DANUBE MANAGEMENT PLANS: THE CHALLENGE FOR THE BASIN

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The ICPDR produced its two most important work programs for the next six years: the Danube River Basin Management Plan Update 2015 and the first Danube Flood Risk Management Plan. Both plans set strategic targets for water management and flood risk management on the Danube basin-wide scale for the planning period between 2015 and 2021. Following the public consultation process which was launched in December 2014 and finished in July 2015, both Plans will be finalised and adopted in December 2015.

KEY WORDS: river basin management, flood risk management, Danube, ICPDR

Introduction

In 2000, the EU Water Framework Directive (WFD) came into force, establishing a legal framework to protect and enhance the status of aquatic ecosystems, prevent their deterioration, and ensure the long-term, sustainable use of water resources throughout the EU. In response, Danube countries, including non-EU Member States, agreed to implement the WFD throughout their entire basin. As the facilitating platform for the contracting parties of the DRPC, the International Commission for the Protection of the Danube River (ICPDR) was mandated to coordinate WFD-related work at the multilateral and river basin level.
The EU Floods Directive entered into force in 2007. It requires all EU Member States to: assess their water courses and coastal areas at risk of flooding; map flood extent and assets and humans at risk; and take measures to reduce flooding. In 2010, the ICPDR agreed to implement the EU Floods Directive and develop one international Danube Flood Risk Management Plan (FRMP) – coordinated by the International Commission for the Protection of the Danube River (ICPDR) and synergized with the EU Water Framework Directive and Danube River Basin Management Plan of 2015.

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Danube River Basin Management (DRBM) Plan

The objective of the updated DRBM Plan is to protect and further enhance the status of surface and groundwater bodies in the Danube River Basin. Four Significant Water Management Issues on the basin-wide scale were agreed by the Danube countries - organic pollution, nutrient pollution, hazardous substances pollution and hydromorphological alterations:

Organic pollution
An excess of organic matter, coming from untreated wastewater from communities, industry and agriculture, which can harm aquatic populations and water status. The ICPDR vision is: Zero emissions of untreated wastewater into the basin's rivers.

Nutrient pollution
High levels of nutrients (nitrogen and phosphorus) from inadequately treated wastewater, agricultural practices, industry and transport can result in `eutrophication´, where harmful growths of algae can produce 'dead zones' in water bodies. The ICPDR vision is: Balanced management so neither the waters of the Danube Basin nor the Black Sea are threatened or affected by eutrophication.

Hazardous substances
Man-made chemicals, metals, oil and its compounds, pesticides and medications stemming from industry, storm water overflow, agricultural practices, mining operations and accidental pollution, that are often very persistent and harmful in low concentrations. The ICPDR vision is: No risk or threat to human health or the aquatic ecosystem.

Hydromorphological alterations

Changes to the physical characteristics of a water body's shape, structure, or natural flow, such as interrupted river and habitat continuity, disconnected wetlands, and altered water quantity and flow conditions. In the Danube Basin, the main causes of change are hydropower generation, navigation, and flood protection.
The ICPDR vision for river/habitat continuity: Balanced management of structural man-made changes so the aquatic ecosystem functions holistically with all native species represented.
The ICPDR vision for wetlands: Reconnection and restoration of wetlands throughout the basin.
The ICPDR vision for water quantity and flow: The natural development and distribution of the aquatic ecosystem are not negatively influenced by altered water quantity and flow conditions.
The ICPDR vision for future infrastructure projects: Projects are conducted transparently using best environmental practices and best available techniques. Negative transboundary effects are fully prevented, mitigated, or compensated.

An updated pressures assessment on Significant Water Management Issues was performed based on latest data available in the Danube countries. This includes e.g. updated assessments on the emissions of wastewater from settlements and industries, nutrient pollution from agriculture, or the physical modifications of river systems like the interruption of river continuity or hydrological alterations due to hydro-engineering works.
Latest available data from the monitoring systems provides an overview on the ecological and chemical status of surface water bodies, as well as the chemical and quantitative status of groundwater bodies. Due to significant investments which were made by the Danube countries during the past years the emissions of pollutants could be further reduced and in many cases the hydromorphology was improved. As outlined in the Joint Program of Measures of the DRBM Plan - Update 2015, the Danube countries commit to further investments and measures to be implemented until 2021 for the step-wise further improvement of water status and protection of the Black Sea.
One further key element which is strongly emphasised in the updated Plan is the need for inter-sectoral cooperation. This is crucial for ensuring the sustainability of future infrastructure projects like hydropower, inland navigation or flood risk management.

Danube Flood Risk Management (DFRM) Plan
Danube Flood Risk Management Plan ensures coordination of the implementation of the EU Floods Directive in the Danube River Basin District and provides for tailored solutions towards flood protection, prevention and mitigation according to the needs and priorities of the Danube countries.

Flood hazard ad flood risk maps
DFRM Plan reviews the conclusions of the preliminary flood risk assessment and shows the map of the areas of potential significant flood risk as well as the flood hazard and flood risk maps of the Danube River Basin District. To ensure a coherent approach with river basin management planning the flood hazard and flood risk maps were prepared for the catchments with the area larger than 4000 km^2. These maps show the potential adverse consequences associated with different flood scenarios and serve as an effective tool for information, as well as a valuable basis for priority setting and further technical, financial and political decisions regarding flood risk management. On the basis of these maps the ICPDR Contracting Parties were required to establish a flood risk management plan coordinated at the level of the international river basin district.
The ICPDR agreed that two scenarios (flood hazard areas with medium and low probabilities) are relevant for the flood hazard map on level of the international river basin district. The medium probability floods are almost unanimously based on 100 year recurrence period and the respective hazard area covers 25 585 km^2 in the Danube River Basin. The recurrence period of floods with low probability varies mostly from 300 to 1000 years and the respective hazard area covers 47 744 km^2 in the Danube River Basin. The flood hazard maps have not been developed in Ukraine, Moldova and Montenegro (Fig.1).
The flood hazard map for the Danube River Basin District has been prepared in the scale of 1: 4,500,000 and the goal of the map is to provide a general overview for the whole basin. For more detailed information including that about flow velocity and depth it is necessary to view the national maps.
The map on Risk and population shows the population affected by floods with low, medium and high probability in the parts of the countries belonging to the Danube River Basin District. The maps on Risk and economic activity display the share of inundated area by class of economic activity (according to Corine Land Cover) for low, medium and high probability floods. The map on Risk and installations with the potential to cause pollution shows the number of IPPC and Seveso installations affected by floods with low, medium and high probability in the parts of the countries belonging to the Danube River Basin District. Two maps on Risk and WFD protected areas have been prepared. One map is showing Natura 2000 protected areas superposed by the flood hazard areas (for low probability floods scenario). Only the overlapping flood hazard areas are displayed. The second map displays the total numbers of affected areas designated for the abstraction of water intended for human consumption under WFD Article 7, and of the affected bodies of water designated as recreational waters,

including areas designated as bathing waters under Directive 76/160/EEC by floods with low, medium and high probability in the parts of the countries belonging to the Danube River Basin District.

Objectives

The ICPDR agreed upon the following objectives of the Danube Flood Risk Management Plan:

- Avoidance of new risks
- Reduction of existing risks
- Strengthening resilience
- Raising awareness
- Solidarity principle

These objectives focus on the reduction of potential adverse consequences of flooding for human health, the environment, cultural heritage and economic activity and address all aspects of flood risk management focusing on prevention, protection, preparedness, including flood forecasts and early warning systems and taking into account the characteristics of the DRBD.

Avoidance of new risks

Physical planning as well as urban, rural and industrial development and construction should take into account the requirements of flood prevention. All activities concerning physical planning, agriculture, forestry management, energy, transport, urban development, etc., shall be planned and carried out without having any impacts on increasing of the risk of flooding. Special focus must be put on activities planned in upstream parts of flood risk areas that might have negative downstream effects. Not to increase the risk potential, the extension of development land into areas affected by flood risk must be avoided.

Reduction of existing risks

The purpose of the EU Floods Directive is to establish a framework for the assessment and management of flood risks, aiming at the reduction of the adverse consequences for human health, the environment, cultural heritage and economic activity associated with floods. All EU Floods Directive implementation steps in the Danube River Basin District: PFRA, development of flood maps and of flood risk management plan have been accomplished following this principle.

Strengthening resilience

To improve its resilience against flooding the society has to have an adequate emergency response during and immediately after flooding to limit adverse effects and it shall recover to regain a standard of living comparable to the pre-flooding status.

Raising awareness

Preparedness is a result of awareness and is based on the necessary information to make the individual recognise his possibilities of action. It is the personal responsibility of anyone who lives and works by or on the river, and broader in the potentially flooded area, to adapt his use of the water and all activities to flood risks. So, everyone must know the risk and take it into account appropriately when acting. Problems associated with floods are often not sufficiently recognised and acknowledged. The authorities should ensure that the information concerning flood prevention and protection plans is transparent and easily accessible to the public. The information provided to the effected communities should also include communication of opportunities how they can adapt e.g. their land use practises to natural circumstances on floodplains. All measures linked to public information and awareness raising are most effective when they involve participation at all levels. Public participation in decision-making is a cornerstone of successful implementation of integrated and comprehensive action plans, both to improve the quality and the implementation of the decisions, and to give the public the opportunity to express its concerns and to enable authorities to take due account of such concerns

Solidarity principle

The solidarity principle is very important in the context of flood risk management. In the light of it countries should be encouraged to seek a fair sharing of responsibilities, when measures are jointly decided for the common benefit, as regards flood risk management along water courses. FD stipulates that in the interests of solidarity, flood risk management plans established in one Member State shall not include measures which, by their extent and impact, significantly increase flood risks upstream or downstream of other countries in the same river basin or sub-basin, unless these measures have been coordinated and an agreed solution has been found among the Member States concerned in the framework of article 8 FD.

Measures

Flood risk management plans shall include measures for achieving the objectives established for the management of flood risks for the areas identified under article 5(1) of the EU Floods Directive and the areas covered by article 13(1)(b) of the EU Floods Directive, focusing on the reduction of potential adverse consequences of flooding for human health, the environment, cultural heritage and economic activity, and, if considered appropriate, on non-structural initiatives and/or on the reduction of the likelihood of flooding.
The measures described in DFRMP address all phases of the flood risk management cycle and focus particularly on prevention (i.e. preventing damage caused by floods by avoiding construction of houses and industries in present and future flood-prone areas or by adapting future developments to the risk of flooding), protection (by taking measures to reduce the likelihood of floods and/or the impact of floods in a specific location such as restoring flood plains and wetlands) and preparedness (e.g. providing instructions to the public on what to do in the event of flooding).
The ICPDR agreed that only the strategic level measures reflecting the activities on the level of an international river basin district shall be presented in the DFRMP. This category includes measures with transboundary effect and measures applicable in more countries of the basin such as awareness rising, warning systems or ice protection measures. To better demonstrate the key actions of a basin-wide importance the measures presented in the Annex 2 of DFRMP are combined with the examples of best practices.

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Fig. 1. Flood hazard map of the Danube River Basin District.