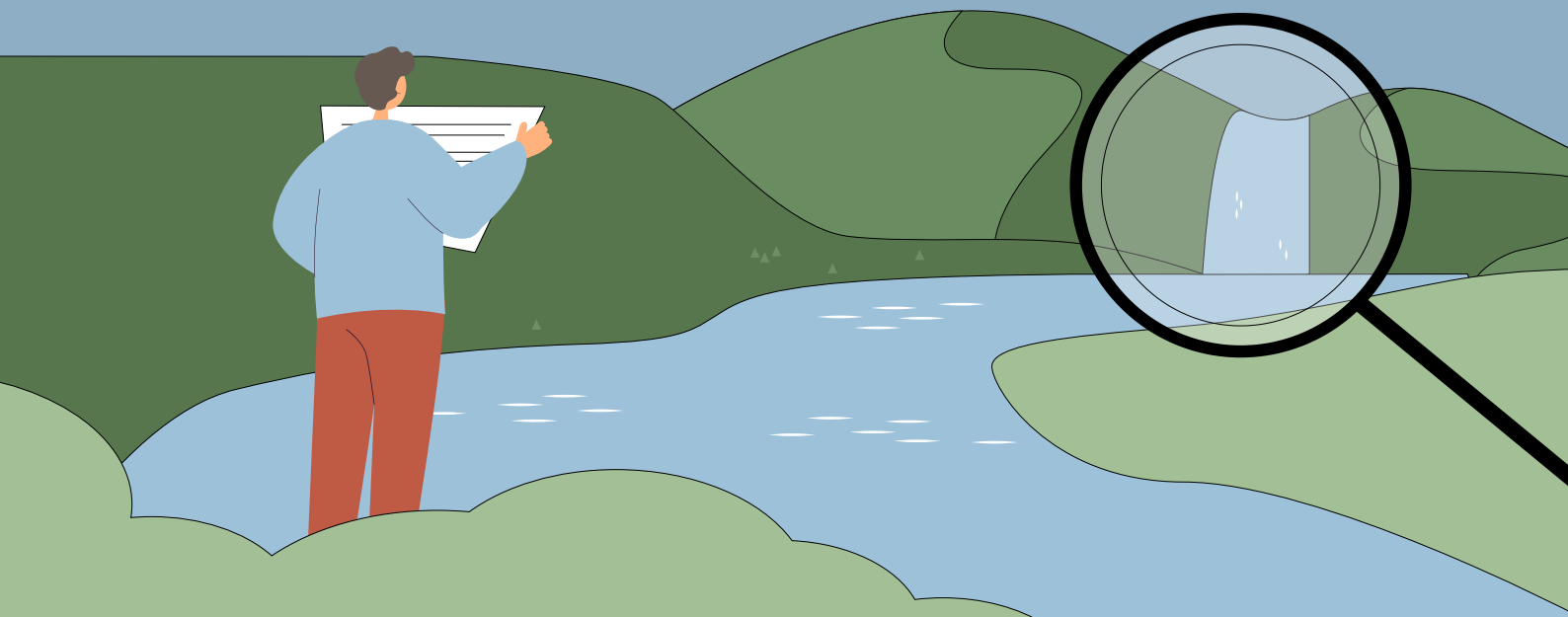




# Flood Risk Management in the Baltic Sea Region

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# Acronyms

APSFR: Area of Potentially Significant Flood Risk

BSR Baltic Sea region: Baltic Sea Region

BSAP Baltic sea action plan: Baltic Sea Action Plan

FIELD: Floods Directive: Flood Risk Management Directive

FRMP: Flood Risk Management Plan

iRBD international River Basin District: International River Basin District

iFRMP international FRMP - International Flood Risk Management Plan

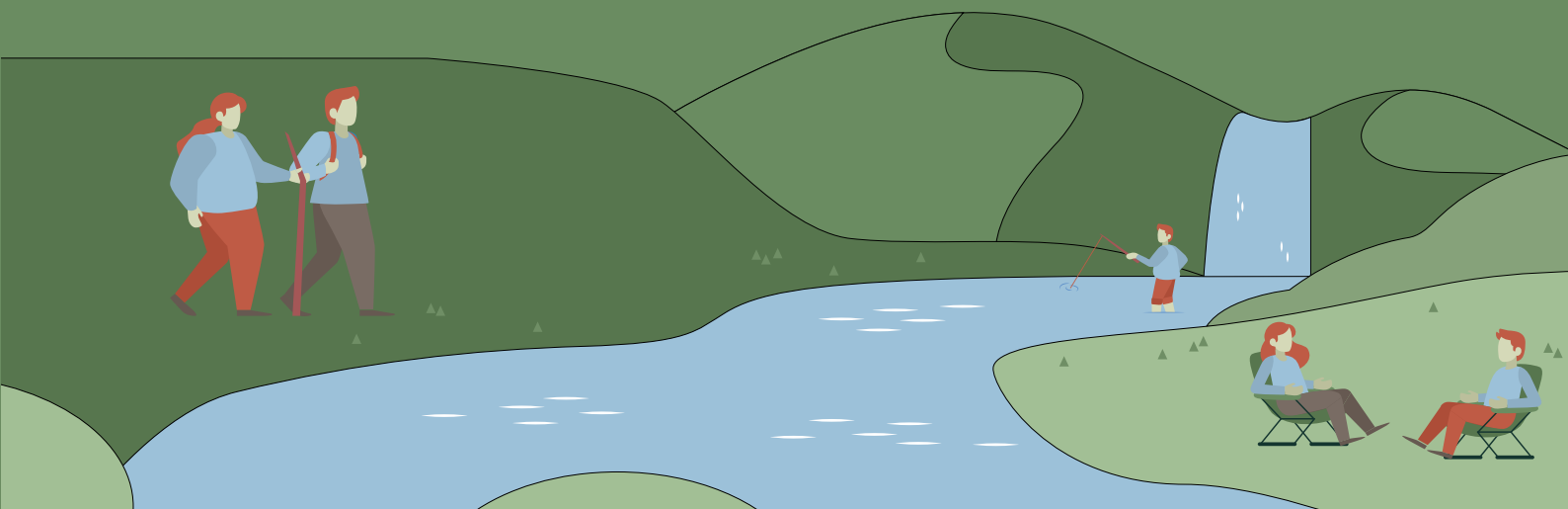
RB River Basin - River basin

RBMP River Basin Management Plan

WFD: Water Framework Directive

WISE: Water Information System for Europe (European Information System for Water)

SCIWO: Schemes of Integrated Water Bodies Use and Protection



# 1. Introduction

## Climate change impact on the Baltic Sea and river basins

Climate change is a recognized fact. It is a global process that affects all aspects of our lives. Water issues, such as floods and droughts, are among the most negative effects from climate change around the world, including the Baltic Sea region.

In the Baltic catchment, it is foreseen:  
an increase of the overall level of runoff;  
an increase of the level of nutrients in water basins.

Besides, an increase in runoff levels will lead to the desalination of water in the sea. **What are the consequences?**

- deterioration of water qualities due to the increased level of pollutants flushed into waters;
- exacerbation of eutrophication due to the increased level of nutrients runoff;
- biodiversity loss due to the deterioration of water bodies and increased temperatures;
- destruction of vital socio-economic infrastructures.

**For the adaptation of water bodies to climate change**, the most important tool is the full integration of the issue of climate adaptation into the river basin water management process. Several countries in the Baltic Sea region have positive solutions and experience with flood management based on Water Framework Directive, basin plans, and Flood Risk Management Plans, but there are countries and regions where such solutions do not exist or are not being implemented effectively enough. There are no common documents in the Baltic Sea region on flood risk management and river basin adaptation to the effects of climate change that are common and sufficient for all countries in the basin.



The **HELCOM Baltic Sea Action Plan** does not yet contain recommendations for adaptation and mitigation to the effects of climate change in the region, for flood risk management, and does not take climate change into account in BSR environmental projections. It is important that the updated BSAP is refined to take into account the climate challenges and necessary solutions.

## 2. Overview of existing Flood Risk Management Plans and approaches

The European Water Framework Directive (WFD) obliges EU countries to develop and update River Basin Management Plans (RBMPs).

**Directive 2007/60/EC Flood Risk Assessment and Management requires** EU countries to develop Flood Risk Management Plans (FRMPs). In the non-EU Baltic countries (Belarus, Russia, and Ukraine) flood risk management is reflected in national documents and partly covered by transboundary projects.

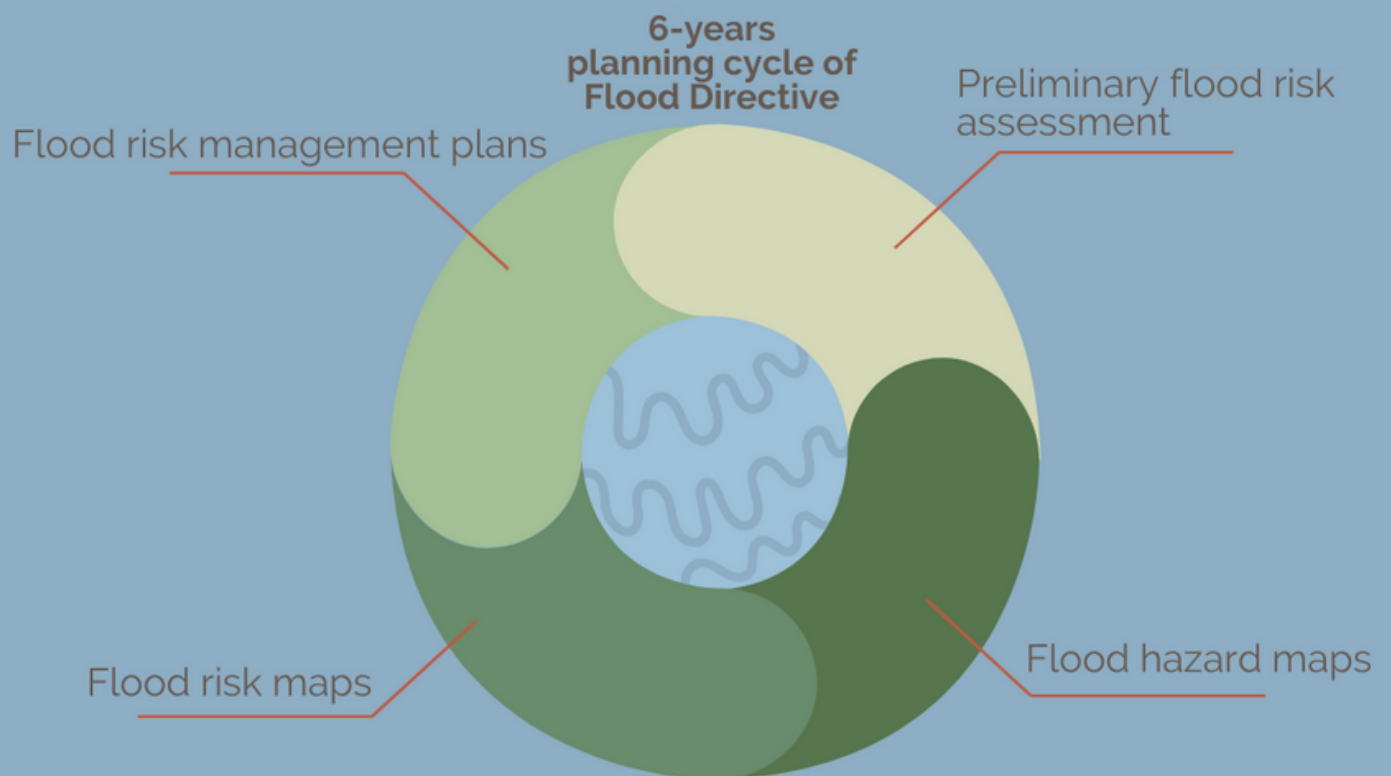
The WFD and the Floods Directive (FD) provide for the establishment of a specialized body to implement measures at the international level to achieve the objectives (WFD) and create a unified international river basin management plan (iRBMP), including with the participation of third (non-EU) countries.



## 2.1. EU documents on FRM

**The Flood Directive** requires member states to assess whether all watercourses and shorelines are at risk of flooding, to map the extent of flooding, and to consider the assets and people in flood-prone areas, and to take adequate and coordinated measures to reduce these risks. **The directive also strengthens public rights of access to this information and a voice in the planning process.**

Implementation of the Flood Directive should be carried out in coordination with the WFD, in particular by coordinating flood risk management plans and river basin management plans, as well as by **procedures for public participation** on all stages. All prepared assessments, maps, and plans should be available to the public.



### Key areas of flood risk management plans (art. 7 WFD):

1. Flood prevention.
2. Flood protection.
3. Preparation for flooding (preparedness), including:
  - flood forecasting and the development of early warning systems;
  - promoting sustainable land-use practices;
  - improving flood retention by natural floodplains;
  - using controlled flooding (polders, reservoirs);
  - Reducing the effects of flooding through land use management in flood zones, including prohibiting or limiting activities that increase risk [1].

## 2.2. National documents in non-EU Baltic Sea countries, related to flood risk management

In the three non-EU countries of the Baltic Sea region, flood risk management goals and measures are partly taken into account in national documents.

### The Russian Federation

In accordance with the Water Code of the Russian Federation, in 2014, Russia approved **Integrated Water Resources Use and Protection Schemes (IWRMS)** for 63 basins and sub-basins, including the basins of Russian and transboundary rivers in the Baltic region. The schemes include information on the condition and use, contain goals, objectives, and priority measures for river basin management, and are the basis for water management and water protection measures, including in the area of flood risk management [2].

In Russia there is also the Decree of the Government of the Russian Federation No. 360 of April 18, 2014 "On Defining the Boundaries of Flood Zones and Submerged Areas" which defines the procedure for establishing, changing, and terminating the existence of flood zones and

## 2. Overview of existing Flood Risk Management Plans and approaches

submerged areas. After the territory is entered in the state water register of flooding and under flooding zones, a special water regime of land use is established. Boundaries of flooding and waterlogging zones are reflected in spatial planning documents.



Sister River, early Spring 2020.

### Republic of Belarus (RB)

The Water Code of the RB determines the need to establish **River Basin Councils and River Basin Management Plans (RBMPs)**. The plans include information on pressures on river basins caused by dangerous hydrometeorological phenomena, including the effects of climate change: floods, low-water periods, and erosion processes. The RBMP includes a list of measures for specific water bodies aimed at improving the environmental status and maintaining water bodies of excellent or good status. The RBMP includes a list of measures aimed at flood risk management, including the development of flood risk assessment maps; establishment of an early warning system based on operational data of automatic monitoring of the level regime of rivers; identification of zones of flooding and waterlogging of areas leading to economic damage due to flooding; regulation of the use of areas potentially subject to flooding; implementation of adaptation measures to climate change [3].



### Ukraine

The Water Code of Ukraine determines the need to develop RBMPs. The State Service for Emergency Situations together with the Ministry of Ecology and Natural Resources and the State Water Agency are developing a **Flood Risk Management Plan** in Ukraine. The developed draft management plan should be submitted by the Ministry of Internal Affairs to the Cabinet of Ministers for approval **not later than August 1, 2022**. During the development of the RMP, Ukraine draws heavily on the experience of European countries [4].

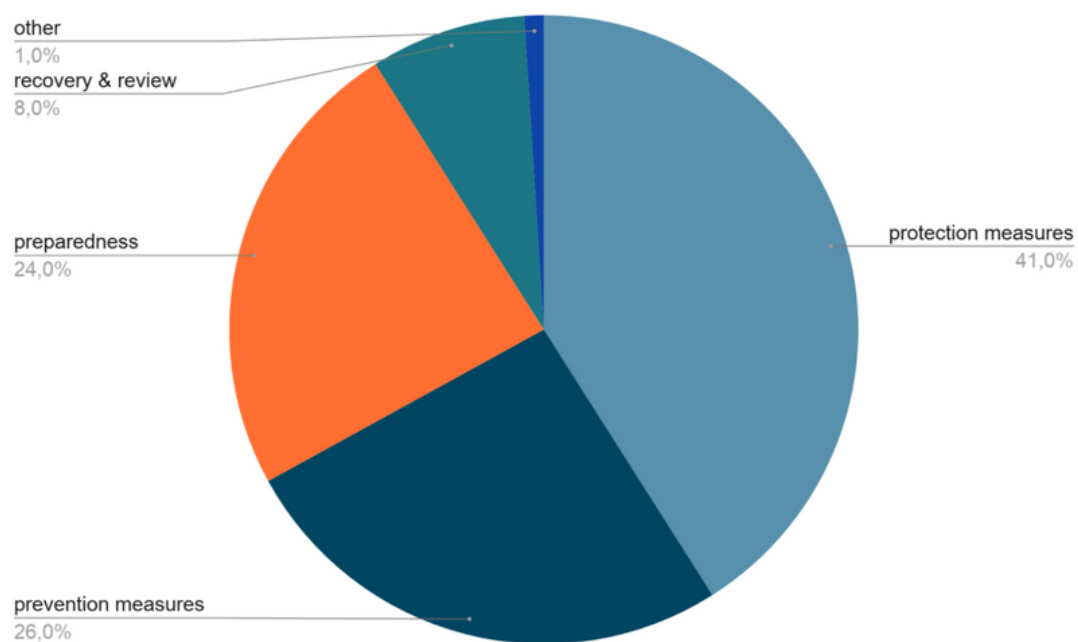


Spring flooding in Solbtsy, Belarus photo by Uladzimir Zuyeu.

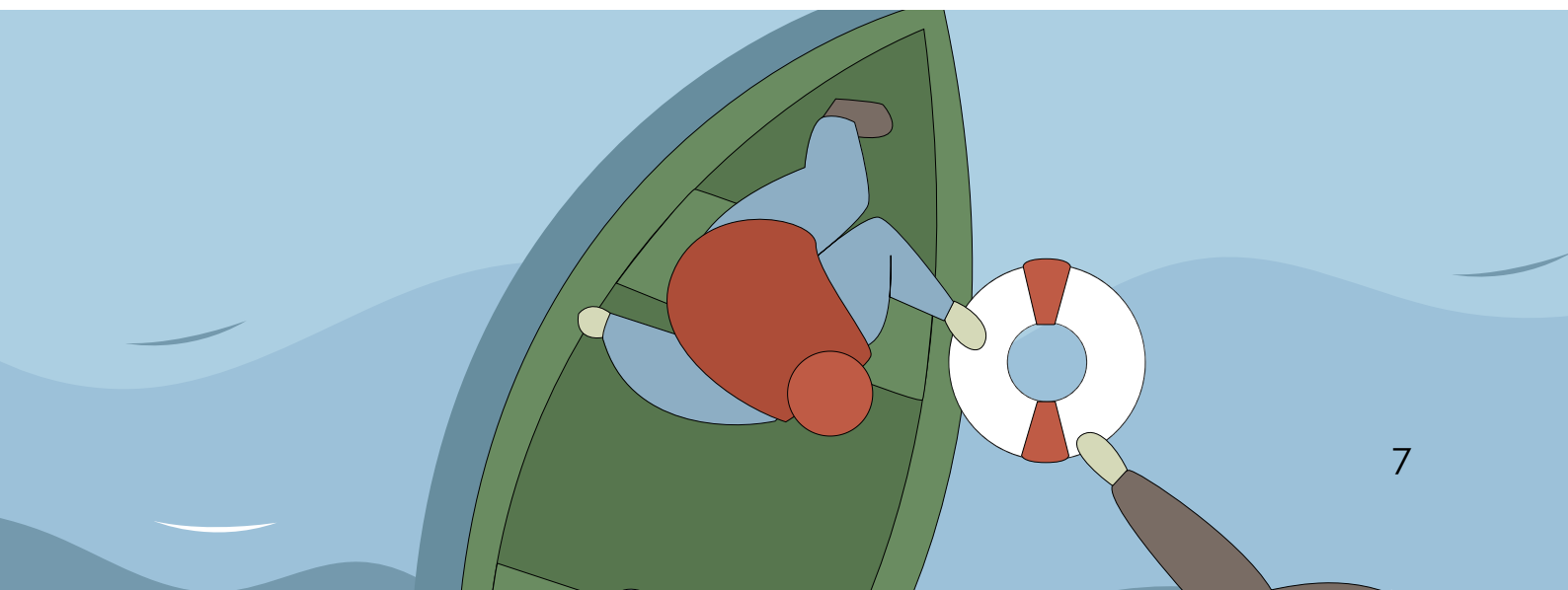
## 2.3. Flood risk management (FRM) in two river basins of the Baltic Sea region

The Vistula and Neman river basins are taken as an example - both basins combine the territories of both EU and non-EU countries with slightly different water regulations.

Under the Floods Directive (FD) and national regulations in the field of water management, EU member states aim to reduce and manage flood risks. The aim is to reduce and manage the risks that floods pose to human health, the environment, cultural heritage, and economic activity [5].



Aspects of EU Member States's FRMPs measures



### THE VISTULA:

#### Strategies and measures to counteract floods in the Vistula River basin (Belarus-Poland-Slovakia-Ukraine), based on FRMP analysis

The Vistula River basin is shared by Belarus, Poland, Slovakia, and Ukraine. The International Vistula River Basin District (IRBD) is evaluated by the European Commission as cooperation category 3, which means that there are formal **international agreements between the countries, but there is no specialized management body of the international river basin region and international RBMP.**

Cooperation in the Vistula basin is based on international conventions and intergovernmental agreements:

- Convention on the Protection and Use of Transboundary Watercourses and International Lakes, an agreement between Poland and Slovakia on the management of water resources in border countries;
- Agreement between Poland and Ukraine on cooperation in the field of water management in border waters;
- Agreement between Poland and Belarus on cooperation in the field of environmental protection, and an agreement between Poland and Lithuania on cooperation in the field of research and development.

Exchange of information takes place within the framework of the Polish-Slovak and Polish-Ukrainian Water Commissions.

Negotiations on the signing of an agreement between Poland and Belarus on cooperation in the field of management of water resources of transboundary waters are going on [6]. (Ukraine plans to develop its FRMP by 2022 and these documents share the goals and strategies of EU countries).

Analysis of measures and strategies is **based on the FRMP of Poland**, as about 90% of the Vistula basin area is located on the territory of this country. Polish FRMP contains mention about the transboundary effect from the application of some measures, but these measures have no international character, most of them are national, some are regional (within Poland).

## 2. Overview of existing Flood Risk Management Plans and approaches

Vistula basin includes the catchment area of the river Western Bug located on the territory of Ukraine. Ukraine in the framework of the Association Agreement between Ukraine and the European Union committed to WFD and FD, the first FRMPs are planned to appear only in 2022.

Poland in the FRMP prioritized the goals for the Vistula River basin as follows:

- Prevention of an increase in flood risk;
- Reduction of the existing flood risk;
- Improvement of flood risk management.



Flood retention walls lead to greater damage when breached. Giving rivers room to flood and allowing wetlands to fulfill their function as natural wetlands reduces flood costs. Photo by Krzysztof Konieczny WWF-Poland.

### **THE VISTULA**

The flood protection strategy of the Vistula River Basin Flood Risk Management Plan includes:

- Identification of flood-prone areas - Central and Upper Vistula;

## 2. Overview of existing Flood Risk Management Plans and approaches

- Drawing a Flood Hazard Map (MZP) and Flood Risk Map (MRP) and making these maps available to all government and commercial agencies;
- Development of Strategic Adaptation Plan for Sectors and Areas Sensitive to Climate Change to 2020 with a Vision to 2030 (SPA 2020);
- Assessment of expected impacts of climate change on water resources and water management (for climate change scenarios 2021-2050 and 2071-2100), approval of a list of proposed adaptation measures and their impact area as well as indicators for monitoring the effectiveness of adaptation measures;
- As part of the FRMP preparation, assessing the impact of projected climate change on flood risk by estimating the impact of projected precipitation on the outflow from the Nysa-Kłodzka catchment to the Kłodzko catchment based on regional simulations from various global models.

To implement the goals of reducing flood risks in the Vistula River basin in Poland, the following measures are proposed:

### A. Preventing increased flood risk:

1 Preparation of measures to protect and increase natural retention and restoration of natural flow conditions (restoration of natural morphological parameters of rivers and valley ecosystems; increase catchment retention through forest plantations; exclusion of land from agricultural use and abandonment of intensive agriculture in areas at risk of flooding; introduction of crops or plantations favorable to meet flood risk management objectives).



Flood protection in the Upper Vistula river basin: grey and green measures, Sandomierz area.  
Photo by Andrew Menage.



## 2. Overview of existing Flood Risk Management Plans and approaches

2 Rational management of flood risk areas, in order to reduce their vulnerability. Planning and spatial development policies, taking into account flood levels, in accordance with the Water Law Act. (including modification of the use of facilities located in flood risk areas, adaptation of existing buildings to flood conditions, and adoption of standards for new buildings to reduce flood damage; introduction of insurance where flood risk does not justify the use of technical or non-technical flood protection methods).

3 Creation and operation of technical infrastructure for flood protection.

4 Raising public awareness of flood risk protection.

## B. Preparing to respond to floods

## C. Improvement of flood risk management system:

- development of integrated information system of flood risk management;
- implementation of local monitoring and warning systems in areas not covered by the national system;
- development of monitoring stations network on rivers and consolidation of hydrometeorological protection department into a basin system;
- research and development work;
- development of flood risk management system from the sea;
- institutional strengthening of administrative units responsible for flood risk management [7].

The implementation of the FRMP of the 1st planning cycle in the Vistula River basin in Poland was summarized with the conclusion:

During the 1st planning cycle, it was not possible to implement most of the planned activities aimed at achieving the objectives of flood risk management. The plans contain a catalog of various types of activities affecting the chassis risk - from increasing catchment and valley retention, through legislative work, education, monitoring, research, to the construction of flood banks and retention reservoirs. Priorities for individual types of activities were defined at the water region level.

### **THE NEMAN: Strategies and Measures against Floods in the Neman River Basin (Lithuania-Belarus-Russia), based on the analysis of the Lithuanian Flood Risk Management Plan and national regulatory documents of Russia and Belarus (SCIHE and Water Strategies of Russia and Belarus).**

The Neman River basin is shared by Lithuania, Belarus, Russia Poland, and Latvia. Belarus accounts for 43.5% of the total flow of the Neman, Lithuania 50.0%, and Russia for 6.2%. The Neman's IRBD is rated by the European Commission as Cooperation Category 4, which **means that there are no formal international agreements between the countries, no specialized IRBD management body, and no international RBMP (iRBMP and IFRMP)**. According to the Polish State Information System for Water (WISE) of the Neman River Basin, no potentially significant flood risk areas (APSFR) have been identified and no separate FRMP has been prepared. The analysis was based on the general Lithuanian Flood Risk Management Plan and national regulations of the RF and RB. Poland and Latvia have only the upper reaches of some tributaries, so RB Plans for the Neman have not been developed in these countries [8].

Thirty-seven rivers have been identified in the Neman River basin where flooding is likely to occur. The highest risk and potential flooding is noted on the coast of the Baltic Sea and the Curonian Bay on the territory of the Republic of Lithuania.

**Measures to reduce the risk of flooding in the Neman River basin in Lithuania** are part of the Lithuanian Water Resources Development Program 2017-2023.



Spring flooding in Silute region, Neman, Lithuania photo by L.Balandis. 15min.lt.

### Types of flood risk management measures and their priority:

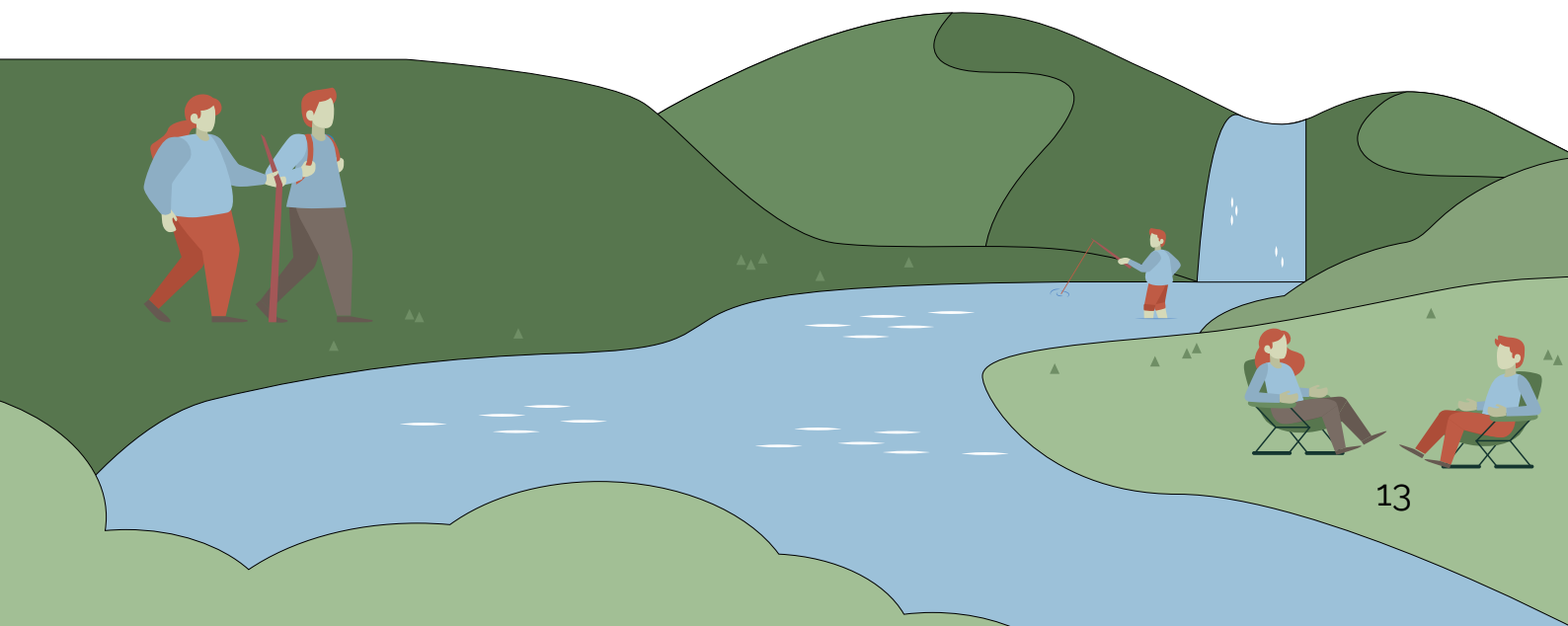
#### Very high priority:

- Preventive measures: prevention of flood risks;
- Flood preparedness: forecasting, informing specialists, public information.

**High priority:** protective measures, i.e., engineering solutions for reconstruction or creation of protective infrastructure.

**Low priority:** non-structural measures, i.e., using natural solutions to reduce risks and impacts and regulating natural flow in the river basin. Such measures meet the principles of sustainable development and reduce long-term economic risks of flooding. These include reforestation (as part of the National Forest Sector Development Year 2012-2020), the Rural Development Program "Agro-Environment and Climate" 2014 - 2020, which includes support to the rural population by providing payments and advice for transition to the responsible handling of fertilizers and plant protection products; sustainable pasture management, use of soil protection measures against degradation and erosion.

The most important information about the proposed measures is posted on the online map <http://potvyniai.aplinka.lt/priemones>, including the number of residents and engineering activities, such as the construction and improvement of embankments [9].





## 2. Overview of existing Flood Risk Management Plans and approaches

### Measures to implement flood risk management according to the SIUPWB in the Neman River Basin in Kaliningrad Oblast, Russian Federation.

Flood risk management measures in the Russian part of the Neman River basin, according to the SIUPWB, should be considered in the following areas:

#### A. Fundamental (basic) measures:

- Rehabilitation and development of the observation network for the state of water bodies and water management systems;
- Identification of areas prone to flooding, their classification, and mapping;
- Design and development of basin geoinformation systems.



Public monitoring on Sestra river, Leningrad region photo by Friends of the Baltic.

#### B. Institutional arrangements:

- Development of normative and technical regulation of water use;
- Development of rules, programs, action plans in cases of extremely low water and extremely high water (including regulation of water distribution procedures and use of reserve water supply sources, improvement of reliability and efficiency of water supply systems, identification of alternative or additional water supply sources, etc.);
- Regulating the use (reservation) of areas potentially subject to flooding.

## 2. Overview of existing Flood Risk Management Plans and approaches

- Regulation of land use in water protection zones of water bodies (including their development and improvement) and in watersheds in order to prevent pollution and depletion of water bodies;
- Regulating the use of banks and bottoms of water bodies;
- Development of insurance systems for risks associated with the negative impact of water.

### **C. Measures to improve the operational management of the use and protection of water bodies:**

- Development of automated management systems for the use and protection of water bodies

### **D. Structural measures (construction and reconstruction of facilities):**

- Ensuring a guaranteed water supply to the population and the economy;
- Construction of water disposal systems and reconstruction of treatment facilities;
- Construction and reconstruction of capital coast-protecting and bank-protecting structures;
- Construction and reconstruction of flood control and other hydraulic structures designed to prevent the negative impact of water [10].



Spring flooding in Solbtsy, Belarus photo by Uladzimir Zuyeu.

## 3. Gaps and challenges in FRM in the BSR

- Increased threat of flooding and an increase in flooded areas;
- Increased sensitivity of flood-prone areas. Lack of legal, economic, and communication tools to hinder the development of flood-prone areas (e.g., high insurance rates);
- Insufficient research data and assessments at the river basin level for reliable forecasts of the development of flood risk situations;
- Insufficiently effective system of hydrological and meteorological protection of watersheds for forecasting and warning the population about the impending threat, especially in areas with a special risk of flooding. Lack of local hydrological protection systems, they are not integrated with the national monitoring, forecasting, and warning system;
- Insufficient effectiveness of the existing system for responding to flood risks and dealing with the consequences of floods. An excessive and complex interaction between crisis management and flood protection authorities;
- Insufficient funding for measures aimed at flood risk management. Lack of financial resources to implement measures identified in the National Program (Poland), as well as a shift in priorities of municipalities in the area of water supply and wastewater treatment;
- Low public awareness of flood risk and flood risk reduction methods;
- Lack of a valid agreement between the countries that use water resources of transboundary and boundary water bodies. As a consequence, lack of coordinated management of the water resources of these rivers, taking into account their special status;
- The problem of coordinating RBMPs and FRMPs tasks and measures, as well as their synchronization with national adaptation and mitigation strategies;
- According to the Polish case: FRMPs can include ideas of investments (especially retention reservoirs) with an obvious destructive impact on the environment, having little to do with flood protection;
- Using slogans and measures to improve safety from flooding government is pushing for the regulation of Poland's largest rivers for inland navigation purposes to the Class Va waterway class.

### 3. Gaps and challenges in FRM in the BSR

- Flood and drought risk management plans and measures, retention plans, and a national program for surface water restoration operate in isolation from the rest and do not translate into ongoing catchment management;
- The challenge of regulating hydropower plants in response to rising flood risks.



Spring flooding in Silute region, Neman, Lithuania photo by L.Balandis. 15min.lt.

### Specific Gaps and challenges in non-EU Baltic Sea countries

- Lack of FRMP-type documents, with goals, objectives, and flood risk management measures and structures responsible for their implementation; linked to the basins;
- Not full use of flood management capabilities due to the lack of a unified basin management system;
- Lack of documents on flood risk assessment in case of emergencies, such as abnormally high precipitation, overfilling of storm and drainage sewers;
- Insufficient bank protection and clearing of river beds from sediments, which aggravates bank erosion and the threat of destruction of settlements and increases the risks of pollution from coastal sources;
- Insufficient control of economic activities, construction in the floodplains of large and medium-sized rivers, which leads to morphometric changes in water bodies, and, consequently, to changes in the hydrological regime and increased risks of flooding;
- Lack of climatic adaptation of regulation of hydropower plants and other hydraulic structures.



#### 4. Proposals for integrated Flood Risk Management Plans, development of national adaptation measures coordinated by basins



Spring flooding in Silute region, Neman, Lithuania photo by L.Balandis. 15min.lt

## 4. Proposals for integrated Flood Risk Management Plans, development of national adaptation measures coordinated by basins

The Baltic Sea region is not only prone to floods and rainfall floods, but also droughts. It's worth talking about Flood and Drought Risk Management. Flood risk management plans and measures need to be harmonized and embedded in catchment management.

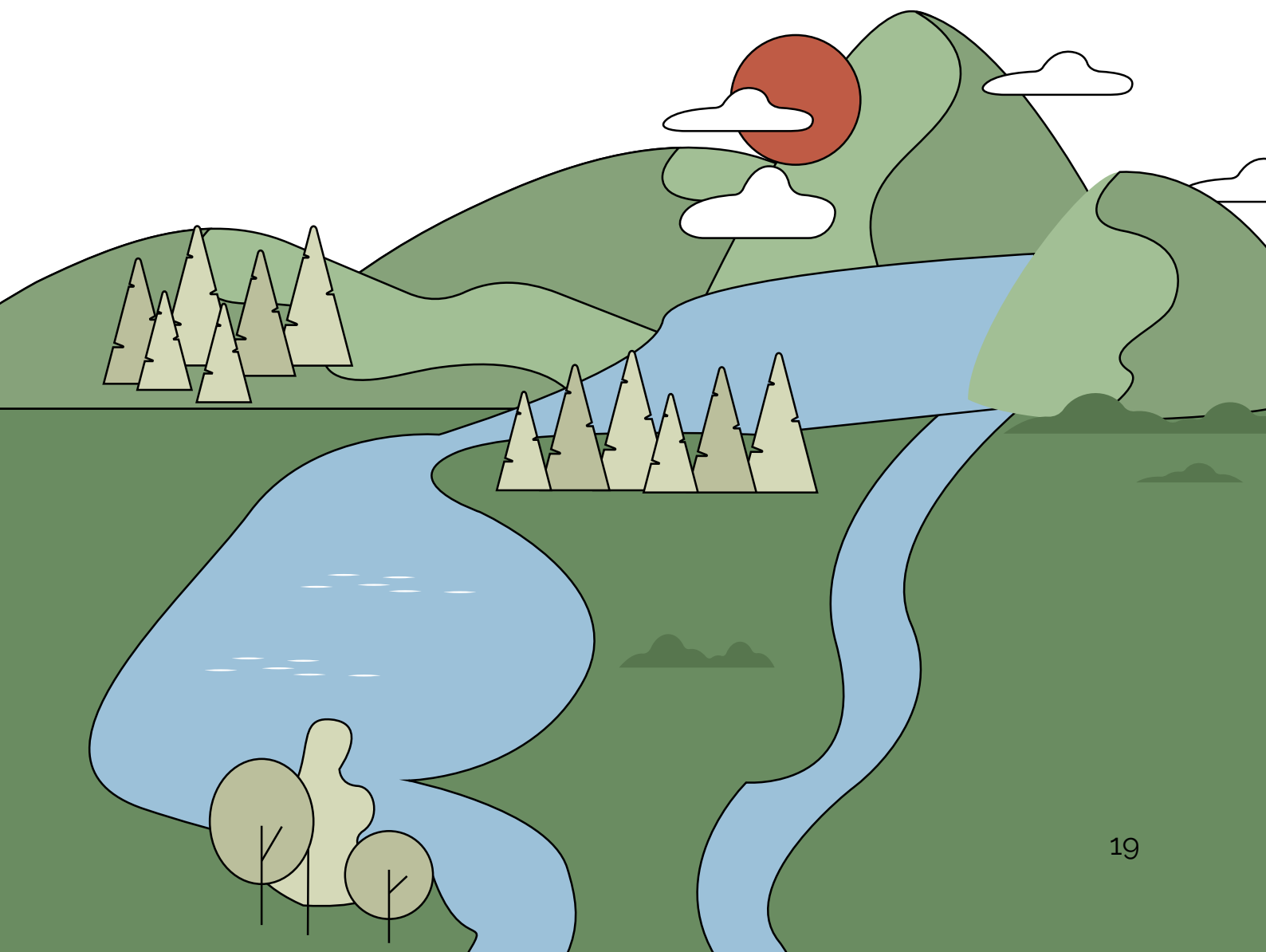
#### **On the BSR/HELCOM level:**

- For each basin, the development of a transboundary/integrated Flood Risk Management Plan, common to all countries in the river basin;
- Signing of international agreement on transboundary rational use and protection of transboundary waters BSR. Synchronization of legislation

#### 4. Proposals for integrated Flood Risk Management Plans, development of national adaptation measures coordinated by basins

within the basin for all transboundary rivers. Establishment of international water commissions for all transboundary river basins in the BSR;

- Development of international warning and alert plans within transboundary river basins;
- Improvement of interagency agreements in the field of hydrometeorology, environmental monitoring and data exchange on the condition of transboundary watercourses between countries in the transboundary BSR river basins. Creation of information exchange and emergency forecasting system;
- Inclusion of recommendations on flood and drought risk management and climate change adaptation and mitigation measures in the updated BSAP;
- Monitoring and development of measures to minimize the negative impact of existing hydropower plants in the Baltic Sea region on freshwater species and habitat.



## **National adaptation measures should include:**

### **A. Development and improvement of Flood Risk Management Plans:**

- Finalize the goals and objectives of the plans, they must be specific and measurable, spread out by SMART and have specific deadlines;
- Develop indicators of achievement of goals and objectives within the Plans;
- Ensure that the goals and objectives are interrelated with the measures being implemented;
- Synchronize measures in the area of flood risk management of the RMP and the RBMP, as well as the National Adaptation Strategies for Climate Change;
- Consider non-structural natural flood and flood control measures: systemic promotion of natural retention (ensuring the conservation of wetlands and river valleys, and promoting floodplain and wetland forests, are effective); modernization of the practice watercourse maintenance based on co-operation with the natural processes of river dynamics; re-naturalising the rivers and streams which were transformed in the past (or, in some cases, simply allowing such rivers to renaturalise themselves through natural processes);
- Identify and analyze climate change scenarios common to the river basin, study the effects of climate change in river basin areas to prepare Plans.

### **B. Improvement of Integrated Water Body Use Schemes (IWBUSs) in the Russia and Water Resource Management Plans in Belarus:**

- Establish a separate section in the SKIHE/PSMP on flood risk management or develop a separate regulatory document on flood risk management;
- Define specific goals and objectives and their corresponding implementation strategies and measures;
- Set a specific time frame for the implementation of flood risk management measures and develop a system of indicators against which the achievement of the objectives can be assessed;
- Identify the specific structures and agencies responsible for flood management and assess its effectiveness.

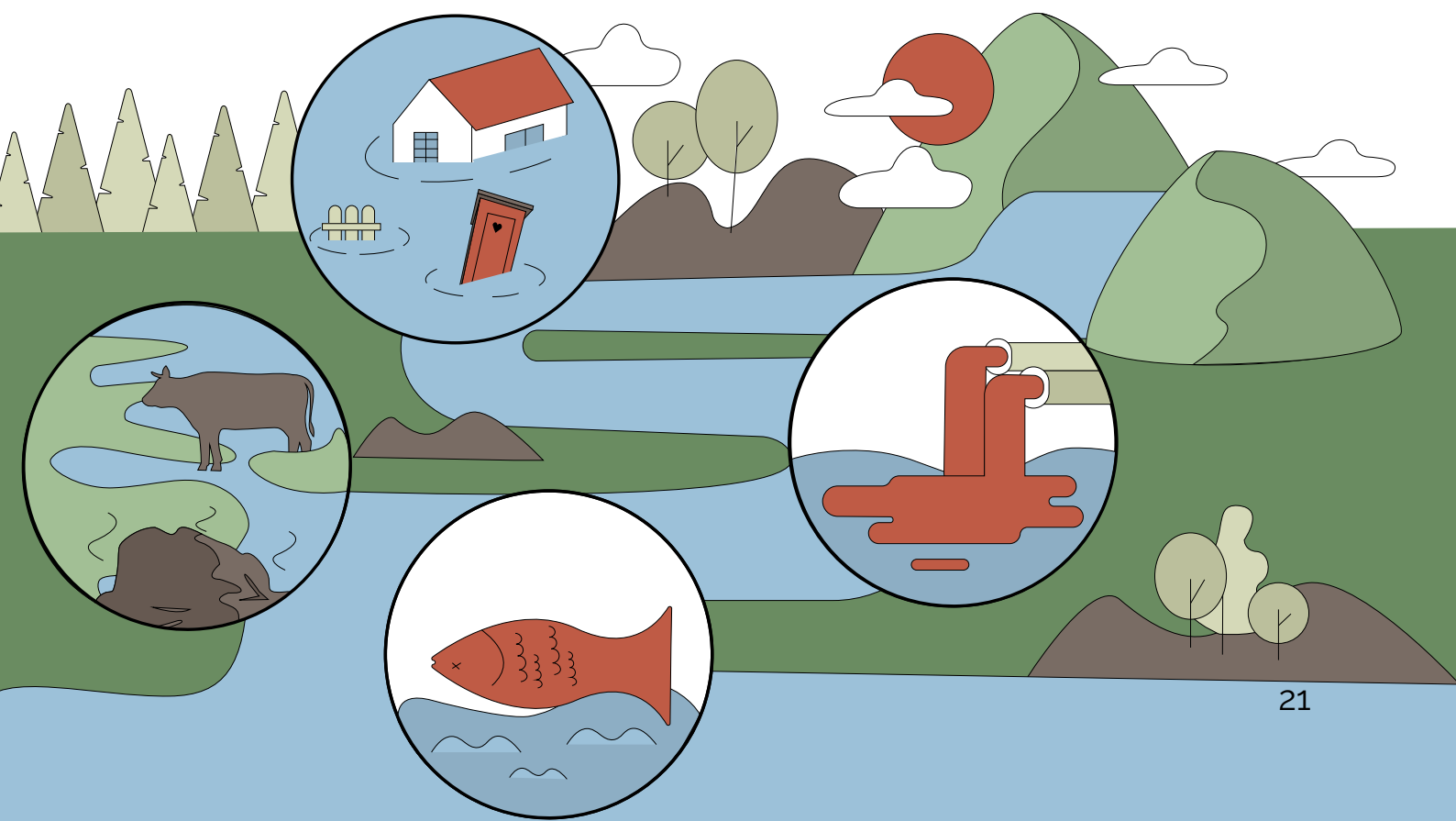
4. Proposals for integrated Flood Risk Management Plans, development of national adaptation measures coordinated by basins

C. Development of incentive economic instruments (including insurance) that help reduce flood risk.

D. Supporting small farms and their application of sustainable solutions, monitoring the environmental impact of large agricultural enterprises.



Small farm in Germany photo S. Maack





## 4.1. Proposals for public participation

- Ensure real public participation and public access to all relevant information related to adaptation to the effects of climate change and flood risks;
- Maximize the number of public access channels to flood risk management resources: Internet, local media, administrative agencies;
- Evaluate the impact of public consultation on the final FRMP. Evaluate the effectiveness of public outreach methods; Incorporate this data into Plans;
- Involve a wide range of stakeholders: local and regional governments, organizations responsible for flood warnings; water and wastewater companies, representatives of agriculture/farmers, service users, educational and research institutions, solid waste management companies, insurance companies, etc;
- Use various mechanisms for active stakeholder involvement: creation of advisory groups, seminars, technical meetings, conferences to involve stakeholders in the development of FRMP projects, interactive online tools, information events, organization of exhibitions.



Round table Baltic sea day, 2017 photo by Friends of the Baltic

# References

[1] [Directive 2007/60/EC Flood Risk Assessment and Management](#)

[2] [The Water Code of the Russian Federation](#)

[3] [The Water Code of the Republic of Belarus](#)

[4] [The Water Code of Ukraine](#)

[5] [European Overview - Flood Risk Management Plans](#)

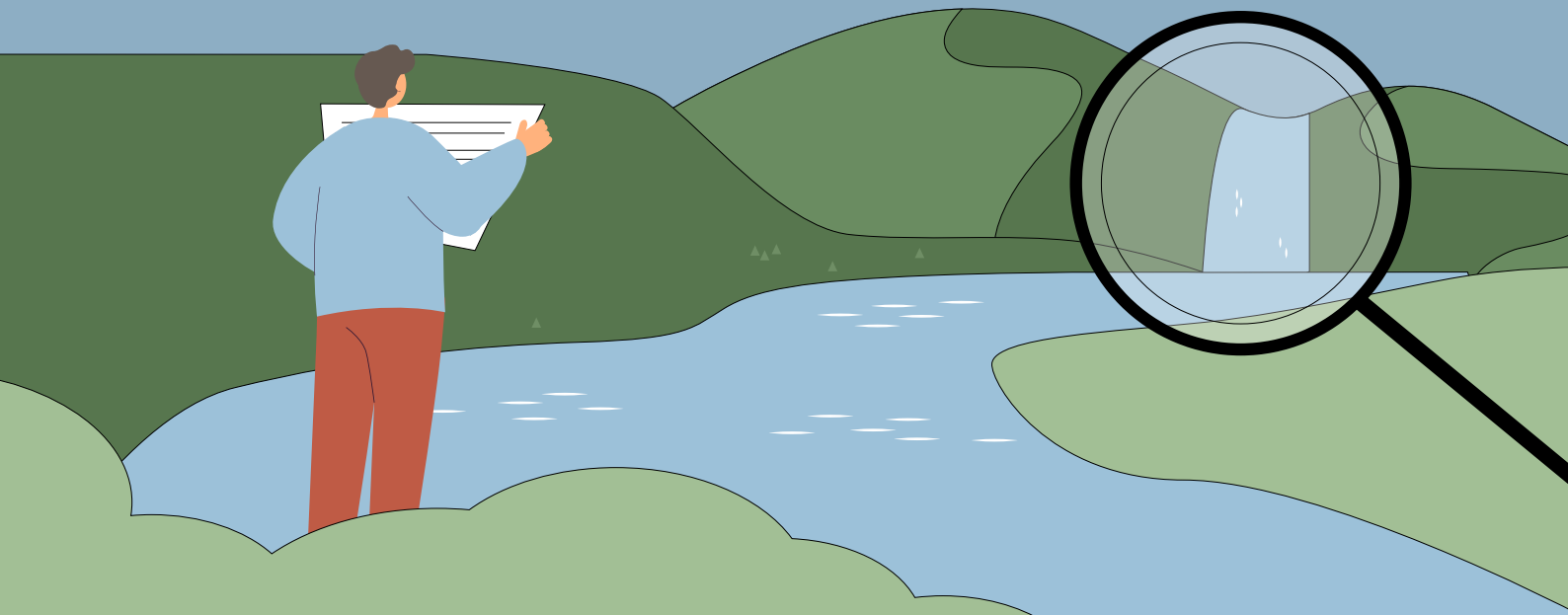
[6] [International Cooperation under the Floods Directive \(2007/60/EC\) - Factsheets for International River Basins](#)

[7] [The FRMP for the Vistula](#)

[8] [International Cooperation under the Floods Directive \(2007/60/EC\) - Factsheets for International River Basins](#)

[9] [Lithuanian FRMP](#)

[10] [The SIUPWB in the Neman River Basin in Kaliningrad Oblast, Russian Federation](#)



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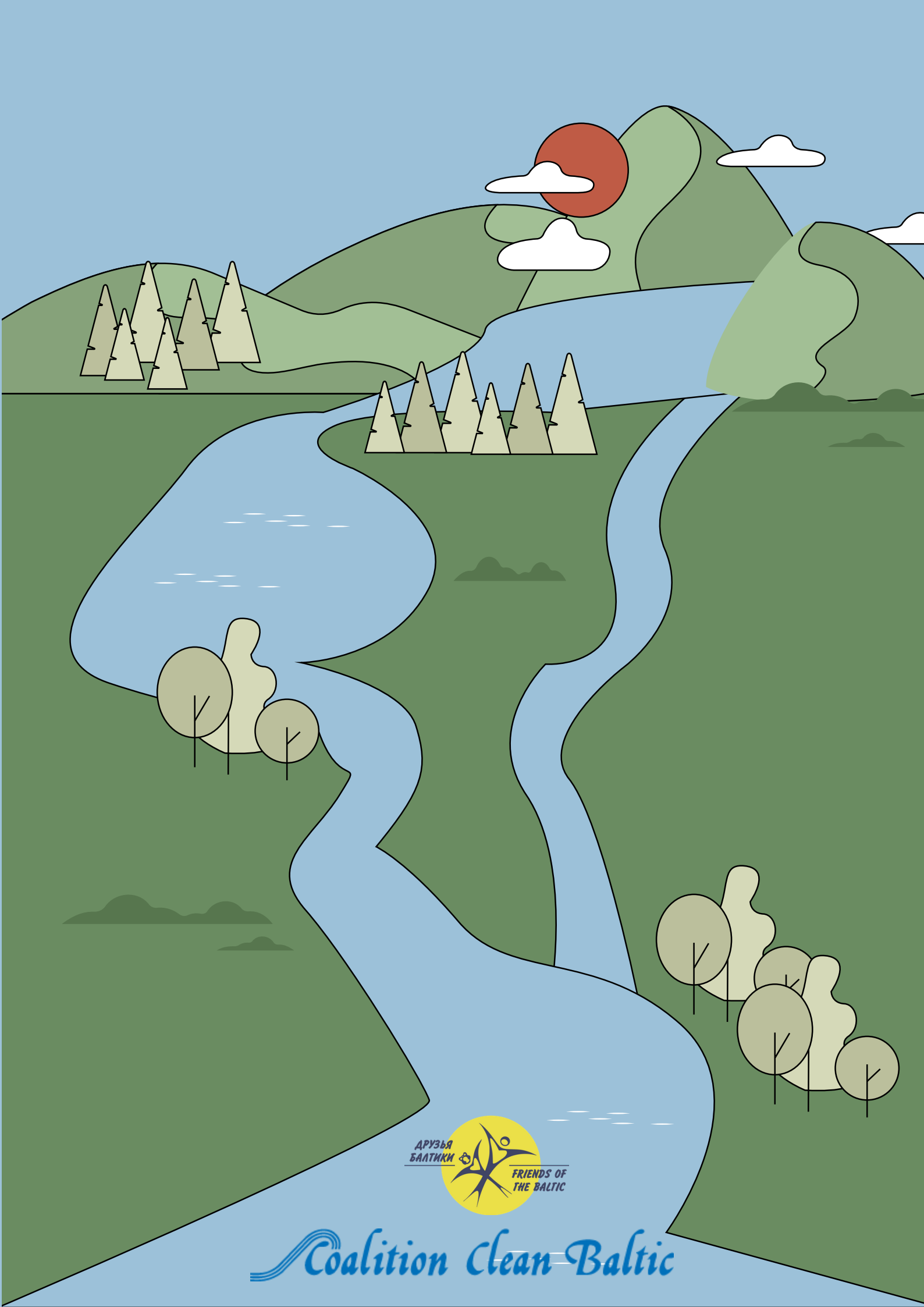
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Coalition Clean Baltic