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First Flood Risk Management Plans - Member State: Romania

Accompanying the document

REPORT FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT AND THE COUNCIL

on the implementation of the Water Framework Directive (2000/60/EC) and the Floods Directive (2007/60/EC)
Second River Basin Management Plans
First Flood Risk Management Plans

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Acronyms

APSFR	Areas of Potential Significant Flood Risk
EEA	European Environment Agency
FD	Floods Directive
FHRM	Flood Hazard and Risk Map
FRMP	Flood Risk Management Plan
NGO	Non-Governmental Organisation
NWRM	Natural Water Retention Measures
PFRA	Preliminary Flood Risk Assessments
RBD	River Basin District
RBMP	River Basin Management Plan
UoM	Unit of Management
WFD	Water Framework Directive
WISE	Water Information System for Europe

Introduction

The Floods Directive (FD) (2007/60/EC) requires each Member State (MS) to assess its territory for significant risk from flooding, to map the flood extent, identify the potential adverse consequences of future floods for human health, the environment, cultural heritage and economic activity in these areas, and to take adequate and coordinated measures to reduce this flood risk. By the end of 2011, Member States were to prepare Preliminary Flood Risk Assessments (PFRAs) to identify the river basins and coastal areas at risk of flooding (Areas of Potential Significant Flood Risk – APSFRs). By the end of 2013, Flood Hazard & Risk Maps (FHRMs) were to be drawn up for such areas. On this basis, Member States were to prepare Flood Risk Management Plans (FRMPs) by the end of 2015.

This report assesses the FRMPs for Romania[1]. It assesses the FRMPs and Member State reporting to the European Commission in 2016. Its structure follows a common assessment template used for all Member States. The report draws on two main sources:

- Member State reporting to the European Commission on the FRMPs[2] as per Articles 7 and 15 of the FD: this reporting provides an overview of the plans and details on their measures
- Selected FRMPs: due to the high number of FRMPs prepared in Romania, the assessment focused on five of the 12 plans. As all FRMPs were prepared by a working group composed of specialists from Romanian Waters, the 11 River Basin Administrations and the National Institute for Hydrology and Water Management, it was expected that they followed a similar methodology. The selection of FRMPs sought to ensure coverage of the range of flood sources as well as relations with neighbouring Member States and third countries. The following FRMPs were assessed:
    - Danube Unit of Management (UoM) (RO1000). This FRMP was developed for the national sector of the Danube; it comprises several other UoMs but not the whole country and borders Bulgaria and Serbia.
    - Buzău – Ialomiţa UoM (RO5). This UoM has experienced significant flooding in recent years. It also borders Bulgaria.

[1] The present Member State assessment reports reflect the situation as reported by each Member State to the Commission in 2016 or 2017 and with reference to FRMPs prepared earlier. The situation in the MSs may have altered since then.

[2] Referred to as "Reporting Sheets" throughout this report. Data must be reported in a clear and consistent way by all Member States. The format for reporting was jointly elaborated by the Member States and the Commission as part of a collaborative process called the "Common Implementation Strategy": http://ec.europa.eu/environment/water/water-framework/objectives/implementation_en.htm
Whereas a key role of the Commission is to check compliance with EU legislation, the Commission also seeks information to allow it to determine whether existing policies are adequate. It also requires certain information to create a European-wide picture to inform the public.

- Dobrogea Litoral (RO6). This UoM is located in a coastal region, thus is subject to seawater floods. It borders Ukraine.
- Someș-Tisa (RO9). This UoM borders Hungary.
- Prut-Bârlad (RO11). This UoM borders with the Republic of Moldova;

Overview

Figure 1 Map of Units of Management/River Basin Districts



Source: WISE, Eurostat (country borders)

Romania has designated 12 Units of Management (UoMs) under the FD. Of these 12 UoMs, 11 cover individual catchments and correspond to the 11 River Basin Administrations under Romania's water management system; the 12th UoM, the Danube (RO1000) is not designated as a separate territory but rather linearly covers the banks of the Danube along seven other UoMs. In contrast, under the Water Framework Directive (WFD), Romania designated a single River Basin District (RBD), the Danube (also designated as RO1000): consequently, the Danube RBD covers the whole country and thus does not correspond to the territory of the Danube UoM, which only covers the Danube River's banks.

Romania prepared and adopted 12 FRMPs, one for each UoM, including the overarching Danube UoM (RO1000)[3]: this FRMP will be implemented by the National Administration "Romanian Waters" (ANAR in Romanian) together with seven UoMs whose territories include the Danube River banks: Banat (01), Jiu (RO2), Olt (RO3), Arges-Vedea (RO4), Buzău – Ialomiţa (RO5), Prut – Bârlad (RO11), Dobrogea – Litoral (RO6).

All FRMPs were coordinated at national level, with input from the individual River Basin Administrations, and consequently share the same approach and style. Romania's FRMPs were adopted by Government Decision no. 972 on 21 December 2016[4].

The table below gives an overview of all UoMs in Romania, including the UoM code, the name, and the number of APSFRs reported. It also shows if all documents required for each UoM were submitted to the European Environment Agency's (EEA) WISE[5] – the FRMP as a PDF and the reporting sheet as an XML.

Table 1 Overview of UoMs in Romania

UoM	Name	Number of APSFRs	XML reported	PDF Reported
RO1	Banat	46	Yes	Yes
RO2	Jiu	16	Yes	Yes
RO3	Olt	39	Yes	Yes
RO4	Arges-Vedea	34	Yes	Yes
RO5	Buzău–Ialomiţa	16	Yes	Yes
RO6	Dobrogea-Litoral	10	Yes	Yes
RO7	Mures	51	Yes	Yes
RO8	Cris	37	Yes	Yes
RO9	Somes-Tisa	37	Yes	Yes
RO10	Siret	54	Yes	Yes
RO11	Prut-Bârlad	35	Yes	Yes
RO1000	Danube	24	Yes	Yes
TOTAL		399		

The FRMPs can be downloaded from the following web page:

- http://www.rowater.ro/PMRI/Planul%20de%20Management%20al%20riscului%20la%20Inundatii.aspx?PageView=Shared

[3] Under the Water Framework Directive, Romania prepared 11 RBMP sub-plans at the level of the 11 River Basin Administrations and one RBMP at national level that is a synthesis of the 11 sub-plans.

[4] See: http://www.rowater.ro/PMRI/Planul%20de%20Management%20al%20riscului%20la%20Inundatii.aspx?PageView=Shared

[5] http://rod.eionet.europa.eu/obligations/603/deliveries?id=603&tab=deliveries&d-4014547-p=1&d-4014547-o=2&d-4014547-s=3

Overview of the assessment

The table below gives an overview of the evidence found during the assessment of the FRMPs. The following categorisation was used for the column concerning evidence:

- **Evidence to the contrary**: An explicit statement was found stating that the criterion was not met.
- **No evidence**: No information found to indicate that the criterion was met.
- **Some evidence**: Reference to the criterion is brief and vague, without a clear indication of the approach used for the criterion. Depending on the comment in the adjacent column, "some evidence" could also be construed as "weak evidence".
- **Strong evidence**: Clear information provided, describing an approach followed in the FRMP to address the criterion.

Table 2 Overview of the evidence found during the assessment of the FRMPs

Criterion	Evidence	Comments
FRM objectives have been established	Strong evidence	Romania has established nine common objectives at national level: these common objectives are presented in all five FRMPs assessed. The nine objectives cover four areas: economic, social, environmental and cultural heritage.
FRM objectives relate to...		
...the reduction of potential adverse consequences	Strong evidence	This is part of the common objectives found in all five FRMPs assessed. The objectives relate to avoiding and reducing adverse consequences to human health and safety, to economic development, the environmental and cultural heritage.
...to the reduction of the likelihood of flooding	Some evidence	Romania's objectives (operational objectives) call for the minimisation of flood risks and thus by definition at least cover both the reduction of potential adverse consequences as well as the reduction of the likelihood of flooding.
...to non-structural initiatives	No evidence	None of the objectives refer specifically to non-structural initiatives (but measures do).
FRM objectives consider relevant potential adverse consequences to...		

Criterion	Evidence	Comments
...human health	Strong evidence	One of the objectives is "Minimising the flood risk on life", the indicator being the number of inhabitants exposed to flood risk.
...economic activity	Strong evidence	Romania has three objectives in this area, one for economic activities, another on transportation infrastructure and the third for agricultural land.
...environment	Strong evidence	Romania has three relevant objectives. These refer to: protected areas where water is abstracted for human consumption; potentially polluting sites (including industrial facilities) and supporting the WFD's objectives.
...cultural heritage	Strong evidence	Romania has an objective on minimising the flood risk on the cultural patrimony.
Measures have been...		
...identified	Strong evidence	Romania has reported a total of 3 138 measures, covering all four aspects of flood risk management – prevention, protection, preparedness and recovery and review. The great majority of measures reported, 2 717 (87 % of the total) are for protection.
...prioritised	Strong evidence	Measures have been prioritised for each UoM in terms of their benefits to the nine flood risk management objectives and the costs. Several categories of measures, including at national level and some river basin level measures, were not prioritised.
Relevant aspects of Article 7 have been taken into account such as...		
...costs & benefits	Some evidence	As noted above, the prioritisation of measures incorporated cost and benefit elements. However, the five FRMPs assessed do not report details of the results.
...flood extent	Strong evidence	In the FRMPs, the flood extent is presented for each APSFR. According to the reported information, the information on the flood extent has been used to define the measures.

Criterion	Evidence	Comments
...flood conveyance	No evidence	No information was found in the five FRMPs assessed regarding consideration of flood conveyance.
...water retention	Strong evidence	Natural water retention measures (NWRM) are included in all FRMPs assessed. The measures include improving forest management in flood risk areas, as well as measures to restore retention areas (flood plains, wetland, etc). Indicators are identified for each NWRM measure presented.
...environmental objectives of the WFD	Strong evidence	All five FRMPs assessed describe in a separate section the effects that planned measures have on the environmental objectives of the WFD. Moreover, supporting the WFD's objectives is one of the environmental objectives of the FRMPs.
...spatial planning/land use	Strong evidence	The five FRMPs assessed all identify a series of national and river basin measures to address spatial planning and land use, among which the introduction of FHRMs in the Town Planning and Local Development Plans, the coordinated update of the County Land Use plans and creation of Area Land Use Plans for flood prone areas, correlated with the National Land Use Plan, based on FHRMs and the provisions of the FRMPs, and legal and technical regulations for all categories of (new) constructions that are built in flood risk areas.
...nature conservation	Some evidence	While several measures, notably the NWRM, may have positive impacts on nature conservation, the five FRMPs assessed do not refer directly to this topic.
...navigation/port infrastructure	Some evidence	The only reference to navigation found is related to the project under preparation "Danube sediment" (proposed by FRMP Danube RO1000, Danube being the sole navigable waterway), which will tackle issues related to navigation, among other things.

Criterion	Evidence	Comments
...likely impact of climate change	Some evidence	The five FRMPs include measures to study and address expected effects of climate change on the likelihood and potential adverse consequences of flooding.
Coordination with other countries ensured in the RBD/UoM	Strong evidence	Coordination was ensured with other countries, through the ICPDR, as well as bilateral cooperation with neighbouring countries, especially Hungary and Bulgaria.
Coordination ensured with WFD	Strong evidence	The same authorities (Romanian Waters) were responsible for the preparation of both FRMPs and RBMPs, and the consultation processes of these plans occurred at the same time. As noted above, FRMP measures were assessed in terms of their impacts on WFD objectives, and one of the FRMP objectives refer to the WFD's objectives.
Active involvement of interested parties	Some evidence	A process for active involvement of stakeholders was carried out, although it mainly involved public authorities.

Good Practices

The assessment identified the following good practices in the five FRMPs assessed.

Table 3 Good practices in the Romanian FRMPs

Topic area	Good practices identified
Integration of previously reported information in the FRMPs.	The FRMP for the Someș-Tisa UoM (RO9) analyses the effects of climate change on the hydrological regime of the region (other FRMPs assessed, however, do not provide information on this).
Setting of objectives for the management of flood risk.	The common FRMP objectives incorporate the WFD's objectives and refer to installations under other key EU legislation, including the Seveso Directive. All objectives contain at least some specific and measurable elements: all five FRMPs assessed define indicators for the objectives. The process for setting objectives was coordinated at national and regional levels and with stakeholders.
Planning/implementing of measures and their prioritization for the	In the five FRMPs assessed, all measures at the APSFR level are specific and measurable, while some of the river basin level measures are specific as well – for many measures, specific locations are

Topic area	Good practices identified
achievement of objectives.	indicated. All the FRMPs assessed establish a process for monitoring the progress of their measures and identify indicators for this process, including quantitative baselines and targets. The FRMPs assessed include measures that address spatial planning and natural water retention. Special attention was given to non-structural measures. Out of 23 types of measures, 22 are non-structural or light structural (only one structural measure involving hard engineering works). Romania's FRMPs and RBMPs were prepared in close coordination, including in the assessment of measures the achievement of WFD objectives.
Consideration of climate change in the FRMPs assessed.	All the FRMPs assessed include measures to address climate change, including studies for future action.
Use of cost-benefit analysis in the FRMPs assessed.	The FRMPs assessed indicate that a prioritisation methodology based on multi-criteria analysis with cost-benefit elements was used.
Public consultation	For all FRMPs assessed and also at national level, Romania used a range of communication tools and consultation mechanisms to inform and engage stakeholders and the public through the different phases of the planning process, including a documentary film, surveys and direct contacts with local authorities. Stakeholders were engaged via workshops and technical meetings in all five RBMPs assessed and via the River Basin Committees.
International issues in flood risk management.	Romania has cooperated with neighbouring Member States on issues related to flood management via the ICPDR and bilateral activities.

Areas for further development

The assessment identified the following areas for further development in the Romanian FRMPs assessed.

Table 4 Areas for further development in the Romanian FRMPs

Topic area	Areas identified for further development
Integration of previously reported information in the FRMPs.	Romania's FRMPs do not distinguish among flood sources[6]. Internet links to online maps were not included in the five FRMPs assessed, with the exception of the FRMP developed for UoM RO1000, whose link was not functional at the time of the assessment. The FRMP for the Danube (RO1000) reports one more APSFR than indicated in the PFRA. The FRMP does not include an explanation for this difference[7].
Setting of objectives for the management of flood risk.	The minimum targets set by the FRMPs for the objectives linked to indicators seem to be low in ambition. Consequently, targets such as achieving zero damages from floods may be difficult to achieve[8]. The objectives are general and do not identify clear locations where they will be achieved and there is no information by when (while the plans have as time horizon a target of 6 years, and up to 12 years for major projects and large areas, it is not indicated if the objectives will be achieved in this time frame). The five FRMPs assessed do not indicate clearly how the objectives are linked to measures, although the FRMPs state that measures have been prioritised based on the set objectives[9].
Planning/implementation of measures and their prioritisation for the achievement of objectives.	The five FRMPs assessed lack a description of how much the measures contribute to the achievement of objectives and do not contain a description of whether the objectives will be met when all measures are implemented. There is no budget provided for the implementation of measures; although there are indications of funding sources, details are not provided[10].
Consideration of climate change in the FRMPs	The FRMPs assessed do not provide an overview of potential climate impacts (with the exception of FRMP for Somes-Tisa, RO9), nor refer

6 Romania subsequently noted that this is a legacy of how FHRMs were prepared in Romania.

7 Romania clarified subsequently that the Danube UoM (RO 1000) indeed contains 24 APSFRs. There was an oversight during PFRA reporting; this will be corrected in the second cycle of implementation of the FD.

8 Romania explained subsequently that minimum and aspirational targets define the envelope of possible outcomes. The minimum targets are set so that there is a benchmark in case factors outside of the control of the flood management authorities reduce the ability to deliver.

9 Romania subsequently explained that the objectives are designed to be general on purpose so that they can be applied to any location. This, according to Romania, means, that projects in different locations and timescales can be compared on an equal basis (a level playing field).

10 Romania recalled subsequently that this was optional reporting.

Topic area	Areas identified for further development
assessed.	to Romania's National Climate Change Strategy.
Use of cost-benefit analysis in the FRMPs assessed.	Details on the results of the analysis of costs and benefits were not found in the FRMPs assessed.
Public consultation	The FRMPs do not include a description of how the consultation results were considered in the final drafting of the plan and the effects of the consultation are not summarised in the FRMPs[11]. It appears that the stakeholders that were actively involved were mainly from the public sector, as opposed to stakeholders from Non-Governmental Organisations (NGOs), the private sector and citizens.

Recommendations

Based on the reported information and the FRMPs assessed, the following recommendations are made to enhance flood risk management (not listed in any particular order):

- To be able to assess progress, the FRMPs should establish a stronger link between the objectives and measures and indicate whether planned measures, when completed, will be sufficient to achieve objectives. The levels of ambition for objectives and measures should be coordinated.
- The FRMPs should provide estimated costs and specify the sources of funding for the measures.
- The FRMPs should provide further detail on the methodology for prioritisation and its application and present its results. A cost benefit analysis to this end should be employed whenever possible and reflected in the FRMPs.
- Climate change should be considered in greater depth in the second cycle, including coordination with the National Climate Change Strategy.
- It will be important to ensure that FRMPs, APSFRs, and FHRMs refer to each other as appropriate and that they are continuously available to all concerned and the public in an accessible format, including digitally.
- An as broad as possible set of interested parties should be actively involved in the preparation of the FRMPs and the FRMPs should indicate how the results of the public consultation were considered in the finalisation of the Plans.

[11] Romania subsequently informed that in the process of FRMPs' approval by Government Decision, comments were received and were integrated in the Plans and were also reportedly shared with the European Commission in February 2017.

1. Scope of the assessment and sources of information for the assessment

1.1 Reporting of the FRMPs

Romania has reported 12 FRMPs, one for each unit of management (UoM). Romania has designated 12 Units of Management (UoMs) under the FD. Of these 12 UoMs, 11 cover individual catchments and correspond to the 11 River Basin Administrations under Romania's water management system; the 12th UoM, the Danube (RO1000) is not designated as a separate territory but rather covers the banks of the Danube along seven other UoMs: Banat (RO1), Jiu (RO2), Olt (RO3), Arges-Vedea (RO4), Buzău –Ialomiţa (RO5), Prut – Bârlad (RO11), Dobrogea – Litoral (RO6).

Romania did not make use of Article 13.3 of the FD, which allowed Member States to make use of previous flood risk management plans for the first cycle (provided their content is equivalent to the requirements set out in the Directive).

1.2 Assessment of the FRMPs

In Romania, the FRMPs were coordinated at national level and thus were expected to follow a common methodology. The selection of FRMPs sought to ensure coverage of the range of flood sources as well as relations with neighbouring Member States and third countries.

The following FRMPs for the following UoMs were assessed:

Table 5 UoMs in Romanian FRMPs

UoM code	UoM Name
RO5	Buzău–Ialomiţa
RO6	Dobrogea-Litoral
RO9	Somes-Tisa
RO11	Prut-Bârlad
RO1000	Danube

2. Integration of previously reported information

2.1 Conclusions drawn from the preliminary flood risk assessment

The conclusions of the PRFA are presented in the FRMP for all five FRMPs assessed. This includes a summary map showing areas of potential significant flood risk (APSFRs). All FRMPs assessed also had a textual description which includes tables listing the APSFRs, the methodology employed and the results of previous steps[12]. Overview maps are reproduced within the plans[13].

Detailed maps are also provided as PDF annexes to the plans (except for the FRMP of the Danube, which has no annexes)[14]. In addition, an online map viewer shows the APSFRs (and FHRMs) for all UoMs: http://gis2.rowater.ro:8989/flood/. The FRMPs assessed do not, however, provide links to this map viewer.

No information on conveyance routes is included in the five FRMPs assessed[15].

2.1.1 Coordination with neighbouring Member States on shared RBDs/UoMs

There are no indications in the FRMP RO1000 (Danube) – which covers the Danube banks – that the identification of flood risk areas was coordinated with neighbouring Member States, but there was a process of information exchange. The FRMP explains that a national approach was used and transboundary coordination is not included as a part of this plan, as in 2015 the International Commission for the Protection of the Danube River (ICPDR) developed a basin level FRMP that deals with transboundary issues[16].

The reporting sheets for the Danube UoM (RO1000) and the Someș-Tisa UoM (RO9) state that Romania is in a continuous process of informing and working with the neighbouring Member States on issues related to flood management. This includes Romania's contributions to the ICPDR and ongoing bilateral dialogues with Bulgaria (for the Danube UoM) and with Hungary for UoM RO9 (Someș-Tisa)[17].

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[12] See Sections 2.5 of FRMP RO1000; FRMP R09; FRMP RO5; FRMP RO11 and FRMP R06.
[13] See Figure no 5 in FRMP RO1000; FRMP R09; FRMP RO5; FRMP RO11 and FRMP R06.
[14] The plans are provided on the same page as the FRMPs: http://www.rowater.ro/PMRI/Planul%20de%20Management%20al%20riscului%20la%20Inundatii.aspx?PageView=Shared .
[15] FRMP RO1000; FRMP R09; FRMP RO5; FRMP RO11 and FRMP R06.
[16] ICDPR, Flood Risk Management Plan for the Danube River Basin District, December 2015. Available at: http://www.icpdr.org/main/activities-projects/flood-risk-management
[17] FRMP RO1000; Summary Sheets for RO1000 Danube and RO9 Someș-Tisa, sections Summary of Coordination: FRMP for the Danube river basin developed by ICPDR, available here: http://www.rowater.ro/Documente%20Externe/1stdfrmp-final_0.pdf

2.1.2 Information how the PFRA was used in the development of the FHR maps

According to FRMPs, the FHR maps were developed based on the PFRA and generally confirmed the findings of the PFRA. In the case of the UoM (RO1000), there is a discrepancy between the PFRA reports finalised in December 2011[18], which list 23 APSFRs and the FRMP and the FHRMs which list 24 APSFRs[19]. This discrepancy is not explained[20].

The Danube FRMP also states that modelling under the Danube FloodRisk Project[21] covered the river's floodplains from its source to the Black Sea, and all 23 APSFRs in Romania that represent parts of the Danube floodplain were united into one area along the Danube with a total length of 1 074.1 km.

2.2 Presentation of Flood Hazard and Risk Maps (FHRMs) in the FRMPs

The five FRMPs assessed all include a description of the FHRMs, and overview maps are provided within the main text of the plans and are also published as separate documents (except for the Danube FRMP, RO1000, where the FHRMs are not published in separate documents)[22].

In none of the FRMPs assessed do the FHRMs distinguish between fluvial floods, seawater floods, pluvial floods, groundwater floods, floods from artificial water bearing structures or floods from no specific sources or more than one source of flooding.

There are no links to the maps (with the exception of the FRMP RO1000, which indicates a link that does not function). The FHRMs are nonetheless available online: as PDFs[23]; and on a common, online map service hosted by Romanian Waters: http://gis2.rowater.ro:8989/flood/.

2.2.1 Maps for shared flood risk areas

The FRMPs do not indicate that FHRMs have been prepared for flood risk areas shared with other Member States. Nevertheless, the FRMP RO1000 mentions that the flood hazard and flood risk maps have been developed as part of the international Danube Floodrisk project, which prepared FHRMs for the Danube River's floodplains.

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[18] See: http://www.rowater.ro/EPRI%20Rapoarte/PFRA%20Dunare_2.pdf, section 7

[19] Comparison of the PFRA report, p. 35 and the Danube FRMP, pp. 57-58.

[20] Romania clarified subsequently that the Danube UoM (RO 1000) indeed contains 24 APSFRs. There was an oversight during PFRA reporting; this will be corrected in the second cycle of implementation of the FD.

[21] See: http://www.danube-floodrisk.eu/

[22] Section 2.6 and Figures no 6 and 7 in the Figures section of FRMP RO1000; FRMP R09; FRMP RO5; FRMP RO11 and FRMP R06.

[23] The PDFs are available on the same page as the FRMPs: http://www.rowater.ro/PMRI/Planul%20de%20Management%20al%20riscului%20la%20Inundatii.aspx?PageView=Shared

As noted above, Romania's reporting sheets for the Danube UoM (RO1000) and the Someș-Tisa UoM (RO9) state that Romania has informed and worked with neighbouring Member States, Bulgaria and Hungary, on flood management issues.

2.2.2 Conclusions drawn from the flood hazard and flood risk maps

All the FRMPs assessed state that the FHRMs have been used to develop the FRMPs[24]. Based on the reporting sheets and the FRMPs assessed:

- FHRMs are used to set priorities for flood risk management (e.g. locations, economic activities, assets)
- FHRMs are used as a tool in the public consultation process
- Specific objectives on flood risk reduction have been defined based on the FHRM
- Nonetheless, limited detail has been provided on how the FHRMs have been used to develop FRMPs. The reporting sheets state that for each APSFR, the FHRMs provided support for the analysis and definition of measures. The FRMPs mention that a statistical analysis based on FHRMs was developed both at national level (including the river Danube), as well as the level of each UoM: indicators were prepared at the level of each UoM for the four categories of consequences established in accordance to the provisions of the FD under the medium probability scenario. The information was used in the establishment of FRMPs' objectives.

2.3 Changes to the APSFRs or other Flood Risk Areas

The FRMP assessment looked for information on changes in the identification of APSFRs since December 2011, or in the FHRMs since December 2013, indicated in the FRMP.

The FRMPs indicate that new flood risk areas have been identified in some UoMs, categorised on the basis of flooding in recent years[25]:

- The FRMP for the Buzău – Ialomiţa UoM (RO5) indicates that 10 new areas were identified;
- The FRMP for Dobrogea Litoral (RO6) indicates nine new areas;
- The FRMP for Prut-Bârlad (RO11) indicates nine new areas;

All FRMPs examined mentioned that the two scenarios for high risk and low risk that were missing have been developed in addition to the one which was initially developed, i.e. for

[24] Section 2.7, chapter 3 and chapter 6 of FRMP RO1000; FRMP R09; FRMP RO5; FRMP RO11 and FRMP R06; reporting sheets.

[25] Romania subsequently indicated that these are based on recent flood events (2010-16) and in the second cycle of the PFRA, the APSFRs will be updated and reported.

medium risk. Also, the FRMP for the Buzău – Ialomiţa UoM (RO5) mentions that more detailed FHRMs will be developed for three APSFRs which have already been reported to the European Commission.

In the case of the Danube UoM (RO1000), as noted above, there is a discrepancy between the PFRA which lists 23 APSFRs and the FRMP and the FHR maps, which list 24 APSFRs. This discrepancy is not explained. For the same UoM, modelling has been made under the Danube FloodRisk Project, in a unitary way from the source to the Black Sea, and all 23 APSFRs in Romania that represent parts of the Danube floodplain were embedded into one area along the Danube.

The reporting sheets mention that the FHRMs have been corrected and improved since last submitted to the European Commission in 2014.

2.4 Areas for further development in the earlier assessment of the flood hazard and risk maps

The prior FHRM assessment[26] identified the following areas for further development for Romania:

- According to Art 6(1) Member States shall prepare FHRMs for the areas identified under Art 5(1) (APSFRs, Areas of Potential Significant Flood Risks). Some UoMs (e.g. RO1000) reported differences in the number of APSFRs identified in the PFRA and those reported in 2014 with the FHRMs.
- Scenarios, Art 6(3): Only one probability scenario had been developed for each of the maps checked[27].
- According to Article 5(c) Member States should include potentially affected protected areas identified in annex IV (i) (iii) and (v) to Directive 2000/60/EC: respectively, drinking water abstraction areas, recreation and bathing waters, and areas for the protection of habitats and species including Natura 2000 sites. Romania did not include information on WFD protected areas in their maps.
- Flood sources were not individually represented on the maps, meaning it was not easy to understand whether pluvial, sea water, groundwater, flooding from artificial water bearing infrastructure or other type of floods had been mapped, although APSFRs related to groundwater floods and flooding from artificial water bearing infrastructure were reported to be associated with these flood sources in 2012.

[26] European Commission, Assessment of Flood Hazard and Flood Risk Maps – Member State Report: RO – Romania, December 2014. Available at: http://ec.europa.eu/environment/water/flood_risk/pdf/fhrm_reports/RO%20FHRM%20Report.pdf

[27] Romanian Authorities subsequently clarified that maps for only the medium scenario were initially published; maps for all three probability scenarios were developed and the previously lacking were published later.

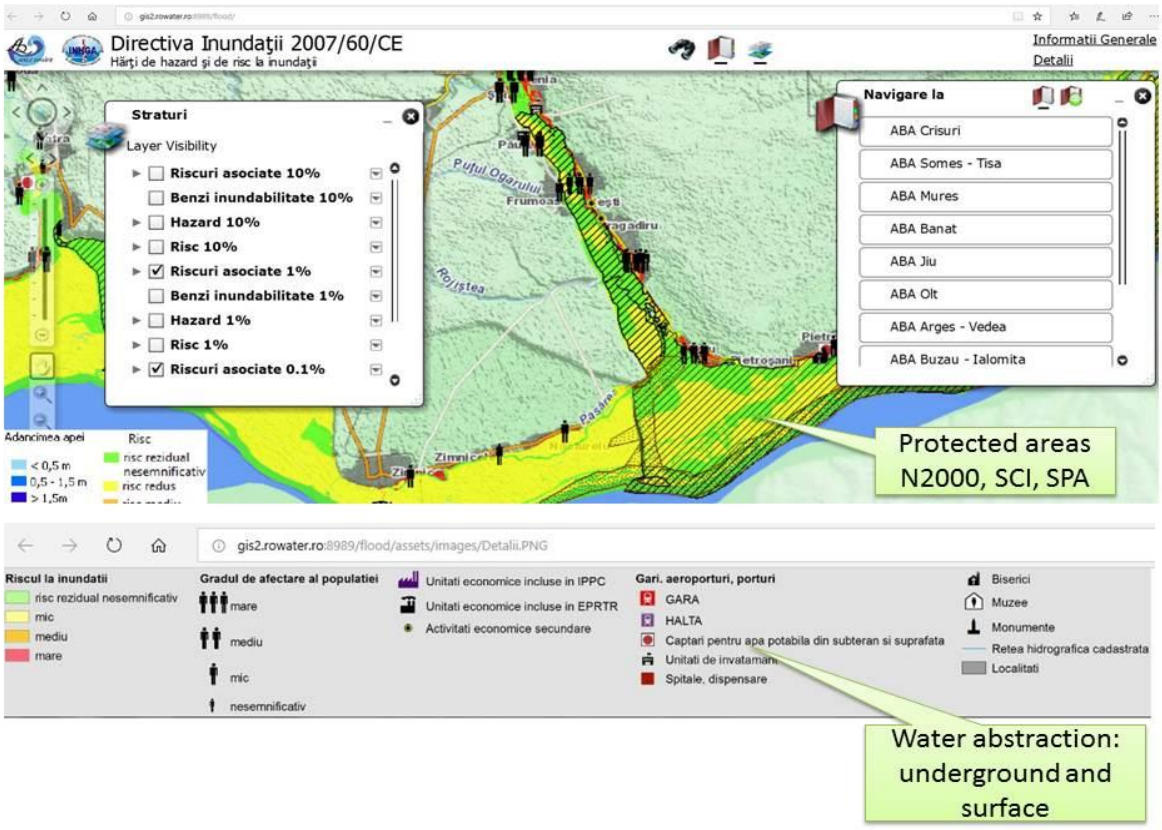
- Links to national FHRMs were not available for all UoMs.
- Climate change had not been included in the analysis.

Some, but not all of these areas for further development, are explicitly addressed within the FRMPs assessed or in the reporting sheets:[28]

- APSFRs mapped: RO1000 still reported differences in the number of APSFRs identified in the PFRA (23) and those reported in 2014 with the FHRM and FRMP (24). The FRMP does not provide an explanation for this difference;
- Scenarios Art. 6(3): all FRMPs examined mention that the two omitted scenarios (high risk and low risk) have been developed in addition to the one which was initially developed (medium risk);
- WFD areas, Art 6(5)(c): information on this topic has been included in all FRMPs assessed. In the FHRMs, there is no information on the protected areas, but WFD protected areas were used in the elaboration of flood risk maps and are presented in the online portal in associated risks (see the figure below).
- Flood sources: Flood sources are still not individually represented on the maps;
- Link to national maps: although working links were not provided in the FRMPs assessed, the FHRMs are available online at http://gis2.rowater.ro:8989/flood/;
- Climate Change: the FRMPs do indicate that an analysis related to climate change was integrated into the FHRMs.

[28] FRMP RO1000; FRMP R09; FRMP RO5; FRMP RO11 and FRMP R06. This refers specifically to any updates in the time period between publication of the FHRMs and the publication of the FRMPs.

Figure 2 Example of protected areas shown in the FHRMs



2.5 Good practices and areas for further development in the FRMPs regarding integration of previously reported information

The following **good practice** was identified:

- The FRMP for the Someș-Tisa UoM (RO9) analyses the effects of climate change on the hydrological regime of the region (other FRMPs assessed, however, do not provide this information).

The following **areas for further development** were identified:

- Romania's FHRMs and FRMPs do not distinguish between flood sources.
- Internet links to online maps were not included in the five FRMPs assessed, with the exception of the FRMP developed for UoM RO1000, whose link was not functional at the time of the assessment.
- The FRMP for the Danube (RO1000) reports one more APSFR than indicated in the PFRA. The FRMP does not include an explanation for this difference[29].

[29] Romania clarified subsequently that the Danube UoM (RO 1000) indeed contains 24 APSFRs. There was an oversight during PFRA reporting; this will be corrected in the second cycle of implementation of the FD.

3. Setting of Objectives

3.1 Focus of objectives

Romania set its FRMP objectives at national level: these are the same for all UoMs. The objectives aim to reduce the adverse consequences of flood risk. In all FRMPs assessed, there are no objectives that refer to non-structural measures, and there are no objectives that refer to specific measures to be implemented. Nine objectives cover four areas: economic, social, environmental and cultural heritage:

- Economic activity:
    - minimising the flood risk on the transportation infrastructure;
    - minimising the flood risk on economic activities;
    - minimising the flood risk on agricultural lands;
- Human health:
    - minimising the flood risk on life;
    - minimising the flood risk on the community;
- Cultural heritage: minimising the flood risk on the cultural patrimony;
- Environment:
    - minimising the flood risk on protected areas where water is abstracted for human consumption;
    - Support to achieve and conserve good ecological status (GES)/good ecological potential (GEP) according to WFD requirements
    - minimising the flood risk on potentially polluting sites.

3.2 Specific and measurable objectives

In Romania, all objectives are identical for each FRMP assessed. They are not specific but do contain measurable elements.

FRMPs have set quantitative indicators to measure achievement of objectives. Examples include: number of inhabitants exposed to floods, transport infrastructure exposed to floods, agricultural land exposed to floods; number of museums, churches and monuments exposed to flood risk; number of areas under the IPPC – IED, Wastewater and Seveso II Directives that are subject to flood risks. The indicators are the same for all FRMPs assessed. There is a minimum and an aspirational target defined for each of the nine objectives. In most cases, the minimum target corresponds to maintaining the defined indicators at the present level of performance, while the aspirational target represents the ideal situation (e.g. zero roads, inhabitants, lands exposed to flooding).

There are no clear locations where the objectives will be achieved and no information by when. While the plan has as time horizon target of 6 years (and up to 12 years for major projects and large areas), it is not indicated if the objectives will be achieved in this time frame.

Although all FRMPs assessed contain chapters on measures, there is not a clear connection on how the set objectives will link to those measures.

3.3 Objectives to reduce adverse consequences from floods

In the FRMPs assessed, the objectives specify the reduction of the adverse consequences of floods on human health, cultural heritage, environment and economic activity.

For all five FRMPs assessed, the objectives cover the following elements:

- adverse consequences of floods on human health;
- adverse consequences of floods on cultural heritage;
- adverse consequences of floods on the environment;
- adverse consequences on economic activity.

The objectives specify a minimisation of these consequences, also defining target levels. As mentioned before, all objectives across the five assessed FRMPs are identical. Examples of objectives across the five FRMPs assessed include the following:

- Economic activity: minimising the flood risk on the transportation infrastructure, with the following indicators: length and importance of the transportation infrastructure (roads, railways, railway stations, ports, airports, etc.) exposed to flood risk;
- Human health: minimising the flood risk on life, the indicator being the number of inhabitants exposed to flood risk;
- Cultural heritage: minimising the flood risk on the cultural patrimony, the indicator being the number of museums, churches and monuments exposed to flood risk;
- Environment: minimising the flood risk on protected areas where water is abstracted for human consumption, the indicator being the number of water abstractions exposed to flood risk.

3.4 Objectives to address the reduction of the likelihood of flooding

The Romanian Flood risk management objectives (operational objectives) address risks and thus at least by definition the reduction of potential adverse consequences as well as the reduction of the likelihood of flooding[30].

[30] The assessment adopts the generally accepted definition of risk as a product of consequence times likelihood, thereby also in alignment with Art. 7(2) of the FD.

3.5 Process for setting the objectives

Overall in Romania, the process for setting the objectives ensured that:

- Objectives have been coordinated at national level in all five FRMPs assessed, to the point that they are identical;
- The objectives were discussed with stakeholders before their establishment in all five FRMPs assessed.

In all FRMPs assessed, the objectives were coordinated at national level by the working group set up to elaborate the FRMPs, which included specialists from the Romanian Waters, the 11 River Basin Administrations and the National Institute for Hydrology and Water Management (with the role of methodological coordination).

As part of the public consultation (see section 7), a public meeting was organised in June 2015, where the objectives and the catalogue of potential measures for all FRMPs were presented for discussion.

In none of the assessed FRMPs have the potential effects of climate change on the risk of flooding been specifically taken into account when setting up the objectives.

3.6 Good practices and areas for further development regarding setting objectives

The following **good practices** were identified:

- The common FRMP objectives incorporate the WFD's objectives and refer to installations under other key EU legislation, including the Seveso Directive;
- All objectives contain at least some specific and measurable elements: all five FRMPs assessed define indicators;
- The process for setting objectives was coordinated at national and regional levels with stakeholders being involved in the setting of objectives.

The following **areas for further development** were identified:

- The minimum targets set by the FRMPs seem to be low in ambition[31]. Consequently, targets such as zero damages created by floods may be difficult to achieve.
- The objectives are general and do not identify clear locations where they will be achieved and there is no information by when (while the plans have as time horizon

[31] Romania subsequently explained this was a deliberate choice in order to account for potentially unforeseen hindrances.

target of 6 years, and up to 12 years for major projects and large areas, it is not indicated if the objectives will be achieved in this time frame).

- The five FRMPs assessed do not indicate a clear link between the objectives and the measures.

4. Planned measures for the achievement of objectives

Across all 12 UoMs, Romania reported a total of 3 138 measures. 2 347 measures are individual, while 791 measures are aggregated[32] [33]. The average number of measures per UoM is 261, with a range between 82 and 441 measures per UoM. Neither the FRMPs nor the reporting sheets assessed provide any definitions of individual and aggregated measures - and indeed do not refer to these terms.

Romania has reported measures for all four aspects of flood risk management[34]: across all twelve UoMs, the great majority of measures are for protection: 2 717 measures, 87 % of the total of 3 138. These are followed by preparedness measures (247 measures, 8 %), prevention (126 measures, 4 %), and recovery and review (48 measures, 1 %). Please see Tables A1 to A4 and Figures A1 and A2 in Annex A for further details.

The FRMPs present the measures in terms of measure aspects and types. In addition, the FRMPs present measures in terms of geographic level[35]:

- Measures at national level (86 measures for the five FRMPs assessed);
- Measures at river basin level (188 measures for the five FRMPs assessed);
- Measures at the APSFR level, this being the majority of measures (720 measures for the five FRMPs assessed).

Additionally, three FRMPs (Buzău – Ialomiţa, RO5; Dobrogea Litoral, RO6; Prut - Bârlad, RO11) list measures for newly identified flood risk areas (see section 3) which have not been declared APSFR yet but have been exposed to floods in recent years (28 measures). It should be noted that the numbers of measures reported by Romania to WISE and described in Annex A below do not appear to match the numbers presented in the FRMPs.

4.1 Cost of measures

None of the FRMPs assessed, nor Romania's reporting sheets, provided an overall budget for the measures, nor the costs of individual measures[36].

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[32] The Reporting Guidance mentions "Measures can be reported as individual measures (recommended for major projects) or aggregated measures,…" and also notes that measures may be comprised of "many individual projects". European Commission, Guidance for Reporting under the FD (2007/60/EC), 2013, pp. 54-58.

[33] The information reported to WISE was the starting point for the assessment in this section. The majority of the statistics presented are based on processing of information reported to WISE. Assuming that the Member States accurately transferred the information contained in their FRMPs to the reporting sheets (the sheets are the same for all Member States and are not customisable) and barring any undetected errors in the transfer of this information to WISE arising from the use of interfacing electronic tools, these statistics should reflect the content of the FRMPs.

[34] Please see Annex B for an overview of measure aspects and the measure types under each aspect.

[35] Please note that these designations are different from Romania's reporting on the location of measures (see below).

4.2 Funding of measures[37]

For the national level measures, the FRMPs specify that they should be financed from EU funds. The FRMPs do not specify the source of funding for UoM level measures. Regarding the APSFR measures, the following funding sources have been indicated in the FRMPs:

- Someș-Tisa FRMP (RO9): 33 APSFR measures referring to renaturation of river banks (vegetative protection). [38] will be funded by the funds of the River Basin Administration;
- Buzău – Ialomiţa FRMP (RO5): out of 119 APSFR measures proposed, 83 come under the responsibility of the Buzau – Ialomita River Basin Authority. Of these 83 measures, 32 measures will be funded with own funds, while applications for funding from the state budget or EU funds and external credits applications will be submitted for 51 measures;
- Dobrogea Litoral FRMP (RO6): two APSFR measures are currently funded from the state budget. Out of 27 measures proposed at APSFR level, 18 measures will be funded with own funds of the River Basin Administration, while applications for funding from the state budget or EU funds and external credits will be submitted for nine measures;
- Prut-Bârlad FRMP (RO11): no information is provided;
- Danube FRMP (RO1000): 77 APSFR measures are proposed – some will be supported with own funds of the authorities (Ministry of Environment, National Administration Romanian Waters, River Basin Administrations on the Danube, National Agency for Land Improvements, National Forestry Authority Romsilva, Forest Districts, local authorities etc.), while for others there will be applications for funding from the state budget or EU funds and external credits.

Funding sources for measures in the new Flood Risk Areas have not been identified, with the exception of four measures under the Dobrogea Litoral FRMP (RO6): it is indicated that EU funds will be requested for their financing. For several APSFRs, the FRMPs indicated that measures will be grouped into regional integrated projects, a mechanism for funding under EU structural funds: The Romanian Waters Administration will send proposals for these integrated projects for EU funding under Romania's Large Infrastructure Operational Programme (LIOP)[39] major integrated project proposals for financing.

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[36] Romania recalled subsequently that this was optional reporting.

[37] See Chapter 4 of FRMP RO1000; FRMP R09; FRMP RO5; FRMP RO11 and FRMP R06.

[38] M31: Protection Natural flood management / runoff and catchment management, Measures to reduce the flow into natural or artificial drainage systems, such as overland flow interceptors and / or storage, enhancement of infiltration, etc and including in-channel, floodplain works and the reforestation of banks, that restore natural systems to help slow flow and store water.

[39] This Operational Programme offers grants for water and wastewater projects as part of the Priority Axis 5. The specific objective 5.1 "Reducing effects and damages on the population caused by natural phenomena associated to main risks emphasised by climate change, mainly floods and coastal erosion" promotes actions

Table 6 Funding of measures

	RO9	RO5	RO11	RO6	RO1000
Distribution of costs among those groups affected by flooding					
Use of public budget (national level)		✓		✓	✓
Use of public budget (regional level)	✓	✓		✓	✓
Use of public budget (local level)					✓
Private investment					
EU funds (generic)	✓	✓	✓	✓	✓
EU Structural funds	✓				
EU Solidarity Fund					
EU Cohesion funds	✓	✓	✓	✓	✓
EU CAP funds					
International funds		✓		✓	✓

Source: FRMPs

4.3 Measurable and specific (including location) measures

In the FRMPs assessed, the national level measures are not specific, but the FRMPs mention that they subsequently will need to be detailed at the level of the river basins. Some but not all of the river basin measures indicated in the FRMPs are specific. All APSFR and new Flood Risk Area measures are specific, with a clear description with regard to:

- What they are trying to achieve,
- Where they are to be achieved,
- How they are to be achieved, and
- By when they are expected to be achieved.

Overall, the number of specific and measurable measures remain high (approximately 80 % of the total number of measures in the FRMPs assessed). For measures with a specific location, the description usually provides the specific dimensions (e.g. kilometres or hectares) of the measure. The geographic reference is either the UoM or the APSFR.

The following table lists the locations indicated for Romanian measures:

that contribute to fulfilling the requirements of the Floods Directive 2007/60/EC, which are transposed in the National Climate Change Strategy as well.

Table 7 Location of measures

	All UoMs assessed
International	
National	
RBD/UoM	✓
Sub-basin	
APSFR or other specific risk area	✓
Water body level	
More detailed than water body	

Source: Reporting sheet and FRMPs

With regard to when, most measures should be completed by 2021, although some should only be completed by 2027. All measures will be monitored against indicators[40].

4.4 Measures and objectives

As noted in section 3, the measures are not directly linked to the objectives. Consequently, it is not clear how measures will contribute to the achievement of objectives. It is also not clear whether the objectives will be achieved when all measures are completed[41].

Nonetheless, in order to support the objectives, for integrated projects, expert judgement was used to select potentially affected localities and the main measures with significant flood risk reducing effects, based on GIS results (mapping of the 1 % scenario) and PPPDEI[42]. During the project implementation process, more in-depth analyses will be done (e.g. via projects to be financed by the Large Infrastructure Operational Programme, LIOP.)

4.5 Geographic coverage/scale of measures

Romania has reported the location of all measures. Across all 12 UoMs:

- 2 591 measures out of 3 138 are located in APSFRs (83 %)
- 342 measures are at UoM level (11 %)
- 205 measures are at national level (7 %)

According to Romania's reporting to WISE, for 10 of the 12 UoMs, Romania has reported 22 measures at UoM level and 17 measures at national level in each UoM (the measures at APSFR level vary, however, across the UoMs). The exceptions are the Prut-Bârlad (RO9), where there are 18 measures at national level; and the Danube UoM, where Romania reported

[40] See chapter 5 of the FRMP RO1000; FRMP R09; FRMP RO5; FRMP RO11 and FRMP R06.
[41] FRMP RO1000; FRMP R09; FRMP RO5; FRMP RO11 and FRMP R06.
[42] Chapter 4.6 of FRMPs

100 measures at UoM level, 17 measures at national level and no measures at APSFR level[43]. (See Table A6 in Annex A.)

The FRMPs, however, provide a different breakdown. The FRMPs assessed define and describe three sets of measures: national-level, river basin level and APFSR level, implicitly also defining the geographic coverage as mentioned above. The FRMPs state that for the measures set at national and river basin level, the specified location is the UoM. All measures set at APFSR / new Flood Risk Areas level specify the exact location.

There are inconsistencies when matching the information provided in WISE compared to that provided in the FRMPs. For example, the FRMP for RO1000 Danube states that there are 77 measures at APFSR level in its area, while the WISE information reports no measures at APFSR level[44].

4.6 Prioritisation of measures

Only APFSR measures were prioritised, each measure being categorised as high, medium or low priority. Four of the five FRMPs assessed[45] provide information on the priority of APFSR measures (though not on measures other than for APSFRs): each measure is categorised as high, medium or low priority. The vast majority of measures was categorised high priority:

- 274 out of 294 APSFR measures in Someș-Tisa FRMP (RO9);
- 79 out of 119 APSFR measures in the Buzău – Ialomița FRMP (RO5);
- 259 out of 264 APSFR measures in the Prut-Bârlad FRMP (RO11);
- 42 out of 43 APSFR measures in the Dobrogea Litoral FRMP (RO6).

The FRMPs state that measures were prioritised by assessing the benefit of each measure to the nine flood risk management objectives. The prioritisation methodology was based on multi-criteria analysis, with cost-benefit assessment elements (see section 6). Among the benefit criteria, support to achieve and conserve good ecological status or potential according to the WFD was considered (a maximum score of five is granted in case the measure does not affect negatively GES or GEP for the body of water or a minimal score of zero in case the measure deteriorates GES or GEP for the body of water). The value of the benefit / cost ratio was used to develop a hierarchy of priorities for proposed measures in each FRMP[46].

[43] Romania subsequently clarified that for the Danube UoM, reporting to WISE includes measures at APSFR level, giving the exact location of the measure, but these are indicated at UoM level because modelling was carried out for one unified APSFR.

[44] This is explained in the previous footnote.

[45] The Danube FRMP (RO1000) did not present any prioritisation.

[46] See Section 4.4. of the FRMP RO1000; FRMP R09; FRMP RO5; FRMP RO11 and FRMP R06.

With regard to timetable, Romania reported that all measures across the 12 UoMs will have the same timetable, January 2016 to December 2021.

The five FRMPs assessed, however, present slightly different information: the FRMPs state that almost all measures should be implemented by 2021 – but measures involving major works that start between 2016 to 2021 will only be completed by 2027. The standard deadline is 2021 and the FRMPs do not provide further specifications about which measures will be completed by 2027.

4.7 Authorities responsible for implementation of measures

According to the five FRMPs assessed, at national level, 21 authorities are responsible for the implementation of measures. Environmental and water management authorities (Ministry of Environment, National Administration Romanian Waters, other authorities within the coordination/subordination of the Ministry of Environment) have most of the responsibilities, but they share them with other ministries, county and local level municipalities, etc.

At river basin level, 22 authorities are responsible for the implementation of measures. The Ministry of Environment, the National Administration Romanian Waters, the River Basin Administrations, but also the National Inspectorate for Emergency Situations have many responsibilities. Other important stakeholders are the Forestry Authority, the Forest Districts, other ministries, county and local authorities, etc.

At APFSR level, eight authorities are responsible for the implementation of measures. The National Administration Romanian Waters, the River Basin Administrations, the Forestry Authority and the Forrest Districts are important stakeholders. No authorities are nominated for measures related to new Flood Risk Areas.

Romania did not report on the level of responsibility of the authorities.

4.8 Progress of implementation of measures

Romania reported that for all 12 UoMs, more than half of the measures were in the category of "progress on-going" (1 861 of 3 138 measures, 59 %), and 37 % of measures had not been started (1 162 of 3 138). No measures were reported as completed and few were categorised as "ongoing construction" (115 measures, 4 %).

Nearly all prevention, preparedness and recovery and review measures were reported as not started (though these three aspects represent only 13 % of all 3 138 measures, whereas protection measures represent 87 % of the total):

- 122 of 126 prevention measures (96 %) were reported as not started;

- 748 of 2 717 protection measures (27 %);
- 244 of 247 preparedness measures (99 %);
- 48 of 48 recovery and review measures (100 %).

Among the 12 UoMs, the shares of measures in the different categories varied somewhat: for example, for the Banat (RO1), Jiu (RO2), Buzău – Ialomiţa (RO5) and Dobrogea Litoral UoMs (RO6), Romania reported that the majority of their measures had not started.

4.9 Measures taken under other Community Acts

Member States have been asked to report on other Community Acts under which each measure has been implemented: Romania has not reported any information. Romania does, however, include an indicator for its objective to minimise flood risks on potentially polluting sites: the indicator refers to the IPPC Directive/Industrial Emissions Directive, the Urban Wastewater Treatment Directive and the Seveso Directive – see section 3 above.

4.10 Specific groups of measures[47]

With regard to **spatial planning/land use measures**, Romanian authorities assume responsibility, in the next period, for the implementation of some essential measures, among which:

- The introduction of FHRMs in the Town Planning and Local Development Plans (measure at national level contained in all FRMPs assessed, but to be developed at local level);
- an update of the National Land Use Plan, a coordinated update of the County Land Use plans and creation of Area Land Use Plans for flood prone areas, correlated with the National Land Use Plan, based on FHRMs and the provisions of the FRMPs (measure at national level contained in all FRMPs assessed, to be developed at national and local level);
- The preparation or adaptation of national legislation regarding the right to use river beds, reservoirs and lands allocated or affected by the implementation of the 2010 National Strategy for Flood Risk Management (minor and major river beds, river banks, lake basins, buffer areas, reservoirs, restorations etc.); the takeover of lands in the state's public patrimony, or (on a case by case basis) limiting / conditioning the right of use of third party owners / administrators is envisaged (measure at national level contained in all FRMPs assessed);

[47] FRMP RO1000; FRMP R09; FRMP RO5; FRMP RO11 and FRMP R06.

- Legal and technical regulations for all categories of (new) construction that are built in potentially floodable areas or which are in any relation to the waters (measure at national level contained in all FRMPs assessed);
- Periodical inspections by the Constructions State Inspectorate at an interval of maximum one year and anytime at the decision of the Ministry of Environment, checking the legality of the town planning certificates, of the construction permits and execution of constructions and infrastructure works placed in floodplains (measure at national level contained in all FRMPs assessed).
- Analysis of possibilities and technical solutions to relocate buildings and infrastructure in floodplains to increase resilience to flood risks. Defining plans for legal solutions and financing sources. (measure at national level contained in all FRMPs assessed).

The FRMPs do not, however, provide information about how the evolution of the framework for land use and spatial planning has evolved since 2000.

NWRM have been planned in all of the five FRMPs assessed. All FRMPs assessed adopted the same water retention measures at river basin level, being listed under the category of protection measures.

The following measures appear in all FRMPs assessed and are NWRM related to forest management:

- Improving forest management in flood risk areas;
- Maintaining the surface of forests in the APSFRs' catchment basins;
- Development of retention areas for torrential rains.

Some of the FRMPs give concrete targets regarding the works of forest extension and development of torrent beds.

The FRMPs present different NWRM at APSFR level. The following measures appear in all FRMPs assessed.

- NWRM related to changing or adapting land use practices in forest management:
    - Improving forest management in flood risk areas;
    - Maintaining the surface of forests in the APSFRs' catchment basins.

Some FRMPs mention additional measures belonging to this category:

- Maintaining forests in the perimeter of storage reservoirs (all FRMPs assessed except Dobrogea Litoral, RO6);

- Development works for torrential catchment areas – development of torrent beds. (Someș-Tisa FRMP, RO9; Buzău – Ialomiţa FRMP, RO5).

Some FRMPs assessed also list measures to restore retention areas (flood plains, wetland, etc):

- Creation of new wetlands (seen, in the Someș-Tisa FRMP, RO9);
- Reconnection and restoration of flood plains (Also in the Someș-Tisa FRMP and in the Prut-Bârlad FRMP, RO11);
- Renaturation of the banks of the watercourse (vegetative protection), found in the Someș-Tisa FRMP, RO9;
- Re-meandering of water courses (Prut-Bârlad FRMP, RO11).

All FRMPs list the indicators associated to measures according to the Catalogue of potential measures at national level. Indicators are developed for the NWRM measures listed above (the FRMPs provide a common list and some include indicators for NWRM that either appear in other FRMPs or will be used in the future). Examples of NWRM indicators include the following:

- Measures to restore retention areas (flood plains, wetland, etc):
  - Restoration of natural lakes: number of natural lakes restored;
- Natural retention measures in urban / populated areas:
  - "green" gutters, channels, drainage systems, etc. (RO 03 Olt): number of municipalities where the measure is applied;
  - Collection and storage of rainwater in buried / underground reservoirs (RO 03 Olt): number of municipalities where the measure is being applied; storage capacity (m3);
  - Permeable pavements, green roofs, bio-retention areas, infiltration channels, landscaped green areas (including planting of trees and shrubs for the biological draining of excess humidity): number of municipalities where the measure is being applied.
- NWRM related to changing or adapting land use practices in agriculture:
  - Maintaining the areas occupied with meadows and pastures in floodplains: surface of areas occupied with meadows and pastures – reference year 2015 (ha)
  - Farming practices for soil conservation: number of areas with farming practices for soil conservation; surface of areas with farming practices for soil conservation (ha);
  - Terracing of slopes: number of terraced areas; surface of areas covered by terracing works (ha).

Measures that specifically consider nature conservation. Although the measures above for NWRM can include nature conservation elements, the FRMPs assessed do not contain measures that specifically refer to nature conservation.

All five FRMPs assessed make a brief reference indicating that they shall take into consideration **navigation and port infrastructure**. Only one measure directly refers to this topic, however: a project under preparation on "Danube sediment" (contained in the Danube FRMP, RO1000) will analyse issues related to navigation, among other things.

No reference has been found in the five FRMPs assessed specifically to **dredging** to increase the river channel capacity and its ability to convey water for flood alleviation purposes. Nonetheless, the FRMPs assessed include measures to increase the transiting capacity of the river bed through local desilting and readjustment works: these measures may involve dredging.

4.11 Recovery from and resilience to flooding

The role of insurance policies is discussed in all five FRPMs assessed, with regard to the recovery from flooding, preparedness/resilience to flood or other issues. All assessed FRMPs mention that one of the national level measures is the design of regulations regarding the insurance system for buildings situated in potential flooding areas. The responsible institutions are the Insurance Supervision Commission and the Ministry of Public Finance.

A 2008 national law (Law no. 260 of that year, recast) already requires all owners of dwellings (natural or legal persons) to have insurance against earthquakes, landslides and floods. The law has been in force since 2010[48].

The FRMPs do not provide further information on insurance in Romania: for example, whether insurance for industrial installations and other potentially polluting sites covers restoration costs from pollution related to flooding.

4.12 Monitoring progress in implementing the FRMP

The FRMPs assessed report that evaluation towards objectives will be carried out by evaluating the progress in implementing the proposed measures, based on quantitative and qualitative indicators. For each of these indicators, an expected value for year 2021 was established, comparing it to the reference year 2015, corresponding to the value at the start of the planning period, when the objective of the plan is established.

[48] https://lege5.ro/Gratuit/geydanjxgq2q/legea-nr-260-2008-privind-asigurarea-obligatorie-a-locuintelor-impotriva-cutremurelor-alunecarilor-de-teren-si-inundatiilor?d=16.05.2018

Indicators have been identified for all measures proposed in the FRMPs assessed, along with monitoring periodicity (controlling the progress in implementing the measure) for each measure, as well as the authorities responsible for monitoring.

In total, 96 indicators have been identified at national level to monitor the accomplishment of measures:

- Prevention measures: 14 indicators;
- Protection measures: 53 indicators;
- Public awareness measures: eight indicators;
- Preparedness measures: six indicators;
- Recovery and Review measures: nine indicators.

A few examples of the most representative indicators for the assessed FRMPs include:

- Length of watercourse with bank renaturalisation works (km);
- Surface of forests in floodplains (ha);
- Surface of forests in catchment basins (ha);
- Surface of forests in reservoir perimeter areas (ha);
- Length of corrected torrent beds (reference year 2015) – finalised works (km);
- Length of unsilted/readjusted watercourses (km);
- Length of relocated dams (km);
- Number of hydrotechnical constructions;
- Length of new dams (km);
- Length of water courses with maintenance works (km);
- Surface of maintained riverbeds (ha).

A few indicators were specific only to some FRMPs:

- Number of re-dimensioned bridges (found in the Buzău – Ialomiţa FRMP, RO5, and the Danube FRMP, RO1000);
- Length of elevated dams (km) (found in the Danube FRMP, RO1000).

The monitoring programme will involve the following activities:

- Monitoring the general measures at national and river basin level;
- Monitoring specific measures at APSFR level;
- Collecting periodic information regarding the result of monitoring, elaboration of a final report, explanation of possible deviations / changes, etc., as a basis for the next cycle activity (FRMP review);

Monitoring of national measures and general coordination of the monitoring will be done by the ministries with competence in flood risk management, with yearly reporting to the Inter-ministerial Council for Waters.

Measures at river basin and APSFR levels will be monitored by the River Basin Committee of each UoM, with yearly reporting to the Inter-ministerial Council for Waters. For the Danube FRMP, RO1000, measures at river basin and APSFR level will be monitored by the River Basin Committee of each UoM that is riparian to the Danube, with yearly reporting also to the Inter-ministry Council for Waters.

As noted, for each indicator a value is determined for 2015, the start of the planning period: Consequently, Romania has established a baseline against which progress will be monitored.

4.13 Coordination with the Water Framework Directive[49]

The table below shows how the development of the FRMPs has been coordinated with the development of the second River Basin Management Plans of the WFD. It should be noted that Romania has reported only one river basin district (RBD) under the WFD, the Danube (RO1000), covering the whole country, though Romania has established sub-basins that correspond to UoMs RO1 to RO11 under the FD (under the FD, the Danube UoM, RO1000, corresponds to the Danube strip between its banks and thus is different from the Danube RBD, despite the same designation).

Table 8 Coordination of the development of the FRMPs with the development of the second River Basin Management Plans of the WFD

	RO9	RO5	RO11	RO6	RO1000
Integration of FRMP and RBMP	✓	✓	✓	✓	✓
Joint consultation of draft FRMP and RBMP	✓	✓	✓	✓	✓
Coordination between authorities responsible for developing FRMP and RBMP	✓	✓	✓	✓	✓
Coordination with the environmental objectives in Art. 4 of the WFD	✓	✓	✓	✓	✓
The objectives of the FD were considered in the preparation of the RBMPs [a]	*	*	*	*	✓
Planning of win-win and no-regret measures in the FRMPs	✓	✓	✓	✓	✓
The RBMP Programme of Measures includes win-win measures in terms of achieving the objectives of the WFD and FD, drought management and	*	*	*	*	✓

[49] See section 4.7 of FRMP RO1000; FRMP R09; FRMP RO5; FRMP RO11 and FRMP R06.

	RO9	RO5	RO11	RO6	RO1000
NWRM [a]					
Permitting or consenting of flood risk activities (e.g. dredging, flood defence maintenance or construction) requires prior consideration of WFD objectives and RBMPs					
Natural water retention and green infrastructure measures have been included	✓	✓	✓	✓	✓
Consistent and compliant application of WFD Article 4(7) and designation of heavily modified water bodies with measures taken under the FD e.g. flood defence infrastructure	✓	✓	✓	✓	✓
The design of new and existing structural measures, such as flood defences, storage dams and tidal barriers, have been adapted to take into account WFD Environmental Objectives [a]	*	*	*	*	✓
The use of sustainable drainage systems, such as the construction of wetland and porous pavements, have been considered to reduce urban flooding and also to contribute to the achievement of WFD Environmental Objectives					
Other					

Notes: [a] based on reporting under the WFD. * Under the WFD, Romania reported only one RBD (the Danube, RO1000), whose territory covers the whole country (in contrast, Romania has reported 12 UoMs under the FD and the Danube UoM only covers the Danube River's banks).

For four FRMPs assessed (corresponding to UoMs RO9, RO5, RO11 and RO6), the development of the FRMPs has been coordinated with the development of the sub-basin River Management Plans, prepared in parallel (the sub-basin plans were prepared for the same territories as the UoMs). The only difference across the FRMPs assessed is a small variation in terms of the measures taken under both the FD and the WFD.

Romanian Waters is the state authority that has the responsibility of implementing both the WFD and FD. Among the main responsibilities of Romanian Waters are both the development of River Basin Management Plans and of FRMPs, based on FHRMs done for flood prone areas. As such, Romanian Waters organised a joint consultation of draft FRMPs and RBMPs at national and river basin level (see section 7).

As noted in section 3, the environmental objectives of the WFD are integrated into Romania's common FRMP objectives (see section 3). Also, the prioritisation of measures in the FRMPs included an assessment of their "support to achieve and conserve GES / GEP…".

The WFD was also considered in the methodological recommendations in defining FRMP measures:

- Special attention was given to non-structural measures, following EU guidelines and recommendations. Out of 23 types of measures, 22 are non-structural or light structural (only one structural type of measure involves hard engineering works).
- Regarding non-structural measures, although the initial recommendation was to apply them at APSFR level, in order to significantly improve flood risk management, the current recommendation is to apply them on a large scale at the level of the river basin or sub-basin.
- The measures proposed in the Catalogue of potential common measures for both FRMPs and RBMPs are those for flood risk protection. Application of these measures is done at the APSFR and/or river basin level.

Moreover, all FRMPs assessed present NWRM related to changing or adapting land use practices in forest management, as described above and some FRMPs also list measures to restore retention areas such as floodplains and wetlands. One FRMP assessed, RO9, also lists a measure for dam relocation, taken under both the FD and WFD. Indeed, many of the NWRM and other measures indicated in the FRMPs are common measures for both FRMPs and RBMPs. In total, across the five FRMPs assessed, there are 103 common measures in the Someș-Tisa FRMP (RO9), 32 in the Buzău – Ialomiţa FRMP (RO5), 59 in the Prut - Bârlad FRMP (RO11) and 15 in the Dobrogea – Litoral FRMP (RO6). RO1000 Danube does not list any common measures, for the reasons explained above.

4.14 Good practices and areas for further development with regard to measures

The following **good practices** were identified:

- In the five FRMPs assessed, all measures at the APSFR level are specific and measurable, while some of the UoM-level measures are specific as well – for many measures, specific locations are identified;
- All the FRMPs assessed establish a process for monitoring the progress of their measures and identify indicators for this process, including quantitative baselines and targets.
- The FRMPs assessed include measures that address spatial planning and natural water retention.
- Special attention was given to non-structural measures. Out of 23 types of measures, 22 are non-structural or light structural (only one structural measure involves hard engineering works);

- Romania's FRMPs and RBMPs were prepared in close coordination, including in the assessment of measures in terms of the achievement of WFD objectives.

The following **areas for further development** were identified:

- All FRMPs assessed lacked a description of how much the measures contribute to the achievement of objectives and do not contain a description of whether the objectives will be met when all measures are implemented[50];
- There is no budget provided for the implementation of measures; although there are indications of funding sources, clear details are not provided;

[50] Romania recalled subsequently that this was optional reporting.

5. Consideration of climate change

5.1 Specific measures to address expected effects of climate change

The five FRMPs assessed contain identical measures that are indicated as related to climate change. The following measure will be taken at national level[51]: Studies to estimate the impact of climate change on the regime of maximal debits of water courses. The following measure will be taken at both national and at river basin level[52]: update of the FHRMs, including: consideration of flash floods (pluvial floods), other flood producing mechanisms and the effects of climate change.

The following measures will be taken at river basin level[53]: Adapting construction, infrastructure and existing flood defence systems for climate change impacts, recalculating the levels of protection of the current flood projection system, including the reservoir's spillway capacity and optimising the exploitation of reservoirs to increase the retention / attenuation capacity;

The following type of measures will be taken at APSFR level[54]: adapting construction, infrastructure and existing defence systems for climate change conditions, elevating existing dams and defence works.

While Romania has identified NWRM as well as measures related to land use and spatial planning, the FRMPs assessed do not specify if climate change was taken into consideration in the identification and planning of these measures.

The five FRMPs do not contain references to the national climate adaptation strategy (which in Romania is integrated into the national Climate Change Strategy 2013 – 2020).

The FRMPs assessed do not provide information about the timeframes considered for the climate change scenarios. There is also no reference to possible shifts in the occurrence of extreme events, changes in numerical recurrence times or changes in the main sources of flooding.[55]

5.2 Good practices and areas for further development concerning climate change

The following **good practice** was identified:

[51] See section 4.1 of FRMP RO1000; FRMP R09; FRMP RO5; FRMP RO11 and FRMP R06.
[52] See section 4.3 of FRMP RO1000; FRMP R09; FRMP RO5; FRMP RO11 and FRMP R06.
[53] See section 4.3 of FRMP RO1000; FRMP R09; FRMP RO5; FRMP RO11 and FRMP R06.
[54] See section 4.5 of FRMP RO1000; FRMP R09; FRMP RO5; FRMP RO11 and FRMP R06.
[55] FRMP RO1000; FRMP R09; FRMP RO5; FRMP RO11 and FRMP R06.

- All the FRMPs assessed include measures to address climate change, including studies for future action.

The following **area for further development** was identified:

- The FRMPs assessed do not provide an overview of potential climate impacts (except FRMP for RO9 Somes Tisa), nor refer to Romania's National Climate Change Strategy.

6. Cost-benefit analysis

The five FRMPs assessed refer to cost benefit analysis as one of the criteria for the establishment of priorities for the selection of measures. Measures have been prioritised by assessing the benefit of each measure to the nine flood risk management objectives. The methodology is based on multi-criteria analysis with cost-benefit elements. The priority of each measure was quantified depending on the value of the benefit / cost ratio[56]. Further details, including the results of the analysis, were not found in the FRMPs assessed.

The multi-criteria analysis with cost-benefit elements was used for most measures at APSFR level. However, the analysis was not undertaken for all the non-structural measures that had been deemed necessary for the flood risk management at the start of preparations for the FRMPs. The analysis was not applied to national and river basin level measures, nor to measures at the APSFR level which have a major environmental benefit, those being considered high priority from the start.

As noted above, benefits were assessed in terms of Romania's nine flood risk management objectives; three of the nine objectives refer to the WFD's objectives and provisions: consequently, the analysis considered benefits for the WFD. No information was found in the FRMPs assessed, or online, indicating whether the method considered other multi-benefits[57]. No information could be found if the cost / benefit analysis was used to assess measures with transnational effects[58].

6.1 Good practices and areas for further development

The following **good practice** was identified:

- The FRMPs assessed indicate that a prioritisation methodology based on multi-criteria analysis with cost-benefit elements was used.

The following **area for further development** was identified:

- Details on the results of the analysis were not found in the FRMPs assessed.

[56] See section 4.4 FRMP RO1000; FRMP R09; FRMP RO5; FRMP RO11 and FRMP R06.
[57] FRMP RO1000; FRMP R09; FRMP RO5; FRMP RO11 and FRMP R06.
[58] FRMP RO1000; FRMP R09; FRMP RO5; FRMP RO11 and FRMP R06.

7. Governance including administrative arrangements, public information and consultation

7.1 Competent authorities

According to the information reported initially by Romania in May 2010, the competent authorities for the Flood Directive are the Ministry of Environment and Forests and the National Administration Romanian Waters[59]. Romania has not reported new information to WISE since 2010.

7.2 Public information and consultation

The table below shows how the public and interested parties were **informed** in the five UoMs assessed concerning the draft FRMPs. Information on how the consultation was actually carried out and which stakeholders participated is presented in the rest of the section:

Table 9 Methods used to inform the public and interested parties of the FRMPs

	RO9	RO5	RO11	RO6	RO1000
Media (papers, TV, radio)	✓	✓	✓	✓	✓
Internet	✓	✓	✓	✓	✓
Digital social networking					
Printed material	✓	✓	✓	✓	✓
Direct mailing	✓	✓	✓	✓	✓
Invitations to stakeholders	✓	✓	✓	✓	✓
Local Authorities	✓	✓	✓	✓	✓
Meetings	✓	✓	✓	✓	✓
Other *	✓	✓	✓	✓	✓

Notes: * for Romania, 'Other' includes the production of a documentary film

The consultation process was carried at several levels:

- national level (national coverage, including at central level);
- river basin level (at the level of the hydrographic basins and the River Basin Committees),
- local and county level (at the level of counties, communes, localities that can be subject to risk and can be affected by negative effects of floods).

The consultation process for the RO1000 FRMP at the river basin level was carried out through the River Basin Administrations of the seven UoMs that are riparian to the river

[59] http://cdr.eionet.europa.eu/Converters/run_conversion?file=ro/eu/fdart3/envsy7cw/RO_CAUoM_20100521.xml&conv=238&source=remote

Danube. Otherwise, the consultation process was very similar across the UoMs, with few differences.

1. Nation-wide actions, including at the central level, consisted of:
    - Drafting the Communication Plan for FRMPs;
    - Meetings with academia;
    - Distribution in mass media (radio, press);
    - Organisation of debates;
    - Presentations at conferences;
    - Dissemination of questionnaires and newsletters to stakeholders – 6 000 copies of brochures containing the FRMPs' proposed objectives and the catalogue of measures were sent to stakeholders, 500 copies for each river basin and 500 copies in Bucharest and at national level;
    - Dissemination of printed material (catalogue of measures, flyers);
    - Posting of relevant information/materials on the websites of the Romanian Waters, the River Basin Administrations, The National Institute for Hydrology and Water Management;
    - Production and broadcast on the national TV channel TVR1 of a documentary, "Water and Technology serving people" (four episodes), dedicated to flood risk management, the FHRM, the catalogue of potential measures, the FRMPs and national relevant projects. The documentary was broadcast in November 2015.

2. Actions at the UoM level consisted of:
    - Drafting the Communication Plan for river basin level FRMPs;
    - Presentations at conferences, meetings, especially organised at the level of River Basin Committees;
    - Dissemination of questionnaires and newsletters to stakeholders;
    - Organisation of information points at the headquarters of the local authorities and in schools;
    - Posting of relevant information/materials on the website;
    - Sending press releases to the media.

3. The FRMPs indicate the following actions at local and county level (specifically, counties, communes and municipalities that are subject to flood risks) that were information and consultation activities:
    - County Councils, prefectures and local authorities were randomly checked whether they are aware of their flood risk responsibilities. The stage of FHRM integration in the county and local level urbanism and land use plans was checked as well.

- All counties participated in the yearly programme that verifies the way watercourses have been cleaned, how ditches and gutters are maintained by municipalities and localities facing flood risk, to ensure drainage sectors of large watercourses.

The table below shows how the actual **consultation** was carried out:

Table 10 Methods used for the actual consultation

	RO9	RO5	RO11	RO6	RO1000
Via Internet	✓	✓	✓	✓	✓
Digital social networking					
Direct invitation	✓	✓	✓	✓	✓
Exhibitions					
Workshops, seminars or conferences	✓	✓	✓	✓	✓
Telephone surveys					
Direct involvement in drafting FRMP	✓	✓	✓	✓	✓
Postal written comments					
Sending newsletters and questionnaires to identify stakeholders	✓	✓	✓	✓	✓

Source: FRMPs

Workshops were organised to involve stakeholders outside the specialist groups. Public consultation was carried out via internet or in public meetings. As noted above, stakeholders were sent questionnaires to complete. There were two questionnaires elaborated at national level and distributed regionally in the river basins, to selected regional stakeholders[60]. During dedicated meetings, their opinion was also directly asked on different aspects related to FRMPs, especially the catalogue of measures[61].

The table below shows how the **documents** for the consultation were provided:

[60] Questionnaire no. 1 is annexed to all FRMPs assessed.
[61] See chapter 6 of FRMP RO1000; FRMP R09; FRMP RO5; FRMP RO11 and FRMP R06.

Table 11 Methods used to provide the documents for the consultation

	All UoMs assessed
Downloadable	✓
Direct mailing (e-mail)	✓
Direct mailing (post)	
Paper copies distributed at exhibitions	
Paper copies available in municipal buildings (town hall, library etc.)	
Paper copies at the main office of the competent authority	
Paper copies disseminated to stakeholders	✓

Source: FRMPs

The relevant documents were posted on the webpages of the Romanian Waters Administration, the River Basins Administrations and of the National Institute for Hydrology and Water Management. Stakeholders were sent electronic newsletters and questionnaires; which stakeholders were requested to complete[62].

7.3 Active involvement of Stakeholders

The table below shows the groups of **stakeholders** that have been actively involved in the development of the five FRMPs assessed:

Table 12 Groups of stakeholders actively involved in the development of the FRMPs

	All UoMs assessed
Civil Protection Authorities such as Government Departments responsible for emergency planning and coordination of response actions	✓
Flood Warning / Defence Authorities	✓
Drainage Authorities	
Emergency services	
Water supply and sanitation	✓
Agriculture / farmers	✓
Energy / hydropower	✓
Navigation / ports	
Fisheries / aquaculture	
Private business (Industry, Commerce, Services)	✓
NGOs including nature protection, social issues (e.g. children, housing)	✓
Consumer Groups	
Local / Regional authorities	✓
Academia / Research Institutions	✓

Notes: * 'Other' in Romania includes: Ministry of Finance, Ministry of Economy, Forestry Directorates, transportation authorities, land use authorities, health authorities, education

[62] See chapter 6 of FRMP RO1000; FRMP R09; FRMP RO5; FRMP RO11 and FRMP R06.

authorities and consumer protection agencies.

Most of the stakeholders were public authorities, either at central or regional/local level. Research and academia, but also a few NGOs and state-owned companies (e.g. the hydro-power company), mass media, schools, the church, citizens living in flood prone areas were involved as well. There is no information on the total number of stakeholders participating[63]. The number of meetings with the public authorities listed is much higher than with the other stakeholders. Most of the meetings listed occurred within the River Basin Committees and the Inter-Ministerial Water Council.

The table below shows the **mechanisms** used to ensure the active involvement of stakeholders:

Table 13 Mechanisms used to ensure the active involvement of stakeholders

	RO9	RO5	RO11	RO6	RO1000
Regular exhibitions					
Establishment of advisory groups					
Involvement in drafting	✓	✓	✓	✓	✓
Workshops and technical meetings	✓	✓	✓	✓	✓
Formation of alliances					

Source: FRMPs

All stakeholders were sent electronic questionnaires which stakeholders were required to fill in. During dedicated meetings at national and regional levels, their opinion was also directly asked on different aspects related to FRMPs, especially the catalogue of measures[64].

Within the national government, the FRMPs were discussed and endorsed within the Inter-ministerial Water Council, a consultative body without legal status that functions along the national water authority. It is composed of representatives of national authorities that have responsibilities in the field of flood risk management. The Council coordinates and endorses policies and strategies in field of water management and flood risk management to achieve an integrated and sustainable approach.

The FRMPs were discussed and endorsed in the River Basin Committee for each UoM: Romania's River Basin Committees are composed of representatives of regional, county and local public authorities as well as other relevant stakeholders that have responsibilities in the field of water management: NGOs and water users associations located in the river basin. The responsibilities of the River Basin Committees related to flood risk management include:

63 See Chapter 6 of FRMP RO1000; FRMP R09; FRMP RO5; FRMP RO11 and FRMP R06.
64 See chapter 6 of FRMP RO1000; FRMP R09; FRMP RO5; FRMP RO11 and FRMP R06.

- to recommend to local authorities methods of ensuring financial resources from local budgets;
- to participate in decisions regarding the creation and use of the dedicated Fund for the equipment and maintenance of flood defence works;
- to endorse the FHRM and the FRMPs.

7.4 Effects of consultation

The FRMPs provide no information about how the involvement of stakeholders led to changes in the content of FRMPs[65].

7.5 Strategic Environmental Assessment

Neither the FRMPs nor the reporting sheets provide information on Strategic Environmental Assessment of the FRMPs.

Nonetheless, according to a draft decision posted by the Ministry of Environment, all of Romania' FRMPs underwent a Strategic Environmental Assessment procedure, specifically the initial screening phase (a final decision was not found online). The decision taken following the screening phase was that the FRMPs did not need further environmental evaluation. The decision also stated that projects necessary to implement the FRMPs' measures should be analysed via EIA procedures[66].

7.6 Good practices and areas for further development regarding Governance

The following **good practices** were identified:

- For all FRMPs assessed and also at national level, Romania used a range of communication tools and consultation mechanisms to inform and engage stakeholders and the public through the different phases of the planning process, including a documentary film, a survey and direct contacts with local authorities;
- Stakeholders were engaged via workshops and technical meetings in all five RBMPs assessed and via the River Basin Committees.

The following **areas for further development** were identified:

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[65] Romania subsequently informed that in the process of the FRMPs' approval by Government Decision, comments were received and were integrated in the Plans and were reportedly shared with the European Commission in February 2017.

[66] Website of the Ministry of Environment: http://www.mmediu.ro/articol/planul-de-management-al-riscului-la-inundatii-sinteza-nationala/1527; http://www.mmediu.ro/app/webroot/uploads/files/2016-05-17_DECIZIA_etapei_de_incadrare_la_PNMRI.pdf

- The FRMPs do not include a description of how the consultation results were considered in the final drafting of the plan and the effects of the consultation are not summarised in the FRMPs.
- It appears that the main stakeholders that were actively involved were largely from the public sector (as opposed to stakeholders from NGOs, the private sector and citizens).

Annex A: Supplementary tables and charts on measures

This Annex gives an overview of the data on measures provided by Romania in the reporting sheets. These tables and charts were used for the preparation of section 4 on measures.

Background & method

This document was produced as part of the assessment of the Flood Risk Management Plans (FRMPs). The tables and charts below are a summary of the data reported on measures by the Member States and were used by the Member State assessor to complete the questions on the Flood measures. The data are extracted from the XMLs (reporting sheets) reported by Member States for each FRMP, and are split into the following sections:

- **Measures overview** – Tabulates the number of measures for each UoM;
- **Measure details: cost** – Cost & Cost explanation;
- **Measures details: name & location** – Location & geographic coverage;
- **Measure details: authorities** – Name of responsible authority & level of responsibility;
- **Measure details: objectives** – Objectives, Category of priority & Timetable;
- **Measure details: progress** – Progress of implementation & Progress description;
- **Measure details: other** – Other Community Acts.

On the basis of the reporting guidance (which in turn is based on the FD)[67], not all fields are mandatory, and, as such, not all Member States reported information for all fields.

Some of the fields in the XMLs could be filled in using standardised answers – for example, progress is measured via the categories set out in the Reporting Guidance. This means that producing comprehensive tables and charts required little effort. For many fields, however, a free data format was used. For some Member States, this resulted in thousands of different answers, or answers given in the national language.

In such situations, tables and charts were developed using the following steps:

- A first filter is applied to identify how many different answers were given. If a high number of different answers are given, Member States assessors were asked to refer to the raw data when conducting the assessment, and this Annex does not reflect these observations.
- If a manageable number of answers are given, obvious categories are identified, and raw data sorted.

[67] http://icm.eionet.europa.eu/schemas/dir200760ec/resources

- Measures missing information may be assigned categories based on other fields (for example, if the level of Responsibility Authority is missing, the information may be obvious from the field "name of Responsible Authority").
- Measures where obvious categories cannot be defined based on other available information (as in the example above on the name of the Responsible Authority), are categorised as "no information".

Types of measures used in reporting

The following table[68] is used in the reporting on the types of measures. Each type of measures is coded as an M-number. Measures are grouped in an 'aspect'.

NO ACTION M11: No Action	**PREPAREDNESS** M41: Flood Forecasting & Warning M42: Emergency response planning M43: Public Awareness M44: Other preparedness
PREVENTION M21: Avoidance M22: Removal or relocation M23: Reduction M24: Other prevention	**RECOVERY & REVIEW** M51: Clean-up, restoration & personal recovery M52: Environmental recovery M53: Other recovery
PROTECTION M31: Natural flood management M32: Flow regulation M33: Coastal and floodplain works M34: Surface Water Management M35: other protection	**OTHER MEASURES** M61: Other measures

[68] Guidance for Reporting under the Floods Directive (2007/60/EC) https://circabc.europa.eu/w/browse/a3c92123-1013-47ff-b832-16e1caaafc9a

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Measures overview

Table A1 - Total number of measures

Number of individual measures	2 347
Number of individual measures including measures which have been allocated to more than one measure type	2 347
Number of aggregated measures	791
Number of aggregated measures including measures which have been allocated to more than one measure type	791
Total number of measures	3 138
Total number of measures including measures which have been allocated to more than one measure type	3 138
Range of number of measures between UoMs	82 – 441

Table A2 - Number of individual measures per measure type and UoM

	Prevention	**Protection**					**Preparedness**		**Recovery & Review**	**Other**	**Grand Total**
	M23	**M31**	**M32**	**M33**	**M34**	**M35**	**M41**	**M44**			
RO1		65	1	66	1	96					229
RO2		40	1	25		56		1			123
RO3		68	1	49	4	64					186
RO4		72	4	58		55					189
RO5		34	3	30		24					91
RO6		14		17		10					41
RO7		99	2	83		85					269
RO8		92	9	89	5	169		2			366
RO9		98	1	21	4	73	12	1			210
RO10		95	3	166	3	90					357
RO11		58	6	21	3	121					209
RO1000	4	4		6	12	51					77

Grand Total	**4**	**739**	**31**	**631**	**32**	**894**	**12**	**4**	**0**	**0**	**2 347**
Average per UoM	**<1**	**62**	**3**	**53**	**3**	**75**	**1**	**<1**	**0**	**0**	**196**

Notes: The codes used are explained in the previous section of this Annex. No individual measures were reported for Recovery & Review or Other.

Table A3 - Number of aggregated measures per measure type and UoM

	Prevention		**Protection**				**Preparedness**				**Recovery & review**			**Other**	**Grand Total**
	M21	**M24**	**M31**	**M32**	**M33**	**M35**	**M41**	**M42**	**M43**	**M44**	**M51**	**M52**	**M53**		
RO1		10	3		3	3	2	8	7	2	1	1	2		42
RO2		10	3			3	2	8	7	2	1	1	2		39
RO3	1	9	6	7	52	16	2	8	7	2	1	1	2		114
RO4	1	9	3	1	10	4	2	8	7	2	1	1	2		51
RO5		10	3	2	20	7	4	8	7	2	1	1	2		67
RO6		10	3	1	1	3	2	8	7	2	1	1	2		41
RO7	1	9	3			3	2	8	7	2	1	1	2		39
RO8	1	9	3	13	19	7	2	8	7	2	1	1	2		75
RO9	1	9	8	21	44	16	3	8	7	2	1	1	2		123
RO10		10	3		25	4	2	8	7	2	1	1	2		65
RO11	1	10	3	12	37	9	2	8	7	2	1	1	2		95
RO1000	1	10	3			3	2	8	7	2	1	1	2		40
Grand Total	**7**	**115**	**44**	**57**	**211**	**78**	**27**	**96**	**84**	**24**	**12**	**12**	**24**	**0**	**791**
Average per UoM	**<1**	**10**	**4**	**5**	**18**	**7**	**2**	**8**	**7**	**2**	**1**	**1**	**2**	**0**	**66**

Notes: The codes used are explained in the previous section of this Annex. No aggregated measures were reported for Other.

Table A4 - Total number of measures (aggregated and individual) per measure type and UoM

	Prevention		Total	Protection		Total	Preparedness		Total	Recovery &	Total	Other	Grand Total
	Aggregated	Individual		Aggregated	Individual		Aggregated	Individual		Aggregated			
RO1	10		10	9	229	238	19		19	4	4		271
RO2	10		10	6	122	128	19	1	20	4	4		162
RO3	10		10	81	186	267	19		19	4	4		300
RO4	10		10	18	189	207	19		19	4	4		240
RO5	10		10	32	91	123	21		21	4	4		158
RO6	10		10	8	41	49	19		19	4	4		82
RO7	10		10	6	269	275	19		19	4	4		308
RO8	10		10	42	364	406	19	2	21	4	4		441
RO9	10		10	89	197	286	20	13	33	4	4		333
RO10	10		10	32	357	389	19		19	4	4		422
RO11	11		11	61	209	270	19		19	4	4		304
RO1000	11	4	15	6	73	79	19		19	4	4		117
Grand Total	**122**	**4**	**126**	**390**	**2 327**	**2717**	**231**	**16**	**247**	**48**	**48**	**0**	**3 138**
Average per UoM	**10**	**<1**	**11**	**33**	**194**	**226**	**19**	**1**	**21**	**4**	**4**	**0**	**262**

Notes: The codes used are explained in the previous section of this Annex. No measures were reported for Other. No individual measures were reported for Recovery & Review

The information in Table A4 is visualised in Figures A1 and A2 below:

Figure A1 - Number of total measures (individual and aggregate) by measure aspect

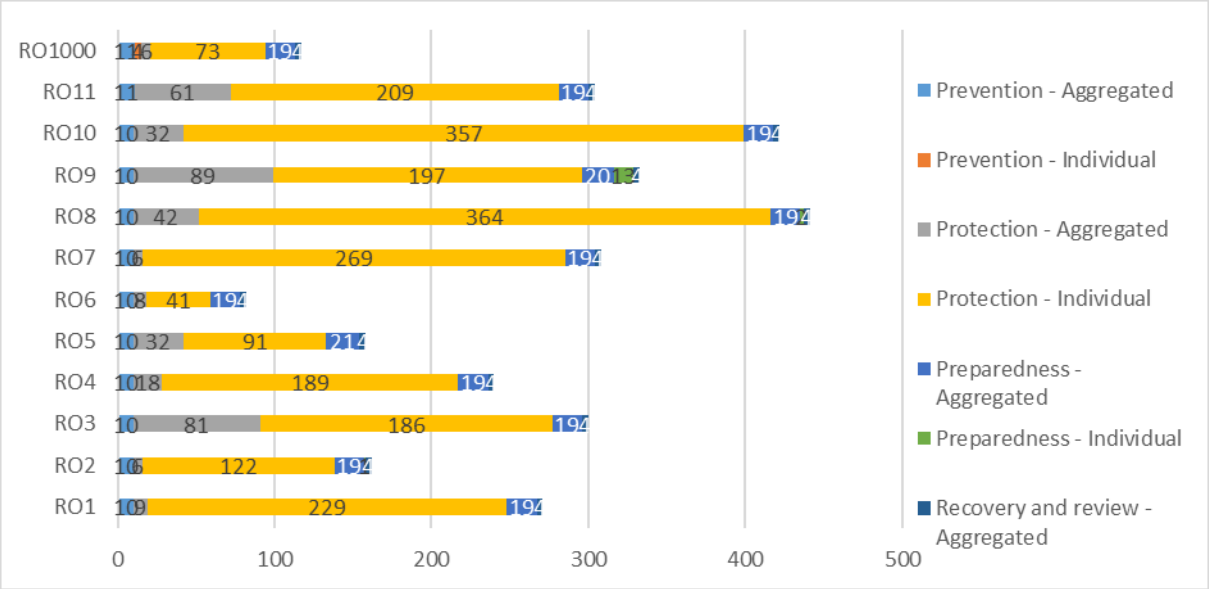
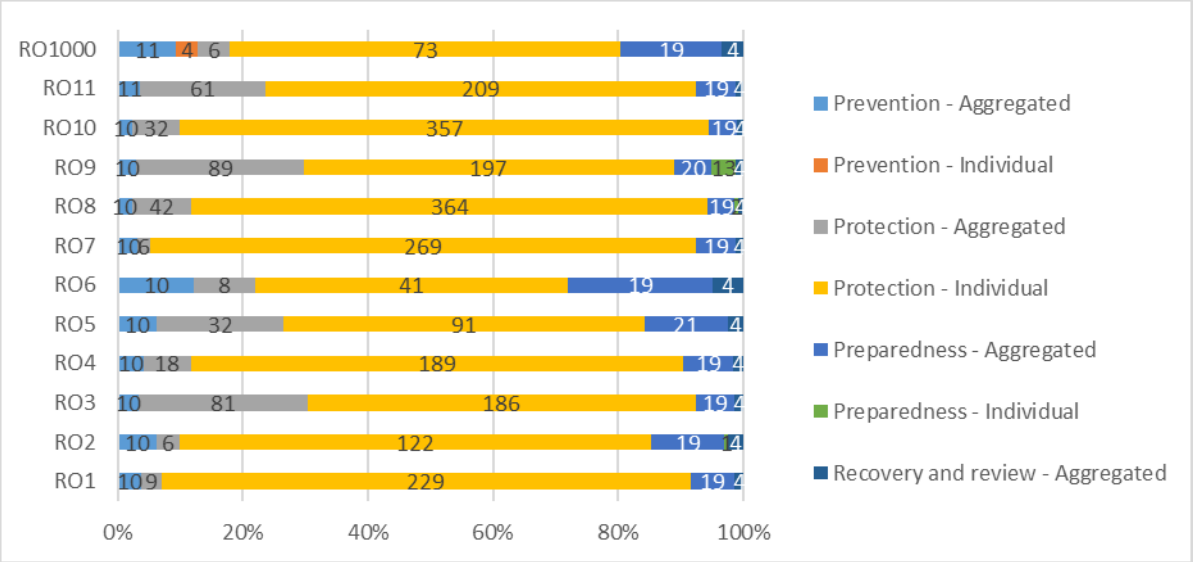


Figure A2 - Share of total measures (aggregated and individual) by measure aspect



Measure details: cost

Member States were requested to report information on:

- Cost (optional field);
- Cost explanation (optional field).

Romania did not provide information about costs or cost explanations for any of the measures in the reporting sheets.

Measure details: name & location

Member States were requested to report information on the following:

- Location of implementation of measures (mandatory field);
- Geographic coverage of the impact of measures (optional field).

Romania provided information about the location of all measures.

Table A5 - Location of implementation by measure aspect

	APSFR	UoM	National	Grand Total
Preparedness	19	108	120	247
Prevention		53	73	126
Protection	2 572	145		2 717
Recovery &		36	12	48
Grand Total	**2 591**	**342**	**205**	**3 138**

Figure A3 - Visualisation of Table A5: Location of implementation by measure aspect

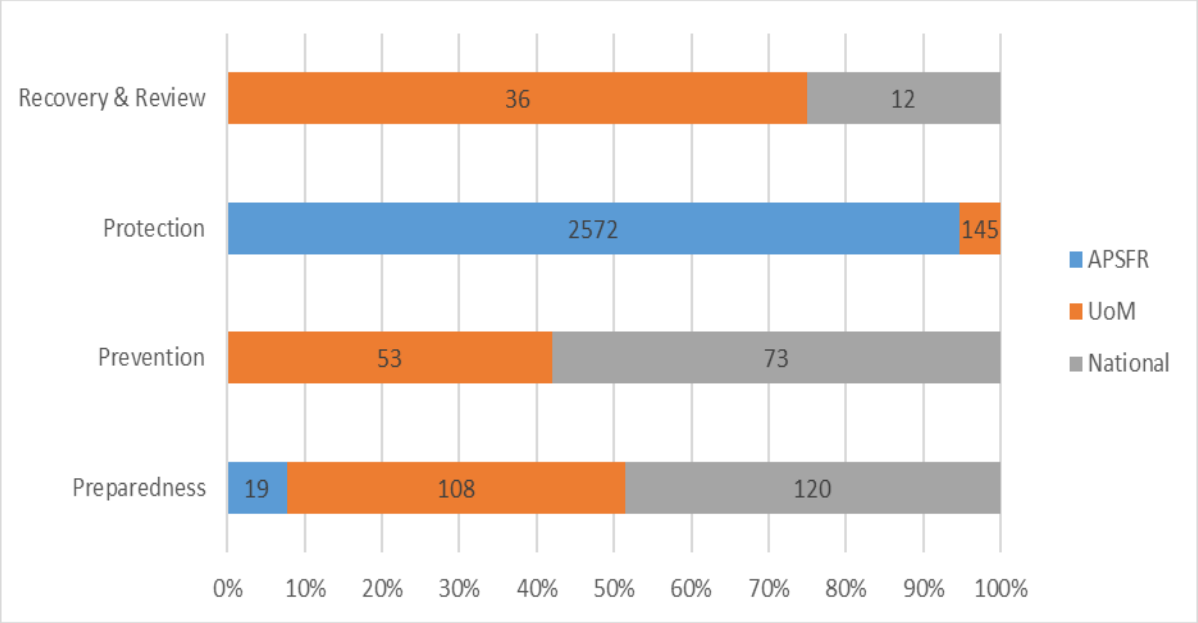
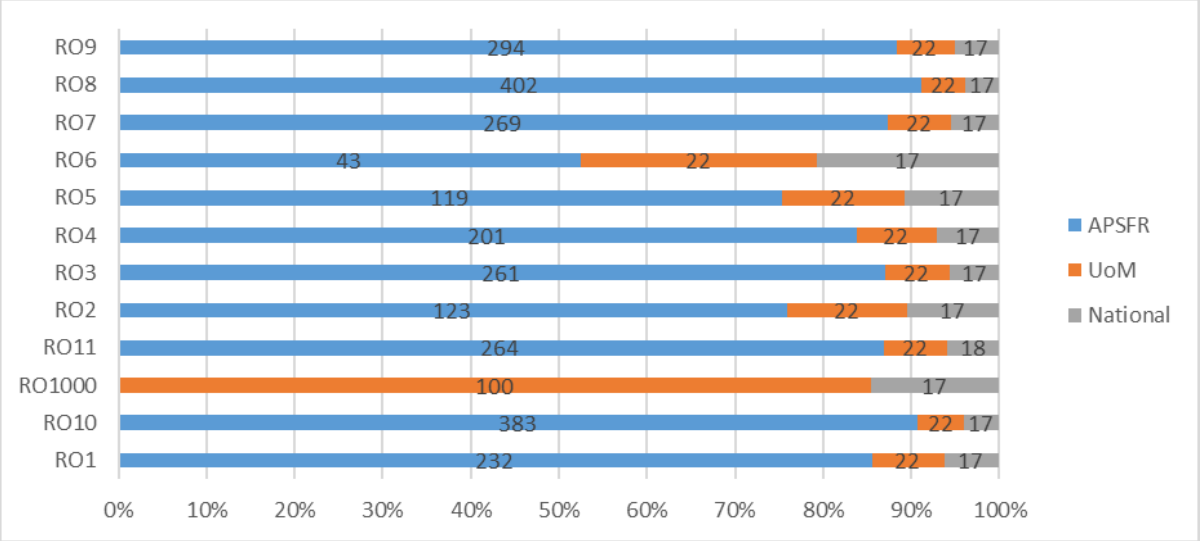


Table A6 - Location of implementation by UoM

	APSFR	UoM	National	Grand Total
RO1	232	22	17	271
RO10	383	22	17	422
RO1000		100	17	117
RO11	264	22	18	304
RO2	123	22	17	162
RO3	261	22	17	300
RO4	201	22	17	240
RO5	119	22	17	158
RO6	43	22	17	82
RO7	269	22	17	308
RO8	402	22	17	441
RO9	294	22	17	333
Grand Total	**2 591**	**342**	**205**	**3 138**
Average per UoM	**216**	**29**	**17**	**262**

Figure A4 - Visualisation of Table A6: Location of implementation by UoM



Geographic coverage

No information reported in the reporting sheets.

Measure details: objectives

Member States were requested to report information on:

- Objectives linked to measures (optional field, complementary to the summary provided in the textual part of the XML);

- Category of priority (Conditional, reporting on either ‘category of priority’ or ‘timetable’ is required);
- Timetable (Conditional, reporting on either ‘category of priority’ or ‘timetable’ is required).

Objectives

Romania did not provide information about the objectives of the measures in the reporting sheets.

Category of priority

Romania did not provide information about the category of priority of the measures in the reporting sheets.

Timetable

Romania reported the same timetable for all measures in the reporting sheets: January 2016 - December 2021.

Measure details: authorities

Member States were requested to report information on:

- Name of the responsible authority (optional if ‘level of responsibility’ is reported);
- Level of responsibility (optional if ‘name of the responsible authority’ is reported).

Romania provided the names of the responsible authority for all measures in the reporting sheets. However, this was an open question and a large variety of responses was provided, thus it was not possible to aggregate the data.

Romania did not provide information about the level of responsibility of the authorities in the reporting sheets.

Measure details: progress

Member States were requested to report information on:

- Progress of implementation of measures (mandatory field) – this is a closed question whose responses are analysed below;
- Progress description of the implementation of measures (optional field) – this is an open text question for which not all Member States reported and whose answers are not analysed here.

Romania reported information about the progress of implementation of the measures. The Progress of implementation was reported as[69]:

- COM (completed);
- OGC (ongoing construction);
- POG (progress ongoing);
- NS (not started).

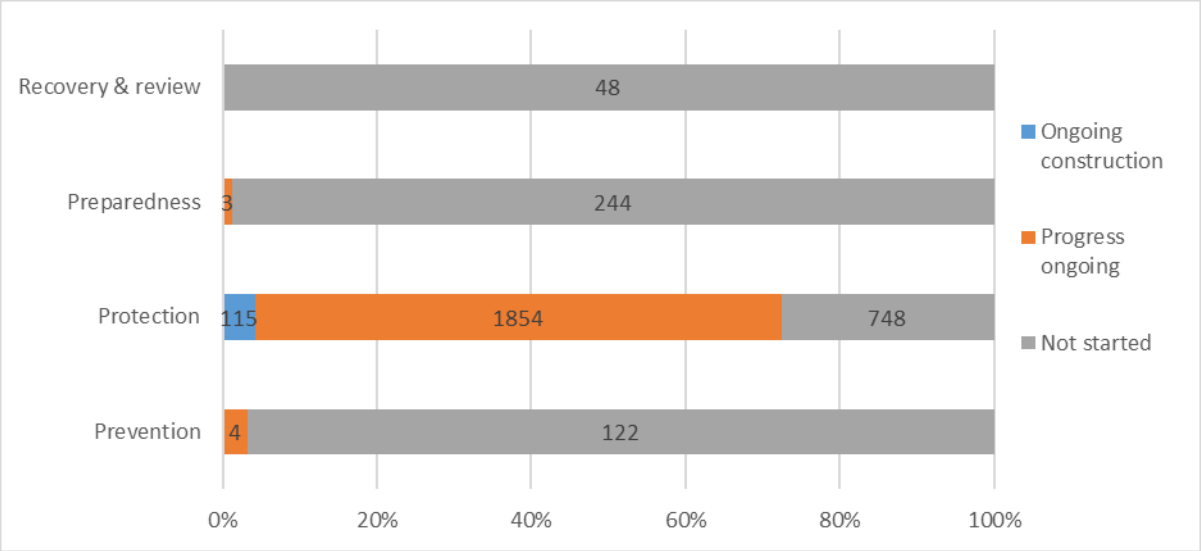
A full definition of these terms can be found at the end of this section.

Table A7 – Progress of implementation by measure aspect

	Ongoing construction	Progress ongoing	Not started	Grand Total
Prevention		4	122	126
Protection	115	1 854	748	2 717
Preparedness		3	244	247
Recovery & review			48	48
Grand Total	**115**	**1 861**	**1 162**	**3 138**

Notes: No measures were reported as completed

Figure A5 - Visualisation of Table A7: Progress of implementation by measure aspect



Notes: No measures were reported as completed

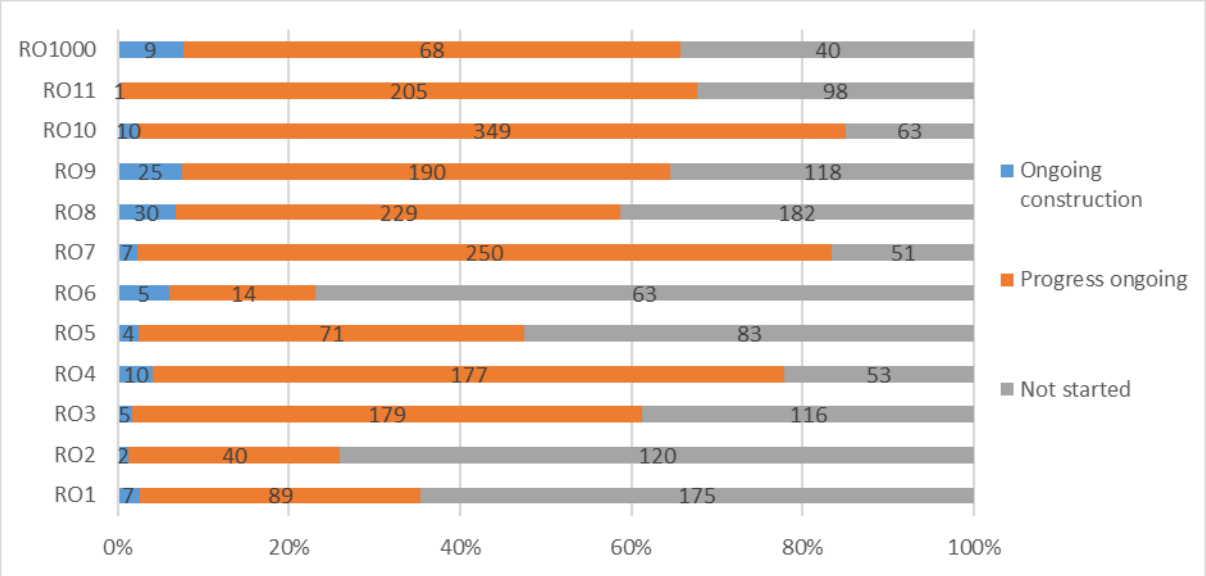
[69] Guidance for Reporting under the Floods Directive (2007/60/EC): https://circabc.europa.eu/w/browse/a3c92123-1013-47ff-b832-16e1caaafc9a

Table A8 – Progress of implementation by UoM

	Ongoing construction	Progress ongoing	Not started	Grand Total
RO1	7	89	175	271
RO2	2	40	120	162
RO3	5	179	116	300
RO4	10	177	53	240
RO5	4	71	83	158
RO6	5	14	63	82
RO7	7	250	51	308
RO8	30	229	182	441
RO9	25	190	118	333
RO10	10	349	63	422
RO11	1	205	98	304
RO1000	9	68	40	117
Grand Total	**115**	**1 861**	**1 162**	**3 138**
Average per UoM	**10**	**155**	**97**	**262**

Notes: No measures were reported as completed

Figure A6 - Visualisation of Table A8: Progress of implementation by UoM



Notes: No measures were reported as completed

The categories describing the progress of measures are defined in the EU Reporting Guidance Document on the FD.

For **measures involving construction or building works** (e.g. a waste water treatment plant, a fish pass, a river restoration project, etc.):

- Not started (NS) means the technical and/or administrative procedures necessary for

starting the construction or building works have not started.

- Progress on-going (POG) means that administrative procedures necessary for starting the construction or building works have started but are not finalised. The simple inclusion in the RBMPs is not considered planning in this context.
- On-going construction (OGC) means the construction or building works have started but are not finalized.
- Completed (COM) means the works have been finalised and the facilities are operational (maybe only in testing period in case e.g. a waste water treatment plant).

For **measures involving advisory services** (e.g. training for farmers):

- Not started (NS) means the advisory services are not yet operational and have not provided any advisory session yet.
- Progress on-going (POG) means the advisory services are operational and are being used. This is expected to be the situation for all multi- annual long/mid-term advisory services that are expected to be operational during the whole or most of RBMP.
- On-going construction (OGC): Not applicable
- Completed (COM) means an advisory service that has been implemented and has been finalised, i.e. is no longer operational. This is expected only for advisory services that are relatively short term or one-off, and which duration is time limited in relation to the whole RBMP.

For **measures involving research, investigation or studies**:

- Not started (NS) means the research, investigation or study has not started, i.e. contract has not been signed or there has not been any progress.
- Progress on-going (POG) means the research, investigation or study has been contracted or started and is being developed at the moment.
- On-going construction (OGC): Not applicable
- Completed (COM) means the research, investigation or study has been finalised and has been delivered, i.e. the results or deliverables are available (report, model, etc.).

For measures involving administrative acts (e.g. licenses, permits, regulations, instructions, etc.):

- Not started (NS) means the administrative file has not been opened and there has not been any administrative action as regards the measure.
- Progress on-going (POG) means an administrative file has been opened and at least a first administrative action has been taken (e.g. requirement to an operator to provide information to renew the licensing, request of a permit by an operator, internal

consultation of draft regulations, etc.). If the measure involves more than one file, the opening of one would mean already "ongoing".

- On-going construction (OGC): Not applicable
- Completed (COM) means the administrative act has been concluded (e.g. the license or permit has been issued; the regulation has been adopted, etc.). If the measure involves more than one administrative act, "completed" is achieved only when all of them have been concluded.

Measure details: other

Member States were requested to provide information on:

- Other Community Acts associated to the measures reported (optional field);
- Any other information reported (optional field).

Romania provided 'other information' for the majority of the measures in the reporting sheets. However, as this was an open question the responses given varied greatly and aggregation of the data was not possible.

Romania did not report information about 'other Community Acts' in the reporting sheets.

Annex B: Definitions of measure types

Table B1 Types of flood risk management measures[70]

No Action	
M11	No Action, No measure is proposed to reduce the flood risk in the APSFR or other defined area,
Prevention	
M21	Prevention, Avoidance, Measure to prevent the location of new or additional receptors in flood prone areas, such as land use planning policies or regulation
M22	Prevention, Removal or relocation, Measure to remove receptors from flood prone areas, or to relocate receptors to areas of lower probability of flooding and/or of lower hazard
M23	Prevention, Reduction, Measure to adapt receptors to reduce the adverse consequences in the event of a flood action on buildings, public networks, etc...
M24	Prevention, Other prevention, Other measure to enhance flood risk prevention (may include, flood risk modelling and assessment, flood vulnerability assessment, maintenance programmes or policies etc...)
Protection	
M31	Protection Natural flood management / runoff and catchment management, Measures to reduce the flow into natural or artificial drainage systems, such as overland flow interceptors and / or storage, enhancement of infiltration, etc and including in-channel , floodplain works and the reforestation of banks, that restore natural systems to help slow flow and store water.
M32	Protection, Water flow regulation, Measures involving physical interventions to regulate flows, such as the construction, modification or removal of water retaining structures (e.g., dams or other on-line storage areas or development of existing flow regulation rules), and which have a significant impact on the hydrological regime.
M33	Protection, Channel, Coastal and Floodplain Works, Measures involving physical interventions in freshwater channels, mountain streams, estuaries, coastal waters and flood-prone areas of land, such as the construction, modification or removal of structures or the alteration of channels, sediment dynamics management, dykes, etc.
M34	Protection, Surface Water Management, Measures involving physical interventions to reduce surface water flooding, typically, but not exclusively, in an urban environment, such as enhancing artificial drainage capacities or though sustainable drainage systems (SuDS).
M35	Protection, Other Protection, Other measure to enhance protection against flooding, which may include flood defence asset maintenance programmes or policies
Preparedness	
M41	Preparedness, Flood Forecasting and Warning, Measure to establish or enhance a flood forecasting or warning system
M42	Preparedness, Emergency Event Response Planning / Contingency planning, Measure to establish or enhance flood event institutional emergency response planning
M43	Preparedness, Public Awareness and Preparedness, Measure to establish or enhance the public awareness or preparedness for flood events
M44	Preparedness, Other preparedness, Other measure to establish or enhance preparedness for flood events to reduce adverse consequences

[70] Guidance for Reporting under the Floods Directive (2007/60/EC) https://circabc.europa.eu/w/browse/a3c92123-1013-47ff-b832-16e1caaafc9a

Recovery & Review	
M51	Recovery and Review (Planning for the recovery and review phase is in principle part of preparedness), Individual and societal recovery, Clean-up and restoration activities (buildings, infrastructure, etc), Health and mental health supporting actions, incl. managing stress Disaster financial assistance (grants, tax), incl. disaster legal assistance, disaster unemployment assistance, Temporary or permanent relocation , Other
M52	Recovery and Review, Environmental recovery, Clean-up and restoration activities (with several sub-topics as mould protection, well-water safety and securing hazardous materials containers)
M53	Recovery and Review, Other, Other recovery and review Lessons learnt from flood events Insurance policies
Other	
M61	Other

Catalogue of Natural Water Retention Measures

NWRM cover a wide range of actions and land use types. Many different measures can act as NWRM, by encouraging the retention of water within a catchment and, through that, enhancing the natural functioning of the catchment. The catalogue developed in the NWRM project represents a comprehensive but non prescriptive wide range of measures; other measures, or similar measures called by a different name, could also be classified as NWRM.

To ease access to measures, the catalogue of measures hereunder is sorted by the primary land use in which it was implemented: Agriculture; Forest; Hydromorphology; Urban. Most of the measures however can be applied to more than one land use type.

Table B2 List of NWRM

Agriculture	Forest	Hydro Morphology	Urban
A01 Meadows and pastures	F01 Forest riparian buffers	N01 Basins and ponds	U01 Green Roofs
A02 Buffer strips and hedges	F02 Maintenance of forest cover in headwater areas	N02 Wetland restoration and management	U02 Rainwater Harvesting
A03 Crop rotation	F03 Afforestation of reservoir catchments	N03 Floodplain restoration and management	U03 Permeable surfaces
A04 Strip cropping along contours	F04 Targeted planting for 'catching' precipitation	N04 Re-meandering	U04 Swales
A05 Intercropping	F05 Land use conversion	N05 Stream bed re-naturalization	U05 Channels and rills
A06 No till agriculture	F06 Continuous cover forestry	N06 Restoration and reconnection of seasonal streams	U06 Filter Strips
A07 Low till agriculture	F07 'Water sensitive' driving	N07 Reconnection of oxbow lakes and similar	U07 Soakaways

Agriculture	Forest	Hydro Morphology	Urban
		features	
A08 Green cover	F08 Appropriate design of roads and stream crossings	N08 Riverbed material renaturalisation	U08 Infiltration Trenches
A09 Early sowing	F09 Sediment capture ponds	N09 Removal of dams and other longitudinal barriers	U09 Rain Gardens
A10 Traditional terracing	F10 Coarse woody debris	N10 Natural bank stabilisation	U10 Detention Basins
A11 Controlled traffic farming	F11 Urban forest parks	N11 Elimination of riverbank protection	U11 Retention Ponds
A12 Reduced stocking density	F12 Trees in Urban areas	N12 Lake restoration	U12 Infiltration basins
A13 Mulching	F13 Peak flow control structures	N13 Restoration of natural infiltration to groundwater	
	F14 Overland flow areas in peatland forests	N14 Re-naturalisation of polder areas	

Source: www.nwrm.eu