th February 2016	ordination Centres

Table 43: Spanish flood management legal framework

4.1.2.5 Slovakia

National legislation (Act/Law/Decision)	Issuing authority	Important subsequent legislation	Short description
Act No. 7/2010 Coll. on protection against floods		Decree of the Ministry of Environment of the Slovak Republic No. 204/2010 Coll. stipulating details of flood forecast service Decree of the Ministry of Environment of the Slovak Republic No. 251/2010 Coll., stipulating details of assessing the expenses on flood securing work, flood rescue work and flood damages Decree of the Ministry of Environment of the Slovak Republic No. 252/2010 Coll. stipulating details of submitting the interim reports on flood situation and summary reports on the course of floods, their consequences and measures taken Decree of the Ministry of Environment of the Slovak Republic No. 261/2010 Coll. stipulating details of the content of flood plans and approval procedures	Establishes: flood protection authorities; the basic groups of preventive technical and non-technical measures for the protection against floods; the obligation to prepare and update the flood plans and provide flood inspections; obligation of the SHMI to provide warning of the flood danger to the bodies ensuring protection against floods operating in the involved area; level of response to flood situation according to the level of flood alert; the restoration measures for living and business conditions; system of reimbursement of expenses related to flood damage, flood management and rescue operations;
Act No. 42/1994 Coll. on civil protection of inhabitants		Decree No. 523/2006 Coll. on details for securing rescue work and organizing the civil protection units	Establishes: warning the inhabitants; procedures taken after emergency situation is declared;
Act No. 364/2004 Coll. on water			Stipulates/defines: the term flooded territory; the government and self-administration bodies authorized to declare the inundation territories; that if the inundation territory is not

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			determined, the available documents about the likely borders of the territory endangered by floods shall be followed;
Act No. 201/2009 Coll. on state hydrological service and state meteorological service			Defines the organizational roles of the hydrological service and state meteorological service: duties of flood forecast, performance of the flood forecast service, obligations of the SHMI
Act No. 355/2007 Coll. on public health protection, support and development			Measures aimed at the protection of health during flooding and after flooding;

Table 5: Slovak flood management legal framework

4.1.3. Similarities, differences and specificities of the selected regions governance models

Based on the information collected and by the WP2 partners, the levels of authority that applies to all pilots in providing the legal framework for the flood risk management, are as follows: national, regional, territorial and local. Romania is the only country where there is a basin level, applied only for one institution, with specific role in water management.

Subsequent legislation analysis provide instruments to enforce the primary legislation, in terms of establishes methodologies, terms, forms and regulations of specific aspects of the flood risk management- assistance and help to people under natural disaster emergency, national, regional and local warning system in the field of hydro geological risk, guidelines to manage emergency situations

Similarities	Differences	Specificities
Portugal, Romania, Italy, Slovakia Unique level (national) for the Floods Directive transposition	Spain Regional regulations regarding the civil protection instruments, the emergency situations response, operational strategies of the Basque emergency response system	Romania Intermediary structure (national-territorial) with a role in establishing the strategy for defence against floods- Basin Water Administration
Portugal, Romania, Spain, Slovakia	Portugal	Spain

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Synergy in terms of measures and public policies with the Water Frame Directive	No subsequent legislation in this field	Both regional and national level for the Floods Directive transposition
Portugal, Romania, Slovakia Central coordination of the public policies regarding the flood risk management		
Italy, Portugal, Romania, Slovakia Centralized approach regarding the involvement civil protection structures		
Romania, Italy Applied methodology in flood risk management for the local (mayor) and territorial level (prefect) of decision		

Table 6: Similarities, differences and specificities of legal framework

4.2 Floods Directive - three step procedure

The Floods Directive basically prescribes a three-step procedure: preliminary flood risk assessment, preparation of the flood hazard maps and flood risk maps and, the final stage, adopting the flood risk management plans. It actually mirrors the Water Frame Directive, in terms of principles, implementation and monitoring methodology and terms.

4.2.1 FD First step implementation

The first step- Preliminary Flood Risk Assessment requires Member States to engage government structures, agencies and other bodies to draw up a Preliminary Flood Risk Assessment. This assessment has to consider impacts on human health and life, the environment, cultural heritage and economic activity. The assessment involves the following activities:

• Collecting information on historical floods, identifying historical events and selecting significant events;

• Assembling information into spreadsheet files;

• Mapping of historical floods (GIS), performed at UoM level, verified / adapted to WISE reporting requirements;

• Identification of areas with significant potential flood risk based on data, studies, available project outcomes.

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Exploration of the specific information regarding the context for establishing the operational objectives has the goal to create particular flood history snapshots of the pilots, as a form of local flood culture that would help the designers in integrating the components for the applications. At this stage, we considered that the "selected regions", as the five municipalities were referred to, became "pilots" in terms of establishing characteristics that narrows the analysis down to specific elements- regional hydrological basin, the circumstances in establishing the objectives of the flood management plan, the flood risk preliminary evaluation status and the structural measures that will have an important impact on piloting strategies.

4.2.1.1. GENOVA Municipality, Liguria Region, Italy

The Municipality of Genova (GENOA, Italy) is the biggest city in the Liguria Region and it is characterized by a narrow coastal zone with hills and steep mountains , with a hydrological context that covers 140 km2 surface area and 3 km2 of underground water basin (Sacchini et al. 2012). The climate is characterized by short winters, temperate summers and widespread rainfall in all seasons with the maximum occurring in autumn and an annual average of more than 1,300 mm. (Faccini et al. 2014).

The regional Hydrological basin to which the project partner belongs	*Circumstances in establishing the objectives of the flood management plan*	*The Flood risk preliminary evaluation*	*Structural measures*
Bisagno river (in pilot site)	*Floods 1970, 2011, 2014* *Losses of human life: 10 deceased (1970) , 6 deceased (2011) 1 deceased (2014)* *1.287 commercial activities suffered damage (2011).* *The 1970 flood involved the monumental cemetery of Staglieno and destroyed part of the medieval bridge of Sant'Agata.* *The characteristic type of floods: flash floods and urban floods*	*Italy has carried out planning on flood risks for at least two decades; as a result, all UoMs have a Plan of Hydrogeological Status (Piano di Assetto Idrogeologico). On this basis, Italy has applied Art. 13.1(b) for all UoMs .*	*Hydraulic works of water retention in Bisagno riverbed* *Started on: July, the 7th, 2015* *Ending on: August, the 31st , 2018*

Table 7: Italian implementation of the FD first step

4.2.1.2 Municipio VILA NOVA DE FAMALICAO, Portugal

The Council of Vila Nova de Famalicão (CMVNF, Portugal), belonging to the basin of the Ave is one of the districts severely affected by the occurrence of events such as flooding, especially during the winter months. Hardly accentuated slopes associated with low drainage are two factors that complicate normal runoff, particularly through increased soil sealing of confronting urban areas to water courses. In addition, in these councils, the average rainfall

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per year is 1514.5 mm, raining more than 133 days a year (more specifically 133.9 days. The precipitation gradually increases from August to December, remaining high until the month of February, the month from which there is a decrease in precipitation.

The regional Hydrological basin to which the project partner belongs	Circumstances in establishing the objectives of the flood management plan	The Flood risk preliminary evaluation	Structural measures
Ave River Basin	The county area of Vila Nova de Famalicão is part of the basin of the Rio Ave, the main affluents are the East River and Vizela. The county has a very abundant drainage network, with a relatively high density, detrital type. This is mainly due to the low permeability substrate, which promotes runoff over of the underground disposal (PMDFCI; 2007). The county Vila Nova de Famalicão is composed of a dense mesh of water lines, typically with flow throughout the year, which results in an enormous availability of surface water resources. (A. Soares et al. geoENV VI – Geostatistics for Environmental Applications - 2008) The characteristic type of floods: Flash-floods, river and urban floods	Civil Protection National Emergency Plan and the National Strategy for Adaptation to Climate Change (ENAAC). The summary document with the risk zones list was submitted together with studies and reports elaborated in the 1990s and 2000s (prior to 2010), with descriptions and analysis of floods and analysis and forecasts of intense rains return periods	Lowland water storage; agri-environmental schemes, land drainage and river restoration.

Table 8: Portuguese implementation of the FD first step

4.2.1.3 IP TULCEA, ROMANIA

Tulcea - Danube Delta (IP TULCEA, Romania), known for its flora and fauna, especially birds, and for its variety of ecosystems, located in Eastern Europe, at the Black Sea shore, is the largest wetland in Europe, protected under three international conventions: 1990 – UNESCO "Man and Biosphere Program", 1990 - the List of the World Cultural and Natural Heritage, and 1991 - RAMSAR Convention. The hydrological network of the pilot area covers a surface of 21660km2. The high torrentially degree of watercourses, due to the climate conditions, physical and geographical factors conduct to a frequent phenomenon of flooding on Romanian territory.

The regional Hydrological basin to which the project partner belongs	Circumstances in establishing the objectives of the flood management plan	The Flood risk preliminary evaluation	Structural measures

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Danube River – Black Sea Seashore (Danube collects almost all rivers on the Romanian territory, except for the ones that flow in the Black Sea)	Floods- 1985, 2006, 2010 *Losses of human life: 0* *Civil contractions affected: 0.5 km of protection dam* *Agriculture: 1 mil EUR* ***The characteristic type of floods*: Flash-floods, river and urban floods**	Report on Preliminary Flood Risk Assessment- completed in December 2011, sent to the European Commission in March 2012, a stage of National Strategy for flood risk management , approved by Government Decision No. 846/2010	Improvement of longitudinal continuity of water bodies: remove discontinuities of water bodies and restoration of longitudinal connectivity, complete the necessary research studies and pre-feasibility studies for technical purposes; Improvement of lateral connectivity of water bodies: the ecological reconstruction of agricultural area and fishery facilities; improving conditions in fish reproduction areas in the Danube Delta; ecological reconstruction of flood plain areas, riverside habitat restoration outside city limits with banks renaturation.

Table 9: Romanian implementation of the FD first step

4.2.1.4 Municipality of BILBAO, Basque Country, Spain

Bilbao (BILBAO, Spain) is located on the Eastern Atlantic seaboard, in the Spanish State, and stands 19 m above sea level, covering a surface area of 41.6 km2. In the history of Bilbao have always appeared as a recurring the floods. The municipality of Bilbao is located within the so-called Atlantic slope, and presents a type of mesothermic climate, moderate in terms of temperatures, and very rainy. It is denominated wet temperate climate without dry season, or Atlantic climate. In this climate the Atlantic Ocean exerts a notorious influence. Air masses, whose temperatures have been softened by contact with the temperate ocean waters, arrive to the coast and make the thermal oscillations between night and day, or between summer and winter, little accused. The orographic factor explains the great amount of rainfall of the whole Atlantic slope of the Basque Country, between 1,200 and more than 2,000 mm. of average annual precipitation. (Monjo, et al.2010)

The regional Hydrological basin to which the project partner belongs	*Circumstances in establishing the objectives of the flood management plan*	*The Flood risk preliminary evaluation*	Structural measures

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Hydro geological Domain of the South Anticlinorium (Nervión river basin, Cadagua river basin)	Flood:1983 Human losses: 39 Economic losses: 101 municipalities /1200 mil EUR Cultural losses: Casco Viejo (Mercado de la Ribera, the Arriaga Theater , Historical Museum)/ The old town of Bilbao	Regions are responsible for the planning of RBDs that lie entirely in their geographic area. Municipal Emergency Plan of Bilbao, up-dated by Royal Decree 20/2016, on January, the 15th.	Restoration of hydrological-forest and agricultural basin districts; Riverbed and flood plains measures: river restoration including natural water retention measures and embankment reforestation Measures to restore coastal waters and sea shore Management guidelines for dam operation during floods Improvement of linear infrastructures drainage: roads, railways Structural measures (channeling, pits, jetty, etc.) implying physical action in river beds, coastal waters and areas likely to flooding Measures involving physical action to reduce floods due to surface water flooding generally in an urban environment, such as improving artificial drainage capacity or Sustainable Drainage Systems (SuDS)

Table 10: Spanish implementation of the FD first step

4.2.1.5 BRATISLAVA Self Governing Region, Slovakia

Bratislava Self-Governing Region (BSK, Slovakia) is located in the south-western part of Slovakia and has an area of 2,053 km² and a population of 603,699 (2005). Slovakia, statistically significant decreasing trends were detected in annual maximum floods for the period 1950–2010 in catchments of east and central parts of the country (Jeneiová et al., 2014**)**

The regional Hydrological basin to which the project partner belongs	*Circumstances in establishing the objectives of the flood management plan*	*The Flood risk preliminary evaluation*	Structural measures

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Danube River Upper Basin	Flash flood 2011; 4 affected localities, 46 affected households, 4km of roads River flood in 2013, 10 localities were affected, 53 households and 5 km of roads. **The characteristic type of floods: Flash-floods, river and urban floods**	The preliminary flood risk assessment in Slovakia was based on the analysis of causes, characteristics and consequences of floods which occurred between 1997 and 2010. The assessment of potential consequences of future floods on human health, environment, cultural heritage and economic activity was based on the available information and expert judgment.	Reconstruction of the dykes to ensure their stability during excessive load in the time of floods; Avoiding insufficient flow capacity (profile) of bridges and removing other bottlenecks in water courses; Regular maintenance of flood bed to remove the vegetation, sediments and all kinds of debris to ensure the transit capacity of high waters.

Table 11: Slovak implementation of the FD first step

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4.3 FD second step implementation- Flood hazard and risk maps

The second step in implementing Flood Directive is the risk assessment. The information following the risk assessment that was used to identifying the areas at significant risk would then be modeled in order to produce flood hazard and risk maps. These maps must include details and revaluations on the flood extent, depth and level for three risk scenarios (high, medium and low probability). The flood hazard and risk maps depict the expansion of the potential flooding areas in floodplains, indicating the potential negative effects associated with floods, the number of inhabitants potentially affected, the type of economic activity of the affected area, installations which might cause accidental pollution in case of flooding, showing areas with a large silt deposits, flash floods and information on other significant sources of pollution. Article 6 of Flood Directive requires all Member States to prepare the second round of the flood hazard and risk maps by 22nd of December 2019 and to make them available to the Commission by 22nd of March 2020.

The European Commission developed a series of reporting and monitoring instruments to support the collection and organisation of data and the development and dissemination of information to support environmental management processes, environmental policy making and assessment, and public participation at national, European and global levels. Pilot country information was analyzed by accessing the following services: e-Eionet, CIRCABC- Information Exchange Platform**,** WISE - Water Information System for Europe and European Flood Awareness System (EFAS)**.**

In the research, we were interested to collect and analyze information that would be serve for different type of beneficiary- project internal beneficiary (the technical partners), project external beneficiaries (authorities and citizens), based on the fact that there are different perspective and expectations but similar interests- the technical partners must follow the project objectives in term of providing pro-active and personalized citizen-centric public service application, the authorities must perform towards improving services towards citizens in terms of safety and resilience, and the citizens must be involved in the decision making processes through transparent instruments and frameworks.

Country	Flood hazard and flood risk maps	Assessment observations
ITALY	http://www.alpiorientali.it/new/flexviewers/ITR051/.	Summary tables are added to the maps Available damage maps, where exposed elements and protected areas can be identified. Mapping all three probability scenarios on one PDF map is a good practice. Content description regarding both hazard and risk maps for the majority of the areas assessed; Clear legend is also available on all the maps. The explanatory information provided on the RBD website is clear on the content and purpose of the maps. A more coordinated approach between the different UoMs should be adopted.

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PORTUGAL	http://sniambportal.apambiente.pt/diretiva60ce2007/	All the information of Flood Risk Areas is accessible to the general public at the same time; The maps are clear, easy to read and understand; For mainland Portugal and for each of the three probability scenarios, themes contain the limit, depth and velocity of flow of affected areas, risk, consequence and exposure to floods, affected population, affected sectors of economic activity, affected cultural heritage, affected roads and railways; Considered the infrastructure included in the Territorial Information System of Internal Management of the National Civil Protection Authority, such as public and private facilities (entitled sensitive buildings), e.g. fire stations, state administration, education, health, security and justice; Information reported to WISE on the methodology to produce the maps is substantial.
ROMANIA	http://gis2.rowater.ro:8989/flood/	Good coordination at national and international level (under the guidance of International Commission for the Protection of the Danube River; Existence of bilateral agreements; The risk of flooding assessed for all types of flood that might be reasonably expected; In general, the maps are of good quality and easily navigable, the legend is comprehensive and the maps are easy to use; UoM codes should be provided; The legend on the map should indicate the full meaning of the icons related to number of potentially affected inhabitants.
SLOVAKIA	http://www.minzp.sk/sekcie/temy-oblasti/voda/ochrana-pred-povodnami/manazment-povodnovych-rizik/povodnove-mapy.html	Same UoM were used as those for river basin management planning; All APSFRs were included in the FHRM schema; The legends of the flood hazard and flood risk maps are self-explanatory; It is easy to work with the maps; A more detailed map scale than the existing one of 1:50,000 have to be reconsidered.
SPAIN	http://sig.mapama.es/snczi/visor.html?herramienta=DPHZI	Most of the Spanish portals provide specific and detailed information on flood hazard scenarios and risks.

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		Most of the portals allow the combination of information with other topics, either from cadastre or the Water Flood Directive MS's river basin management plans or monitoring networks User requests in FAQs or videos, it can be confusing for portal users (when visiting the portal, no information is displayed on the status of the portal, e.g. information imports that are finished, ongoing or planned); A more transparent approach might be useful. It is difficult for non-technical users, Only in February 2015, APSFRs layers were consulted more than 13,000 times and flood-prone areas layers, more than 150,000; Timely -generated information on climate change is needed to take into consideration climate change effects within the FRMPs. For the first planning cycle, it seems that this has been only partially considered, and the approach should be improved for further planning cycles and flood risk management.

Table 12: Pilots implementation of the FD second step

4.4 Limitations of the flood risk and flood hazard maps for the partner countries

In Italy there is lack of unitary methodology applied for different levels of flood risk and flood hazard maps, and the explanations on how to use the maps are insufficient for the public .In Portugal, flood risk reduction is implemented across multiple stakeholders, namely central administration, local level, private sector, research institutions and NGOs and the affected population is only visible if the hazard map is zoomed in to at least the 1:200,000 scale. The Romanian maps lack of proper legend indicating the number of persons represented by the icons. Most of the Spanish portals have limited appeal and usefulness for potentially interested users (they currently focus more on the exchange with technicians from other administrative bodies than providing information to the interested public). In Slovakia, all floods are assessed in total, there is no difference on the maps between flood sources and flood mechanisms. The indication of consequences of floods on the status of water bodies are missing. Information about impacts on cultural heritage is scarce. We consider that this section observations will help the designers identifying the means to cover this limitations by the Flood-serv applications, because the criteria relate to the all range of community interests- long-term/short-term, vital/ comfort related aspects, remote/close.

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Potential adverse consequences on	*ITALY*	*PORTUGAL*	*ROMANIA*	*SPAIN*	*SLOVAKIA*
Human health	Population Census data - the indicative number of inhabitants affected from at the cadastral level assuming that, within each cadastral section, the population was evenly distributed. For some UoMs the differences in population densities were also taken into account.	Census data were used. Population density of constituencies (there are several in each municipality) were combined with the flooding area maps to estimate the number of population affected.	The limit of each locality, the surface, and population in the last census. This information was correlated and overlapped with the floodplains (for classes of depths previously established) in order to determine the affected population: (proportionally to flooded areas) on each settlement, followed by aggregation of APSFR.	Overlap between the flooded areas and the population density maps determine the number of potentially affected inhabitants.	The ratio of affected inhabitants compared to the total number of inhabitants in the basic residence unit.
Economic activity	The economic activities considered and mapped: continuous and discontinuous urban areas; economic activities (industrial, commercial and service areas; agricultural land (cropping systems, orchards, meadows, arable land, and vineyards), mining areas, wooded areas (shrubs, conifers and deciduous forests, and bushes); disused land in urban areas and waters and inland wetlands. Linear features mapped include roads and railways; point locations are related to public services such as schools, railway	There was little information, though charts of soil usage were said to be used.	The following risk receptors were considered: properties; infrastructure (airports, railway stations, ports); roads, railways, bridges, hydraulic structures (the minimum affected length criterion has only been used for roads, 200 m for main roads and 500 m for secondary roads); agricultural land (arable land, vineyards, orchards, secondary pastures, complex crop areas), and forests.	Instead of using the EU CORINE LAND COVER, the land use information has been retrieved from the National Land Occupation System (Sistema de Información sobre la Ocupación del Suelo de España (SIOSE), or regional sources in ES100, ES110, ES120-ES127), due to its better resolution, precision, and updates; but subsequently regrouped according to CORINE standards	The following risk receptors were considered: properties; infrastructure (airports, railway stations, ports); roads, railways, bridges, hydraulic structures (the minimum affected length criterion has only been used for roads, 200 m for main roads and 500 m for secondary roads); agricultural land

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	stations and hospitals.				(arable land, vineyards, orchards, secondary pastures, complex crop areas) and forests.
Industrial installations	IED installations have been acquired and integrated with other registered types of installations regulated by national/regional law, such as: Sites of National Interest, relevant accident risk industries and installations subject to the integrated environmental authorization.	Seveso and/or IPPC sites mapped.	**National approach:** Locations of IED/IPPC installations which might cause accidental pollution if any type of flood occurred are mapped. Other economic sectors potentially affected are included in the mapped risk layer obtained based on the risk matrix.	Installations covered by the requirements of the Industrial Emissions Directive (IED) or previously under the IPPC Directive have been used from the corresponding National register. The information is displayed in pop-up boxes in the portals (national, regional and RBD) including some additional information e.g. on the name of the installation, its status, etc.	The risk is presented on the map by indicating Seveso areas, storage areas, significant pollution sources and environmental loads. The number of affected installations was determined as the intersection of the geo-database installations and the inundation area.
Protected Areas	Protected Areas related to Habitat, Birds, Nitrates, UWWT, water intended for human consumption, bathing water, groundwater, and surface water bodies as well as national and regional legislation have been identified on the maps. For each of these WFD Protected Areas, the level of risk attributable to each element has been identified by overlaying their surface area with the information available on the flood hazard maps. The	RAMSAR sites were considered together with the Natura 2000 areas and sites.	Article 7 abstraction areas for drinking water, bathing waters, national nature Protected Areas, natural monuments; Natura 2000 sites were taken into consideration when building the maps. However only their exposure has been shown as there are no associated damage-depth functions	Bathing Waters, Birds, Habitats, and WFD Article 7 drinking water Protected Areas have been retrieved from the GIS layers of the RBMPs, and physical overlaps with identified flood areas. Nitrates and UWWT Directive Protected Areas have not been considered. In ES010, flood risks for water-dependent species	Number of affected Protected Areas was determined as the intersection of the geodatabase of Protected Areas and the inundation area. The map shows where the Protected Areas overlap with inundation areas.

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	potential impact of IED installations on Protected Areas was evaluated when: 1)the installation and the Protected Area are located within the area of flooding and, in turn, the installation is located within one or more Protected Areas; 2)the installation is not located within the Protected Area but in an area hydraulically connected to the flooded areas affecting the Protected Area.			have been considered as positive, as they are thought to benefit these species. The information is displayed in pop-up boxes on the web maps' portals, except for the National map portal that only reports "yes/no" in a specific PDF fiche per APSFR. The ES authorities subsequently indicated that the problem with the national maps portal seems to be that most of the information displayed has not been found because of the difficulty of access.	
Cultural heritage and other potential receptors	Landscape, archaeological and cultural heritage sites were considered where appropriate. Additional information considered relevant relates to the areas of debris flows. For this type of phenomenon, given that systematic observations over long periods and therefore data to evaluate the return period are not available, only the mapping of the areas potentially affected by debris flows was carried out.	Other consequences considered were sites with historical interest and heritage classified at national or global level.	Potential adverse consequences on churches, monuments, museums.	Mapping of cultural heritage is based on regional information sources, which is displayed in pop-up boxes in the national SNCZI viewer and in the regional viewers.	Number of affected installations which might cause accidental pollution in case of flooding was determined as the intersection of the geo-database of these installations and the inundation area.

Table 13: Pilots approach of the horizontal aspects of flood risk and hazards map

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4.5 FD third step implementation Flood Risk Management Plans

4.5.1 European Context

The third step in the implementation of the Flood Directive, is the preparation of the , meant to indicate to policy makers and the public the nature of the risk and the measures proposed to manage these risks. The FRMP were to be completed by December 2015. The Floods Directive prescribes an active involvement of all interested stakeholders in the process. The management plans are to focus on prevention, protection and preparedness. Also, flood risk management plans took into account the relevant environmental objectives of Article 4 of the Water Framework Directive.

The further analysis of the authorities and levels stand for the concept of ”governance”, which is explained as a set of processes that shift the approach from a traditional “top-down” administration, to more flexible architectures in policy-implementation, meaning the participation of a multitude of non-elected bodies, from different layers of administration and society. The process of governance requires an increases horizontal and vertical coordination of policy implementation.

Governance can also be regarded as an institutionalized participatory planning and it is best reflected in the environmental planning, where all layers of administration are involved in all stages of implementation. Aiming at the protection of human health, the environment, cultural heritage and economic development, the Floods Directive it mandates the production of flood risk management plans in six-years cycles on the level of river basins with involvement of the public. First cycle plans were completed by the end of 2015, aligned with the second-cycle planning of the Water Framework Directive. Compared to the Water Framework Directive, public participation is less formalized and less extensively required. Floods Directive does not define any substantive goals for flood protection or reduction of flood risk. Next to an assessment of the status quo of flood risk and the extensive requirements of drafting flood risk maps and the designation of flood risk areas, plans only have to define measures of how flood risk will be managed, but not how flood protection will be achieved in any way. By obliging public administrations to intensively engage with local flood risks, it is hoped that flood protection will be enhanced, too. (Newig, Jens & Koontz, Tom. 2013). The minimum content of the Flood risk management actions plans include:

- conclusions of the preliminary flood risk evaluation
- hazard maps, flood risk maps and the conclusions that can be drawn from those maps
- establish flood risk management objectives
- proposals in order to achieve the appropriate objectives of flood risk management.

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4.5.2 Flood management governance structure in the selected countries

There are many differences in how to set goals at the Member States level. One of the models is that setting goals first at national level and then to detail at basin level. Generally speaking, the strategic objectives concern guiding principles, such as the principle of subsidiarity, the principle of solidarity, synergy between the Water Framework Directive and the Flood Directive, etc. Operational objectives concerns, targets the reduction of risks whether new or existing, and to minimize negative consequences in all societal aspects economy, environment, health and culture.

Some countries identified operational targets at a very high level e.g. reducing the risks related to all areas of the management cycle flood risk (Austria, Ireland). The Netherlands focuses mainly on standards security of the infrastructure. Croatia's main objective is to reduce risks. Germany focuses on preventing new risks (building in risk areas is forbidden). In the UK, goals are set to avoid risks and on protection and training. At I.C.P.R. (International Commission for Rhine Protection), there are three 3 levels of objectives:

- strategic objectives, e.g. achieving an acceptable level of security, sharing of responsibility, the principle of subsidiarity (in some countries there are different measures, but the principle is the same);
- operational objectives, e.g. reduce existing risks to an acceptable level;
- sub-goals related to measures (e.g. the establishment of a flood risk map, etc.).

I.C.P.D.R. agreed on the following objectives for the Danube Region Flood Risk Management Plan: avoiding new risks, reducing existing risks, increasing resilience, public awareness. As a conclusion, almost all countries define goals flood risk management in terms of risk reduction (reduction risk to the population). Another relatively commonly used term is the realization of a level of target protection (eg community protection at flood with period of return for 100 years).

Based on the existing data in the Flood Risk Plans developed on national levels of the FLOOD-serv pilots, it is obvious similarity between the pilots in the established operational objectives.

GENOVA	**CMVFN**	**IP TULCEA**	**BILBAO**	**BSK**
- Forecasting/ preventing new risk - Mitigating the risk - Promoting the risk prevention culture	- Forecasting/ preventing new risk - Increasing resilience; - Promoting the risk prevention culture - Public awareness. - Improving land	- Avoiding new risks; - Mitigating the risk - Promoting the risk prevention culture .	- Forecasting/ preventing new risk; - Increasing resilience; - Promoting the risk prevention culture - Improving land use planning	- Mitigating the risk

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	use planning			

Table 14: Strategic objectives of the FRM Plan (established on national level)

The inventory of the activities developed at different levels of flood management decision flow, contributes to provide standardized and aligned terminology that will also answer various user needs and technical functionality requirements of the platform components, along with the inventory of the FRM stakeholders on the ownership and decision level criteria. The data was recollected by the pilots based on studying the Flood Risk Management Plans and accessing the methodology. Each pilot received tables , pro-forma and instructions on how to develop the collection.

Based on the project technical targets of the project, the most relevant information resides bellow the national level, with the observation that some of the national main prerogatives can be found on different other levels (e.g. establishing the preventive measures, continuous monitoring and assessment of risks, grant access to national resources or provide the inter-institutional cooperation framework). The inventory also reveals that the biggest responsibility in activating the management plan or declaring the emergency state belongs to the local level of decision.

Level	*Main prerogatives*
National	Preventive measures; Development and implementation of national strategy, coordination, monitoring and international cooperation regarding the management of flood risk; Ensures national resources to help the district and municipality Define rule and guideline to assure operative coordination of civil protection structures, to organize training and dissemination activities, to manage emergency situation Adopts the politics and strategies for understanding, preventing and managing emergency situations and to limit their effects Coordinate management of emergency situations -including floods Continuous monitoring and assessment of risks, threats and vulnerabilities of competence; Water management works in the public domain of the state, whose role is the defense against floods; Inter- institutional cooperation framework. Disaster rescue operations and evacuation Monitoring, archiving and interpreting the quantity and quality of environmental indicators;
Regional	Preventive measures Define risk map and regional specification of national rule and guideline Manage civil protection Ensures regional resources to help the district and municipality Assess, at regional level, the emergency situations caused by floods, Monitor the structural measures operations; Assume coordination of rescue operations. With the help of the Technical Support Group elaborates flood defense plan coordinates, at regional level, actions for managing the emergency situations caused by floods elaborates flood defense plan Ensuring public order within the territory affected by flooding, provisional traffic access to the

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	areas cut off by flooding, including the construction of provisional bridges or footbridges, disinfection of wells, septic tanks, living areas and removal and disposal of dead animals and other waste, removal of flood deposits from houses and other objects, public areas and from roads, securing of damaged constructions against collapse or their removal, other operations required to protect health, property, cultural heritage and environment Develop analyses of possible emergencies, plan the protection of the population, organize and control civil protection training, control rescue operations, plan, control and declare evacuation.
Basinal	Management of water related emergencies through its units at the county level, assists local and regional public administrations in the development of emergency plans
Territorial	Management of national resource available on the district area; Public order and public security. Management of resources available at this level
Local	Implement warning, training, and dissemination actions First answer to emergency. Implementation of the emergency plan provisions. Provide communication strategy with the population Assesses, at local level, the emergency situations caused by floods Establishes specific measures and actions to address them and follows their fulfillment Provide means, resources and personnel for the operational response; Set self-protection measures; Support in the recognition and field guidance. Ensure coordination between all entities and institutions involved in emergency operations Assume coordination of rescue operations. Declare the emergency situation. Activate the Emergency Plan Determining the overall strategy of operations. Manage the flood management plan Decide the mobilization of the privately ownership. Ensure the link with higher level plans: regional and national.

Table 15: Stakeholders FRM activity inventory

The state owned stakeholders prevail at all FRM decision level, the only exception being GENOVA, with two PPP partnerships:

OSSERVATORI CERTIFICATI

Role of the public partner - Control the processes and the assets;
Role of the private partner - Appropriately trained volunteer citizens;
Role of the PPP in the flood risk management processes- Citizens who live in homes near the torrents can provide useful information to integrate the monitoring of torrents carried out both through instrumentation (eg. webcam) and through the territorial coverage (by civil protection volunteers and Local Police).

FACILITATION FOR ECONOMIC ACTIVITIES TO PREVENT FLOOD RISKS WITH TECHNOLOGICAL SOLUTIONS (DEVICES AND / OR SYSTEMS)

Role of the public partner - Provide funding while the project is active;

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Role of the private partner - Small and medium enterprise;
Role of the PPP in the flood risk management processes- Finance/design/build and own/controls the profits and losses.

Level	*Institutions/organizations/authorities*
National	Ministry of Interior Ministry of Environment Civil protection departments Environmental Agencies National water authorities National Committee for Emergency Situations Hydro meteorological Institute
Regional	Regional Services for Civil Protection District Commando of Relief Operations of Braga Regional Council
Basinal	Water Management System
Territorial	PREFECT Emergency Situation Inspectorate County Council County Committee for Emergency Situations Technical support group
Municipality	Mayor Municipal Civil Protection Commission Municipal Operational Commander Municipal Civil Protection Service Municipal Operational Coordination Centre

Table 16: FRM Stakeholders inventory

4.5.3 Genova flood management governance structure

According to the phenomenon strength and extension, as well as to the answer capability of the local system, operation and coordination centres are implemented on the local area to guarantee the emergency management organization. Operative agencies and structures of the Civil Protection National Service act within the operation and coordination centres (Directives PCM of 3/12/2008 "Indirizzi operativi per la gestione delle emergenze" and Rules from Civil Protection Department of 31/02/2015).
Every Municipality is provided with a civil protection structure. The Municipality validates (by Municipality Council) the emergency plan drawn up according to criteria and modalities indicated by the Civil Protection Department directives and the Regional Government guidelines. The Municipality regularly updates its emergency plan sending a copy to the regional government – Civil Protection and Emergency Management Department – and to the Prefecture – Government Office on the Territory.

Municipality level (Comune)
The first answer to emergency – whatever the event nature and its effects – is guaranteed by the local structure (Municipality) even through the implementation of a Municipality Operation Centre (Centro Operativo Comunale - COC), where the different units operating in the local context are

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represented.
The Mayor, supported by the COC, takes over the coordination of relief to assist people in early interventions by implementing the emergency plan provisions. Besides, he puts effort to get the population informed on how to behave and on the way the situation evolves.

District level (Provincia)
The district level activates the Relief Coordination Centre (Centro di Coordinamento dei Soccorsi - CCS) where different components are represented. In addition to the Prefecture there are regional government, the metropolitan city government and/or the great area government, institutions, administrations and the functional operational structures for managing the emergency. All these entities are tasked with:

- ensuring the synergy of the interventions to be coordinated with those implemented by mayors of the involved municipalities;
- monitoring the territorial needs to rationally use available resources;
- defining type and scope of regional and national resources needed to complete those activated by the district level. In particular, that means to identify sites to be used as relief areas if nothing else is mentioned in the emergency plan.

The Prefect is responsible for managing national resources available on the district area; for law and order and public security. He takes decisions through official orders and is entitled to exercise the right of subsidiarity on the involved municipalities if it is requested by the situation. As president of the metropolitan area government and/or the great area, the prefect is responsible for managing resources available at this level; transport and viability issues; infrastructures and service network. According to the size of the involved area, the number of people to help as well as the potential need of further coordination activities among the operational structures, Joint Operative Centres (Centri Operativi Misti – COM) are activated in order to support the Municipality Operational Centres activities and to coordinate the Municipality and district levels by rationally using available resources. These Joint Operative Centres are placed within previously chosen suitable structures where one or more Municipalities can easily access. The Prefect is responsible for defining, organizing and activating the Joint Operational Centres but it is the head of the Civil Protection Department who is in charge of empowering the Designated Commissioner after the state-of-emergency declaration, as well as of delegating the coordination activities.

Regional level (Regione)
The Regional Operative Room (Sala Operativa Regionale – SOR) must ensure the emergency h24 operation; updates information on carried out actions for the National Civil Protection Department; coordinates its activity at district level with the Prefects who are responsible for emergency services; selects type and amount of national resources potentially needed to complete the ones available at local level; asks for these resources by managing the coordination among operative centres at district and municipality level.

The Regional Operative Room is structured in three areas:

- The Situation Room (Sala Situazioni) receives, evaluates and shares any kind of information related to potential or in-place disastrous events; cooperates to guarantee coordination with the district and municipality levels; cooperates to the relief organization for events classified as a) and b) by the law 225/92 by activating needed resources; guarantees the continuous information updating at local and national level.

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- The Telecommunication Area (Area Telecomunicazioni) manages the coordination among different levels.
- Operative Support Area (Area Supporto Operativo) gathers together different tasks: technical task (functional, informatics, technical centres), volunteer task, operative structure task (VVF, CFS), health task (Servizi sanitari regionali, 118), logistical tasks and support to population task.

The regional government ensures:

- the immediate activation and management of a regional task force (known as "colonna mobile regionale" as well as the voluntary organizations (DPR n.194/2001);
- the management of health emergency interventions according to its own organization rules and to the emergency guidelines for disastrous situations;
- the sending of technicians to test conditions of effected buildings, inspect for any damage, evaluate further risks, test the condition of drinking water and implement environmental remediation interventions;
- the engagement (if necessary) of public officials to manage operative-and-coordination-centre activities;
- the management of networks to communicate emergency information and the coordination of ham-radio voluntary organizations;
- the distribution of primary-need-goods to support population in addition to those provided at district level.

The regional government asks for declaration of state-of-emergency after testing the territorial needs and according to the local entity opinions. If the national government observes the need for a national coordination structure to face the emergency, the regional government, together with the national Department, is in charge of defining and setting up the most suitable office according to the scenario features to be faced.

Alarm level	Alarm level definition according to relevant law for the pilot city	Law or other legal norm that defines alarm levels	Brief alarm level description (a shorter definition for the public synthesizing essential information from the legal definition
YELLOW	Areas and elements with limited effects on people and socio-economic fabric and / or crossed by secondary infrastructure and production activities that are minor and / or intended mainly for agricultural or public activities; *According to Law no. 225 /1992, as amended by Law no. 12 /2012*	*Law no. 225 /1992, as amended by Law no. 12 /2012*, which identifies the Mayor as the Civil Protection Authority and defines the types of calamitous event and the areas of competence	ATTENTION: minimal risk alert
ORANGE	Areas and elements with problems for people's safety and the functionality of the economic system and / or crossed by communication lines and services of significant interest and / or locations of important production activities.		PRE-ALARM: medium risk alert

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	According to Law no. 225 /1992, as amended by Law no. 12 /2012		
RED	Areas and elements where loss of life can be experienced, major damage to economic, historical and cultural assets of major interest, serious ecological and environmental disasters. *According to Law no. 225 /1992, as amended by Law no. 12 /2012*		ALARM: high risk alert

Table 17: FRM alarm coding in GENOVA

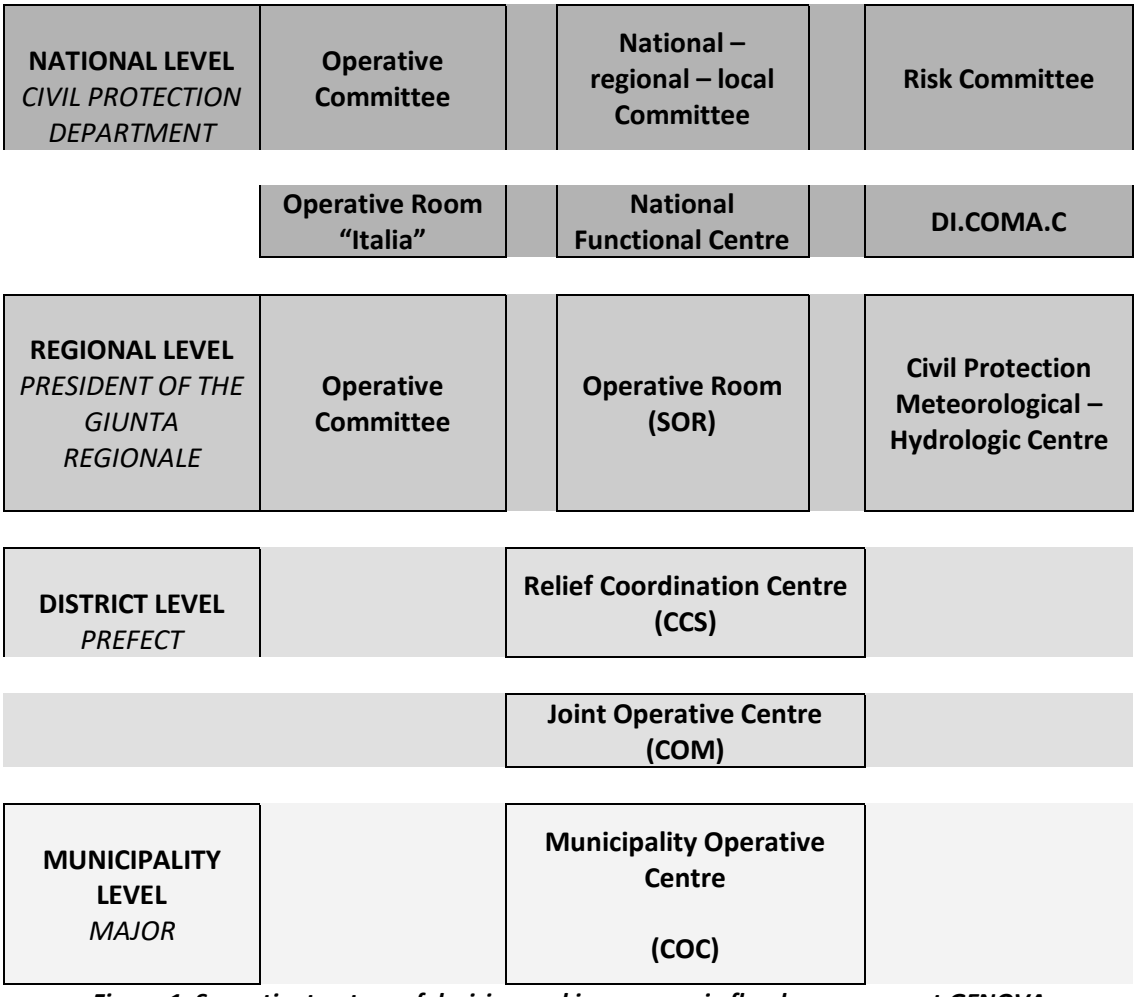

Figure 1: Synoptic structure of decision making process in flood management GENOVA

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Institution/authority	Level (central/ regional/local/other)	Main prerogatives (field of competences in non-emergency situations)	Specific roles in flood management (prevention, intervention, restoration)
CIVIL PROTECTION DEPARTMENT	**NATIONAL**	Define rule and guideline to assure operative coordination of civil protection structures, to organize training and dissemination activities, to manage emergency situation	Preventive measures The Director of Civil Protection Department ensures national resources to help the district and municipality
PRESIDENT OF THE GIUNTA REGIONALE	**REGIONAL**	Coordinates public services on regional level; coordinates and controls investment activities and infrastructure rehabilitation region	Prevision Define risk map and regional specification of national rule and guideline Preventive measures Implement system of civil protection ONG Civil Protection Meteorological – Hydrologic Centre declares a state of emergency levels The President of the Giunta Regionale and Regional offices manage civil protection ONG and ensures regional resources to help the district and municipality
PREFECT - PRESIDENT OF THE METROPOLITAN AREA GOVERNMENT AND/OR THE GREAT AREA	**DISTRICT**	Representative of the Government (appointed by the Prime Minister) on territorial level Coordinates the ministerial and inter – ministerial agencies and organizations in the territory and provides the enforcement of the public policies on local level	The Prefect is responsible for managing national resources available on the district area; for law and order and public security. He takes decisions through official orders and is entitled to exercise the right of subsidiarity on the involved Municipalities if it is requested by the situation As President of the metropolitan area government and/or the great area is responsible for managing resources available at this level; transport and viability issues; infrastructures and service network.
MAYOR	**LOCAL**	represents the local government	Preventive measures Define Emergency plan Implement warning, training, and dissemination actions First answer to emergency. The Mayor takes over the coordination of relief to assist people in early interventions by implementing the emergency plan provisions. Besides, he puts effort to get the population informed on how to behave and on the way the situation evolves

Table 18: FRM governance structure in GENOVA

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4.5.4 CMVNF flood management governance structure

The structure of civil protection in Portugal is organized on three levels: national, district and municipal. At municipal level, institutional coordination is ensured by the CMPC - Municipal Civil Protection Commission. As defined in article 40 of Law no. 27/2006, on July the 3rd, in each municipality there is a Municipal Civil Protection Commission, being the structure responsible for the management of the operational participation of each force or service in the relief operations to be triggered before a flood situation. As for the operational command this is assured at the municipal level by the COM - Municipal Operational Commander. As the first level to act in the event of a major accident or catastrophe, the municipal level plays a very important role in the structure of operations, so that its organization is so crucial to success in Civil Protection operations.

The articulation between the district and municipal level is promoted, at the level of services, by the CDOS - District Command of Relief Operations of Braga (district level) and by the Municipal Service of Civil Protection of Vila Nova de Famalicão (municipal level); At the operational level, by CODIS - Operational Commander of the District of Braga and by the COM - Operational Commander of Vila Nova de Famalicão.

The mayor of Vila Nova de Famalicão is responsible for the convening of the CMPC, being replaced in his absence or impediment by his legal substitute. It is the responsibility of the CMPC to activate the PMEPCVNF - Municipal Emergency Plan for Civil Protection of Vila Nova de Famalicão.

The PMEPCVNF was designed to organize, facilitate, streamline and standardize response actions in the event of a major accident or catastrophe, with the aim of contributing to minimizing negative effects, as well as, Life of affected populations.

The implementation of the PMEPCVNF aims to provide, through a planned response, the conditions and means necessary to minimize the effects of a major accident or catastrophe by organizing operations in two phases: Emergency and Rehabilitation.

The emergency phase comprises in actions taken immediately following a major accident or catastrophe, characterized by a rapid and concerted response in order to minimize the consequences on citizens, assets and the environment. It will be necessary to mobilize various resources, both public and private sectors, in this regard the following criteria for mobilization should be considered:

- the involvement of all human and material resources that civil protection have and are deemed as necessary in the recovery situation;
- when a high number of victims or victims with high severity are reported, the presence of INEM is requested (National Institute of Medical Emergency);
- due to an inexistence or insufficiency of means considered necessary to control the situation in the county, the CDOS in Braga will be requested to send reinforcement to the municipality of Vila Nova de Famalicão.

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Alarm level	Alarm level definition according to relevant law for the pilot city	Law or other legal normative that defines alarm levels	Brief alarm level description
GREEN	Small number of injuries but no fatalities. Some hospitalizations and withdrawal of persons for less than twenty-four hours. Some support staff and necessary reinforcement. some damage. Disruption (less than twenty-four hours). Small impact on the environment without long lasting effects. Some financial loss. *According to Directive nº1/ National Civil Protection Authority /2007*	*Directive nº1/ National Civil Protection Authority* /2007	Level of gravity: REDUCED
YELLOW	Medical treatment necessary, but no fatalities. Some hospitalizations. Evacuation of people for a period of twenty-four hours. Some technical staff required. Some damage. Some disruption in the community (less than twenty-four hours). Small impact on the environment without long lasting effects. Some financial loss. *According to Directive nº1/ National Civil Protection Authority /2007*		Level of gravity: MODERATE
RED	High number of injuries and hospitalizations. High number of removal of people for more than twenty-four hours. Fatalities. External resources required to support the support staff. Significant damage requiring external resources. Partially working community with some services unavailable. Some impacts in the community with the long-term effects. Significant financial loss and required financial assistance. *According to Directive nº1/ National Civil Protection Authority /2007*		Level of gravity: HIGH
PURPLE	Critical situation. Large number of injuries and hospitalization. Withdrawal of persons on a large scale by a long term. Significant number of fatalities. Support staff and necessary reinforcement. The community´s no longer able to function without significant support. Significant environmental impact and or permanent damage. *According to Directive nº1/ National Civil Protection Authority /2007*		Level of gravity: CRITICAL

Table 19: FRM alarm coding in CMVNF

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Given that various inherent risks in the county of Vila Nova de Famalicão, it becomes crucial to define scenarios that provides a clear image of the potential damage that a particular risk can cause. In this sense, the following scenarios take into account the risks that may presumably occur in the municipal territory, identifying both the entities involved priorities for action and the measures adopted on the basis of foreseeable damages against the established scenarios. The planned scenarios combine the following variables - gravity, probability, which give rise to a risk matrix according to the provisions of Directive nº1/ANPC/2007.

	Execution	***Operational Command***	***Institutional Coordination***
Nacional Level	*ANPC -National Civil Protection Authority*	*CNOS - National Relief Operations Command*	*CCON -National Operational Coordination Center*
Regional Level		*CADIS - District Arrangement Commander*	*CADIS - District Arrangement Commander*
District Level		*CDOS - District Command of Relief Operations*	*CCOD - District Operational Coordination Center*
Municipal Level	*SMPC - Municipal Service of Civil Protection*	*COM - Municipal operational commander*	*CMPC - Municipal Civil Protection Commission*

Figure 2: Synoptic structure of the decision making process in flood management in CMVFN

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Institution/authority	*Level (central/ regional/local/other)*	*Main prerogatives*	*Specific roles in flood management (prevention, intervention, restauration)*
ANPC- National Civil Protection Authority	NATIONAL	Adopts the politics and strategies for understanding, preventing and managing emergency situations and to limit their effects	Coordinate management of emergency situations - including floods
CCOD - District Operational Coordination Center	REGIONAL	Assesses, at regional level, the emergency situations caused by floods, establishes specific measures and actions to address them and follows their fulfillment	To permanently monitor protection and relief operations; Assume coordination of rescue operations.
SMPC (Municipal Civil Protection Service) Vila Nova de Famalicão	LOCAL	Assesses, at local level, the emergency situations caused by floods, establishes specific measures and actions to address them and follows their fulfillment	Ensure warnings to the population; Provide means, resources and personnel for the operational response; Set self-protection measures; Support in the recognition and field guidance.
CMPC -Civil Protection Municipal Commission	LOCAL	Ensure coordination between all entities and institutions involved in emergency operations	Activate the PMPCVNF Achieve greater operationality and coordination of civil protection agents.
Municipal Operational Commander	LOCAL	Promote the preparation of previous intervention plans	To permanently monitor protection and relief operations; Assume coordination of rescue operations.

Table 20: FRM governance structure in CMVNF

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4.5.5 IP TULCEA (Danube Delta) flood management governance structure

At county level, the professional public communitarian services for emergency situations is represented by the Inspectorate for Emergency Situations Tulcea subordinated from methodological point of view to the General Inspectorate for Emergency Situations (GIES) and provide - in their areas of competence - guidance and control of prevention and management of emergencies.
To handle inter-ministerial and cross-cutting coordination, the County Committee for Emergency Situations is led by the county prefect and local committees are chaired by the mayor and endorsed by the prefect. Inter-agency coordination during flood emergencies is managed by a person (action commander) nominated by County Committee, depending on the nature or the extent of the event or on the number of forces involved. This task is usually performed by the Chief Inspector of the Inspectorate for Emergency Situations Delta Tulcea.
County Emergency Committee:
a) declares, with the approval of the Minister of Administration and Interior, the state of alert at the level of the county or in several localities in the county, in the endangered areas and checks the permanence of the local committees;
b) ensures through the Operational Center of the County Inspectorate for Emergency Situations, the transmission of the warnings and forecasts to all the localities and the objectives in the affected areas and follows the measures taken by the local committees, the flood defense worksholders, the specialized economic operators, the polluting units , etc .;
C) it has the permanent follow-up of the evolution of the specific risk factors and informs through operational reports the Ministerial Committee through the Technical Support Group and the National Committee on the concrete situation in the field;
d) concentrate the means and forces of intervention in critical areas to strengthen or upgrade the hydrotechnical works, remove ice blockages from watercourses, combat accidental pollution, help Local Committees in actions to limit the effects of floods, dangerous meteorological phenomena, accidents at hydrotechnical constructions and accidental pollution;
e) ensure the technical coordination through the Technical Support Groups of the operative intervention actions;
f) executes the evacuation and salvage of persons, material goods and animals; g) provide accommodation, food, water and medical care for the sinful population;
h) ensures the housing, feeding and veterinary assistance of the evicted animals, in case of exceeding the local Committees' intervention capacity.
The Local Committees for Emergency:
a) ensure the permanent presence at the City Hall in order to receive the hydrometeorological forecasts and warnings, the decisions of the County Committee and the transmission of the information regarding the evolution of the dangerous phenomena, their effects, the measures taken and the necessary additional measures;
b) use all available means to prioritize the population and the objectives in flood risk areas from flooding, leakage and hydrotechnical accident as defined in local defense plans, such as and the population in risk areas for the production of dangerous weather and accidental pollution; (
c) trigger operational defense actions in endangered areas, in accordance with the provisions of approved defense plans, consisting mainly of:
• permanent surveillance of risk areas;
• directing forces and means of intervention;
• consolidation of dams and banks, according to the maximum predicted levels;

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• preventive evacuation of humans and animals and the safe disposal of goods that can not be discharged by elevation or by anchoring;
(d) take measures to avoid or eliminate flood and ice-blocking, especially in road and railway bridges, water intakes, outflows of enclosed water;
e) ensures the participation of the local intervention forces in the operative actions carried out by the specialists of the flood defense workshops;
f) locate overflowing waters as well as those from infiltrations and leaks from the slopes and guide them in the watercourses, gravity or pumping;
g) provide additional sources for water supply to the population in periods of deficiency.

Alarm level	Alarm level definition according to relevant law for the pilot city	Law or other legal normative that defines alarm levels	Brief alarm level description
YELLOW	Meteorological phenomena temporarily hazardous to certain activities but otherwise customary for that period or specified area. It is recommended to regularly monitor the evolution of meteorological phenomena for details on the intensity of phenomena in the coming days. The yellow code is similar to a weather alert. *According to ORDER no. 823 of 15th August 2006 to aprove warning and coding procedures of meteorological and hydrological allert.*	*Order nº 823 of 15th August 2006 to aprove warning and coding procedures of meteorological and hydrological allerts.*	ATTENTION
ORANGE	Applied to meteorological phenomena foreseen to be dangerous, with a high degree of intensity. (2) The orange and red codes shall be similar to a weather warning and the weather reports issued twice a day (morning and afternoon) shall explain the atmospheric phenomena of the orange and red codes, specifying the evolution of the phenomena specified, their spatial coverage, Intensity and duration. *According to ORDER no. 823 of 15th August 2006 to aprove warning and coding procedures of meteorological and hydrological allert.*		FLOOD SITUATION
RED	The red code applies to those meteorological phenomena foreseen to be dangerous, of a very high intensity and with disastrous effects. (2) The orange and red codes shall be similar to a weather warning and the weather reports issued twice a day (morning and afternoon) shall explain the atmospheric phenomena of the orange and red codes, specifying the evolution of the phenomena specified, their spatial coverage, Intensity and duration. *According to ORDER no. 823 of 15th August 2006 to aprove warning and coding procedures of meteorological and hydrological allert.*		HAZARD SITUATION

Table 21: FRM alarm coding in IP TULCEA pilot

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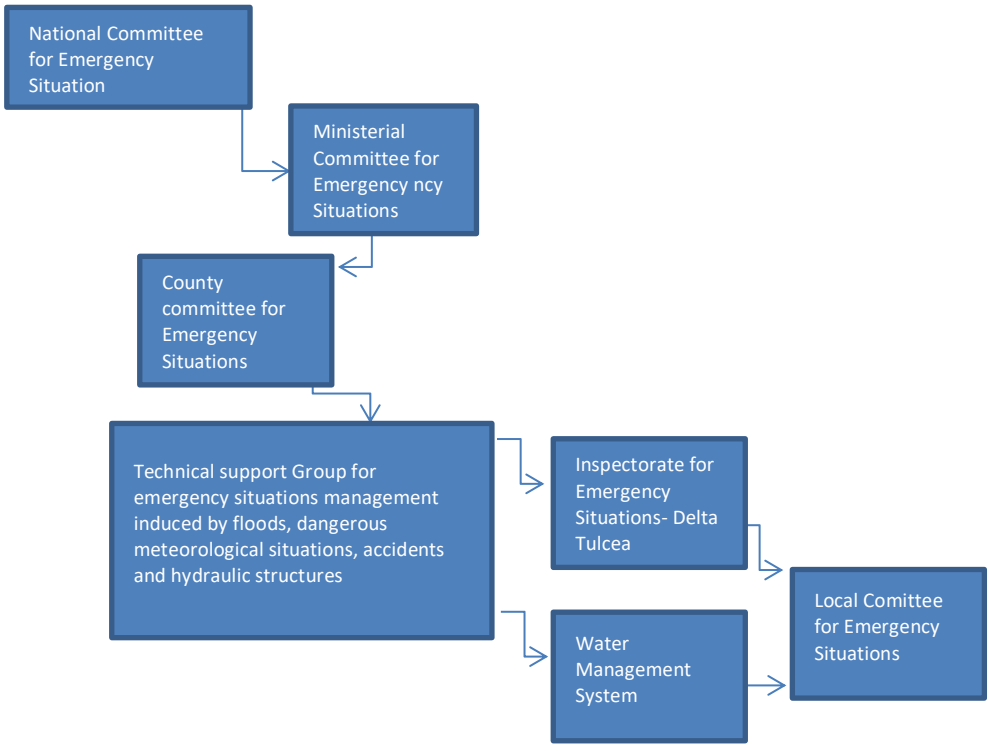

Figure 3: Synoptic structure of decision making process in flood management in IP TULCEA

Institution/authority	Level	Main prerogatives	Specific roles in flood management
National Committee for Emergency Situations Ministry of Waters and Forests	Central	Adopts the politics and strategies for understanding, preventing and managing emergency situations and to limit their effects	Coordinates the management of emergency situations -including floods;
Romanian Waters National Administration	Central	Carries out the national policy in the areas of water and forest management, fulfilling the role of State authority and coordinates and controls in these areas, either directly or through specialized technical bodies, authorities or public institutions under the control of, or under the authority of the Ministry of coordination.	Continuous monitoring and assessment of risks, threats and vulnerabilities of competence; Development and implementation of national strategy, coordination, monitoring and international cooperation regarding the management of flood risk;
	Central	Protection and sustainable use of water resources, natural monopoly of strategic interest, the management of the national network of hydrological, hydro geological measurements and quality of water resources belonging to the public domain	Applies the strategy for defense against floods; Makes the plans for defense against the flood for each river basin in Romania; Manages the water management works in the public domain of the state, whose role is the defense against floods;

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		Administrates the National System of water management	
Dobrogea-Litoral Water System	Basinal	Responsible for (regional) cross boundary cooperation and flood protection infrastructure Responsible for (regional) cross boundary cooperation and flood protection infrastructure	Play a key role in the management of water related emergencies through its units at the county level, assists local and regional public administrations in the development of emergency plans
County Committee for Emergency Situations	Regional	Assesses, at regional level, the emergency situations caused by floods, establishes specific measures and actions to address them and follows their fulfillment	With the help of the Technical Support Group elaborates flood defense plan coordinates, at regional level, actions for managing the emergency situations caused by floods elaborates flood defense plan
Local Committee for Emergency Situations	Local	Assesses, at local level, the emergency situations caused by floods, establishes specific measures and actions to address them and follows their fulfillment	important role in prevention and intervention: elaborates flood defense plan, elaborates flood defines plan

Table 22: FRM governance structure in IP TULCEA pilot

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4.5.6 Bilbao flood management governance structure

The organizational structure of the Bilbao Municipal Emergency Plan is based on the existence of three well-differentiated bodies. Each of them has clearly assigned its functions, within the structure and operation of the PEMU. It is based on a coordinated action involving different levels of the organization, in order to adopt the measures leading to an effective protection of the population.

The bodies involved are the following:
1. **Governing Board** - It is responsible for decision making in an emergency situation. It consists of three essential components:

- Director of PEMU or the maximum responsible - the Municipality's Mayor, or a replacing person, assuming the following roles in flood management processes:

Declare the emergency situation.
Activate the Emergency Plan, determining the overall strategy of operations.
Activate PEMU organizational structure, as well as members of the Advisory Committee.
Constitute the Municipal Operational Coordination Centre (CECOPAL) and Action Groups may be required.
Manage the PEMU and the measures to be taken in each of the existing situations.
Decide the mobilization of the necessary means and resources of the municipal administration and, if necessary of the privately ownership. Ensure the link with higher level plans: regional and national.
Inform the higher level and, if necessary, request the activation of higher-level emergency plans if necessary, or the mobilization of state resources that were not initially assigned to the PEMU.
Determine the information to the population, both the info designed to adopt protection measures and the general associated with the event.
Declare the end of the emergency and return to normal.
Guarantee the assistance and attention to the victims, protection to the population, the environment, the property and the attached personnel to the PEMU.
Maintain the effectiveness and updating of PEMU in non-emergency situations.

- Advisory Committee or management support team. In this Committee different Councilors are responsible for the areas of the City Council, assuming the following roles

Analyze the emergency situation caused.
Advice the Director of PEMU on all matters related to the emergency, both in the technical and legal aspects.
Act as an auxiliary Board.

- Press Office, responsible for emergency information, both to people involved and to the general public (Head of Press of City Council), assuming the roles:

Disseminate the orders, instructions and recommendations issued by the Director of PEMU through the means of social communication relevant.
Centralize, coordinate and prepare the general emergency information, according to the Director of PEMU, and make it available to the media.
Report on the emergency.
Obtain, centralize and provide all information on family contacts, paging and data relating to potential evacuated and relocated.
Attend representatives of the media.

2. **Coordination Board**. This Board is constituted by the Municipal Operational Coordination Centre (CECOPAL).

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In this case it is composed by:

- Operational Coordination Room (SACOP).
- Transmissions Center (CETRA).
- Information Center (CIN).

Bilbao Municipal Operational Coordination Centre (CECOPAL).The coordination element of PEMU for the direction and control of emergency operations is called Municipal Operational Coordination Centre (CECOPAL).It is defined as the management system of all the elements involved in the resolution of the emergency. It is the link between the Executive Board and Action Groups. The CECOPAL is the headquarters where the Executive Board is located, providing all necessary infrastructure for the coordination of the actions. The CECOPAL centralizes all the information on the evolution of the emergency and the actions taken to control them, setting priorities and transmitting to the other bodies the necessary orders.

3. Executive Board

It integrates the means that intervene directly in the actions, both logistically and operationally. It is composed of the Technical Director of Operations, the Action Groups and the Advanced Control Posts. It is the control organ of the emergency, and is made up of the Technical Director of Operations, the various Advanced Control Posts and the so-called Action Groups. The Technical Director of Operations will be directly appointed by the Director of the PEMU, according to the type of emergency that happens. He will normally be the Director of the area or service most involved in the emergency. The implementation of the measures and actions planned for the development of the Emergency Plan are structured through the so-called Action Groups. The Action Groups are responsible for regular operational services and are designed to act in a coordinated way under a single direction within the framework established by the PEMU. The functions of those responsible, leaders and members of the different Action Groups, as well as the material and special resources that are mobilized, described in the PEMU, can be modified and expanded, in order to find a greater operational capability and effectiveness of the PEMU, or when changes occur in the organizational structures involved in it. These modifications and extensions shall be established by the Director of the PEMU. For the development of functions the Action Groups shall act in coordination with each other through CECOPAL It is the Manager centre near the place of emergency, from which the actions of the Action Groups are directed and coordinated, according to the orders issued by the Director of the PEMU. The performance of the professionals in emergencies is characterized by being homogenous groups that operate framed with their Manager, with different actions before the emergency.

Alarm level	Alarm level definition according to relevant law for the pilot city	Law or other legal normative that defines alarm levels	Brief alarm level description
YELLOW	No weather risk for population in general but there is some risk for specific activities (usual but potentially hazardous weather phenomena) These may be repeated several times a year. This is an alert level, not a warning level. *According to Resolution N_ 3/2015, of the government and parliament relations secretary, setting the publication of the agreement made by the governing council to approve the Basque*	*Resolution N_ 3/2015, of the government and parliament relations secretary, setting the publication of the agreement made by the governing council to approve the Basque country special flood risk emergency plan.*	WARNING

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	country special flood risk emergency plan.		
ORANGE	Significant weather risk. These orange level situations take place very few times a year, normally just once. Damages, in particular to certain sectors start to be significant and the physical integrity of people is in danger. It generates a warning situation. According to Resolution N_ 3/2015, of the government and parliament *relations secretary, setting the publication of the agreement made by the governing council to approve the Basque country special flood risk emergency plan.*		ALERT
RED	Extreme weather risk (unusual weather phenomena of exceptional intensity. *According to Resolution N_ 3/2015, of the government and parliament relations secretary, setting the publication of the agreement made by the governing council to approve the Basque country special flood risk emergency plan.*		ALARM

Table 23: FRM alarm coding in BILBAO

Operational Group / Organization	*Members, participants*	*Mobilized by*
FLOOD WARNING SYSTEMS	EUSKALMET, National Institute of Meteorology (INM) Hydro meteorological control network Civil Works and Services	Automatically
ALERT RECEIVING CENTER	Civil Protection SOS Deiak (112) Citizen Security	Automatically
COORDINATION BOARD (CECOPAL)	Safety and Security Area	Automatically
GOVERNING BOARD	Director of PEMU, Councilors and Press office	PEMU Director
EXECUTIVE BOARD	Technical Director of Operation Responsible of Action Groups Advanced Control Posts (PMA)	PEMU Director
INTERVENTION GROUP (Action groups)	Firefighters Civil Protection	Executive Board
Health Group (Action groups)	Municipal Medical Emergencies. Municipal Health Services.	Executive Board

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TRANSMISSION GROUP (Action groups)	Security Area	Executive Board
SECURITY GROUP (Action groups)	Citizen Security ERTZAINTZA (Basque Police)	Executive Board
LOGISTICS GROUP (Action groups)	Urban Planning Social Action Transports and Traffic Budget and General Services	Executive Board
ESSENTIAL SERVICES REHABILITATION GROUP (Action groups)	Civil Works and Services Transports and Traffic	Executive Board

Table 24: Actors and area of interventions in emergency situations in BILBAO

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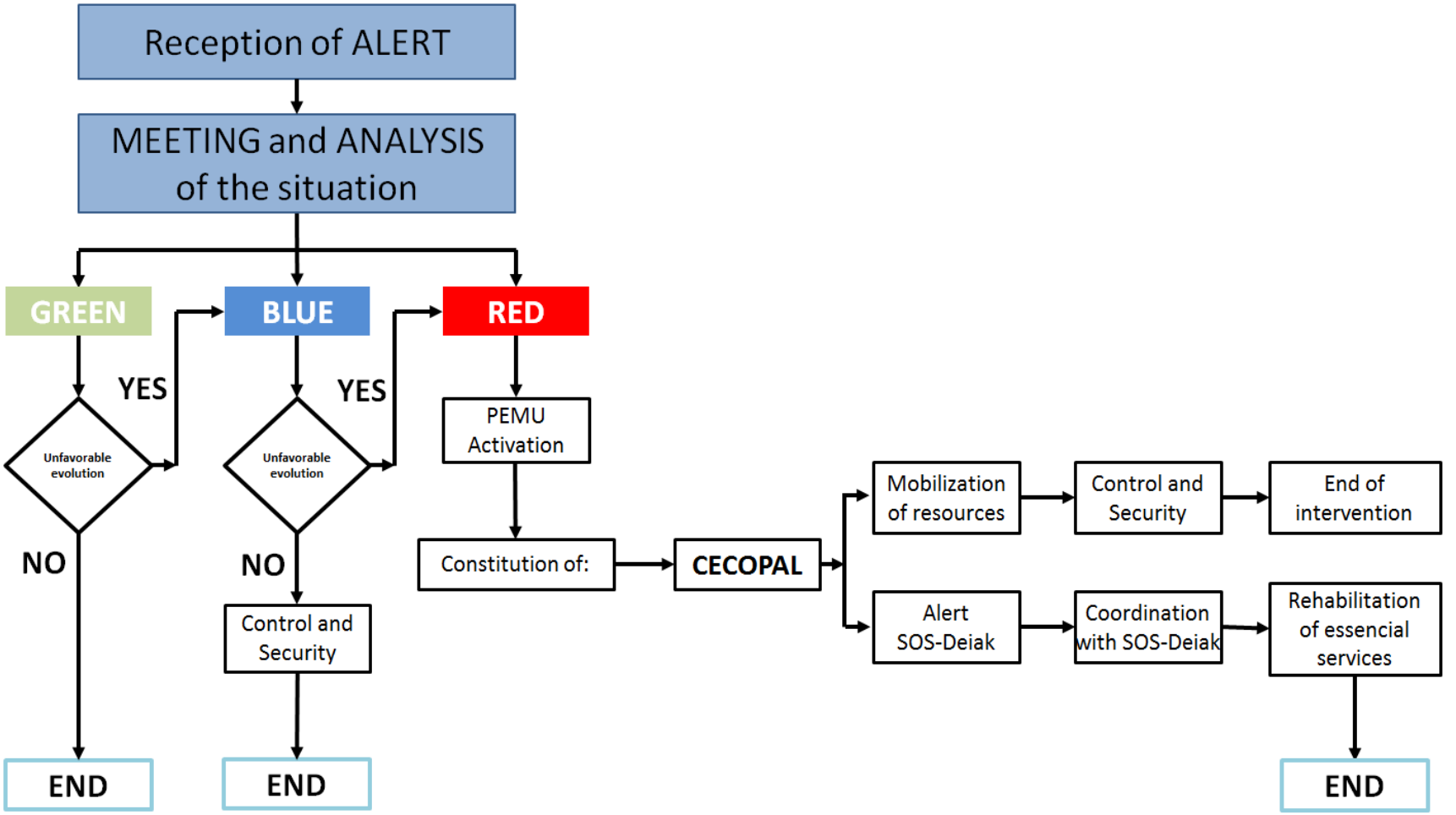

Figure 3: Synoptic structure of decision making process in flood management in BILBAO

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Institution/authority	Level	Main prerogatives	Specific roles in flood management
Mayor of the Municipality, Director of PEMU	LOCAL	Chief executive officer of the municipal government	**Governing Board** Chaired by the Director of PEMU or the maximum responsible. Declare the emergency situation. Activate the Emergency Plan, determining the overall strategy of operations. Constitute the Municipal Operational Coordination Centre (CECOPAL) and Action Groups may be required. Manage the PEMU and the measures to be taken in each of the existing situations. Decide the mobilization of the necessary means and resources of the municipal administration and, if necessary of the privately ownership. Ensure the link with higher level plans: regional and national. Maintain the effectiveness and updating of PEMU in non-emergency situations.
Municipal Operational Coordination Centre (CECOPAL).	LOCAL	The management system of all the elements involved in the resolution of the emergency	**Coordination Board** centralizes all the information on the evolution of the emergency and the actions taken to control them, setting priorities and transmitting to the other bodies the necessary orders
Technical Director of Operations	LOCAL	Director of the area or service most involved in the emergency	**Coordinator of the Executive Board -** Assist and inform the Director of PEMU of the progress of operations Move the orders of the Director of PEMU to the leaders of the Action Groups. Maintain the necessary coordination between the different Action Groups to facilitate their work. Ensure the availability of the resources and resources requested, coordinating their use. Coordinate the reception and broadcast of the messages that are transmitted through the Transmissions Center **prevention, intervention, restauration**

Table 25: FRM governance structure in BILBAO

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4.5.7 Bratislava flood management governance structure

BSK competence –as results in Act nr. 7/2010 Coll. on flood protection

Self-Government Territorial Unit cooperates with the authorized persons with the administrator of important water flows, with the state water authorities and municipalities with the production, review and updating of the preliminary flood risk assessment, and parts of flood risk management plans relating to the territory of the higher territorial unit

- uses the preliminary flood risk assessment, flood hazard maps, flood risk maps and information on the designated floodplains for the determination of spatial arrangement and functional use of land in the planning processes;
- participate in coordination with the district office at the county, district authorities and municipalities in the preparation and control of flood protection measures;
- cooperate with district offices at the county plan on compiling flood County;
- participate in solving the problems of ensuring protection against floods, affecting several municipalities, as well as to solve problems that arise during the floods and the reconstruction of the area affected by floods;
- develop regional management of road conditions for fulfilling its tasks in the field of flood protection;
- approve the plan patrol service of the regional administration of roads, cooperate with organizations that provide or mediate humanity, the material or financial assistance to municipalities and citizens affected by floods;
- fulfils tasks during an emergency under a special regulation;
- evaluates flood damage to property in their ownership, management or use of flood damage and evaluated by the Regional Office for the Environment.

Alarm level	Alarm level definition according to relevant law for the pilot city	Law or other legal normative that defines alarm levels	Brief alarm level description
YELLOW-	Flood alert level I is declared a) when water level or water flow is reached as defined in the flood plan and in case of rising water level b) the water level is rising and it can be expected to reach the water bed line in case of undiked watercourse, *according to art 11 of Act No. 7/2010 Coll. on protection against floods as amended*	*Act No. 7/2010 Coll. on protection against floods as amended*	Flood alert I
ORANGE-	Flood alert level II is declared a) when the water level of water flow defined in the flood plan is reached and when the water level is rising; on undiked watercourse, if the water level in the water bed reaches the bank line and is rising, b) during melting of snow, if according to the	*Act No. 7/2010 Coll. on protection against floods as amended*	Flood alert II

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	information provided by the flood forecast service it is reasonable to expect rapid increase of water level, c) when objects carried by water create a barrier in the water bed at the bridge or sluice, and there is a danger of obstruction of the flow profile and overflow of the water from the water bed, d) in case of ice drifts at higher sections of the watercourses within the river basin, when ice block can be expected resulting in water overflowing from the waterbed of the watercourse, e) in case of internal water ice and freezing of water within the effective flow profile, when water is expected to overflow the water bed; the effective flow profile is the part of the flow profile, where the water is flowing in the direction of drainage, f) in case of internal water, if pumping of water maintains maximum level of internal waters specified in the water construction operating regulations. *According to art 11 of Act No. 7/2010 Coll. on protection against floods as amended*		
RED-Flood	Flood alert level III is declared a) when water level or water flow defined in the flood plan is reached, b) on undiked watercourse when the flow exceeds the capacity of the water bed, when the water is flooding the adjacent areas and may cause flood damage, c) on diked watercourse, when water level is lower than the water level defined for flood alert level III if the flood alert level II is lasting for extended time or the dike is starting to leak or if there are other serious circumstances that may possibly cause flood damage, d) when objects carried by water create a barrier in the water bed at the bridge or sluice, and the water is overflowing the water bed and may cause flood damage, e) in case of ice drifts on the watercourse or in a reservoir if there is a direct danger of ice block, obstruction or when the block or obstruction already began to appear and the water is overflowing from the waterbed of the watercourse	*Act No. 7/2010 Coll. on protection against floods as amended*	alert III

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	and may cause flood damage, f) in case of internal water, if with full capacity of the pumping station and its continued operation, the water level is rising over maximum level defined in the operating regulations of the water construction, g) in case of flash flooding of extreme intensity, h)when the area is flooded from the waterbed of the watercourse under the water construction as a result of malfunction or an accident of the objects or facilities of the water construction. *According to art 11 of Act No. 7/2010 Coll. on protection against floods as amended*		

Table 26: FRM alarm coding in BSK pilot

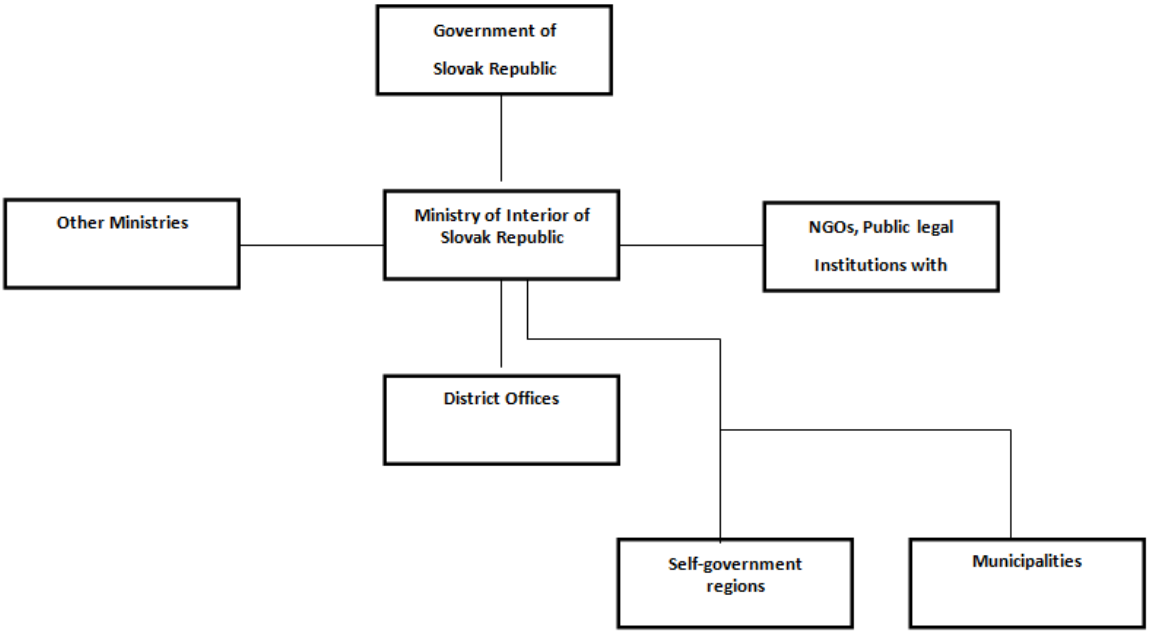

Figure 4: Synoptic structure of decision making process in flood management BSK

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Institution/authority	*Level*	*Main prerogatives*	*Specific roles in flood management*
Ministry of the Interior	CENTRAL	Establishes internal affairs policies	Responsible for the administration of civil protection in cooperation with public authorities and municipalities. The Section on Crisis Management and Civil Protection also cooperates with public and legal institutions and civil/humanitarian associations. The MoI participates in rescue operations and evacuation in situations that are stipulated in the Act on Civil Protection
Ministry of Environment	CENTRAL	Establishes environmental policies	Ensures the preparation of flood risk management plans through the administrator of watercourses important for water-management
Slovak Hydro meteorological Institute		Manage, implement and provide specific services	Monitoring the quantity and quality parameters describing the condition of air and water on the territory of the Slovak Republic, Gathering , validation, evaluation, archiving and interpreting data and information about the condition and regime of air and water, Providing data and information about the condition and regime of air and water, Studying and describing the activities in atmosphere and hydrosphere.
District authorities	DISTRICTUAL	Manage resources allocated on districtual level and enforces national policies	Ensuring public order within the territory affected by flooding, provisional traffic access to the areas cut off by flooding, including the construction of provisional bridges or footbridges, disinfection of wells, septic tanks, living areas and removal and disposal of dead animals and other waste, removal of flood deposits from houses and other objects, public areas and from roads, securing of damaged constructions against collapse or their removal, other

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			operations required to protect health, property, cultural heritage and environment
Mayor	LOCAL	Manage local resources	Develop analyses of possible emergencies, plan the protection of the population, organize and control civil protection training, control rescue operations, plan, control and declare evacuation.

Table 27: FRM governance structure in BSK

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5. Flood-serv Pilots and flood risk management evolution in European funded projects approaches

Starting with the financial funding exercise 2007-2013 (which coincides with the Floods Directive issuing year), continuing with 2014-2020 cycle, the pilots were involved in a plurality of European funded projects, relevant to the flood risk management approach. Outside the purpose of providing an inventory or a ranking of these projects, we organized the following projects in order to focus on the specific problems and outputs. If we analyse the problems solved (or intended to solve) and the corresponding year, we observe that the interests of the administration/community/stakeholders, from practical needs solving, to research and explore long term approaches, such as vulnerability assessment and unified strategies. It is also a sample of a concept evolution from flood management (stay safe) →to risk management (avoid)→ to flood resilience (embrace the unavoidable).

Project Title	Financing programe	Scope/Objectives	Problems solved	Status and implentation period
RESILIENZA 141 http://www.comune.genova.it/content/progetto-resilienza-141-0	National Civil Service	Risk mitigation - Search and monitor flood risk vulnerabilities in order to improve the safety conditions of the citizens exposed at this risk	Processing the data of the vulnerability detection card in order to put in place some risk mitigation measures, as well to facilitate the communication and information about the flood risk.	2016-2017
ANYWHERE http://www.comune.genova.it/content/presentazione-progetto-anywhere	Horizon2020 - DRS1 - Secure Societies	Improving risk analysis; encouraging self-defense behaviors, very important in flood risk; improving coordination between the various insitutions (data and informations sharing).	Creation of a multi-risk platform (products and services) improving the management of emergencies and strengthen the response capacity of local and regional authorities in case of emergencies caused by extreme weather events.	2016-2019

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RESIN http://www.resin-cities.eu/home/related-projects/	H2020-EU.3.7.	Develop standardised methodologies and decision support tools that cities can use to develop local adaptation strategies	Create a common unifying framework that allows comparing strategies, results and identification of best practices	2015-2018
DANUBE WATER INTEGRATED MANAGEMENT http://www.rowater.ro/Danube%20Water/Forms/AllItems.aspx	European Regional Development Fund	Establish a common Romanian-Bulgarian system for managing and controlling the Danube's water in extreme conditions caused by natural and technological disasters.	Vessel that has been equipped with a laboratory with modern equipment for quantitative and qualitative water measurements, sensors for monitoring and drilling sections, as well as equipment for equipping hydrometric stations and laboratories in the common area of the Danube.	Finalized /2012-2015
WATMAN - Information System for Integrated Water Management http://www.rowater.ro/Danube%20Water/Forms/AllItems.aspx	Operational Programe-Environment, Cohesion Fund	The overall objective of the project is to provide an effective tool for authorities responsible for flood management to limit the damage caused by major risk (floods, accidental pollution) in order to protect the population and its assets.	Modernized decision-making systems for operational actions during and after floods; Optimization of the control in the coordination of hydro-technical constructions; Enhanced and integrated hydrological data by collecting more data in river sections where hydrological stations do not exist at this time; More accurate forecast of floods and pollution over a short period of time using the data collected.	Finalized 2013-2016

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DANUBE FLOODRISK **file:///F:/WP3_4/Danube%20Floodrisk%20Final%20Report.pdf**	Transnational Cooperation Programe	Develop and produce high quality, stakeholder oriented flood risk maps for the Danube river floodplains	Methods and solutions for the most cost-effective measures for flood risk reduction: risk assessment, risk mapping, involvement of stakeholders and risk reduction by adequate spatial planning. DANUBE FLOODRISK Atlas of hazard and risk maps,	Finalized 2009-2012

Table 28: Flood risk relevant projects with EU funding

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6. Conclusions

This report provided an analysis of the regarding the legal framework, regulation and organization of flood risk management, contingency planning and response functions in the selected regions, in order to provide key country and local characteristics and differences of the governance structure of the flood risk management. In particular. The section dedicated to allowed to draft a clear image of the organizational structure in implementing the requirements of the Flood Directive in Italy, Portugal, Romania, Spain and Slovakia, in order to provide a basis for the technical components analysis, designed to improve the effectiveness of the decision making intruments.

We focused on the general framework- Floods Directive, and narrowed the analysis as we approached the national/territorial/district/local levels. The report brought out to light the similarities and specificities, which would enable the technical partners to evaluate the current emergency management system prototype, identify the gaps of the former and the end user requirements.

Regulatory models analysis can be used for a better understanding of opportunities and constraints in the design and validation of applications and helps to identify the relations among takeholders and the allocation of responsibility.

We identifyied which institution or administrative structure has the responsibility of providing information and managing communication flows and establishes the implementation instruments. European context and the national regulatory models analysis contributes to understanding the opportunities and constraints to be taken into account in designing and validation of applications. The administrative architecture provides a clear image of the responsibilities, inter-operability, and communication flows between different layers of administration. We identified different layers of administration, both horizontally or vertically oriented, similarities in adopting applied methodology for flood risk management for both territorial and local administrative authorities.

Exploration of the Floods Directive three stages, provided an insight of the pilots natural constraints and contributed to identify the characteristic flood type and the limitations of the European regulation, due to the lack of unitary methodologies in elaboration of the flood risk /hazard maps and the flood management plans.

Different governance structure indicates a common characteristic of the implementation of Floods Directive, regarding the approach of the environmental policies, shifting from centric models to sub-national model, demonstrated by the presence in the decision and communication flow of inter-institutional structures.

The next assessment of Floods Directive (Water Frame Work Directive, also) will be made in 2019, when it is expected that the approach on risk management to continue in parallel with an integrated assessment of the climate change and city resilience, in response to the post 2016 Paris Agreement initiatives.

In Italy there is lack of unitary methodology applied for different levels of flood risk and flood hazard maps, and the explanations on how to use the maps are insufficient for the public .In Portugal, flood risk reduction is implemented across multiple stakeholders, namely central

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administration, local level, private sector, research institutions and NGOs and the affected population is only visible if the hazard map is zoomed in to at least the 1:200,000 scale. The Romanian maps lack of proper legend indicating the number of persons represented by the icons. *Most of the Spanish portals have limited appeal and usefulness for potentially interested users (they currently focus more on the exchange with technicians from other administrative bodies than providing information to the interested public). In Slovakia, all floods are assessed in total i.e. there is no difference on the maps between flood sources and flood mechanisms. The indication of consequences of floods on the status of water bodies are missing. Information about impacts on cultural heritage is scarce.*

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