



22HR06 CROATIA SUPPORT TO REDUCE WATER LOSS WITHIN THE REFORM OF THE WATER SECTOR

May 30, 2024

Mr. Raimund Mair, Mr. Stjepan Gabric
Ms. Vesna Grizelj Simic, Mr. Luka Jelić, Mr. Dražen Vouk



www.worldbank.org/water | www.blogs.worldbank.org/water |

@WorldBankWater 



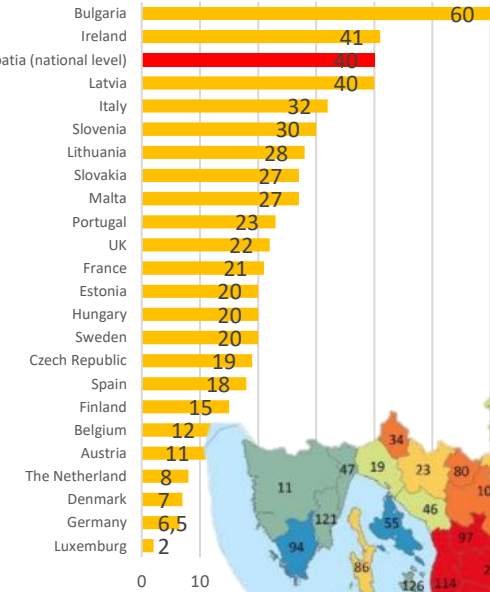
Funded by
the European Union



REPUBLIKA HRVATSKA
Ministarstvo gospodarstva
i održivog razvoja

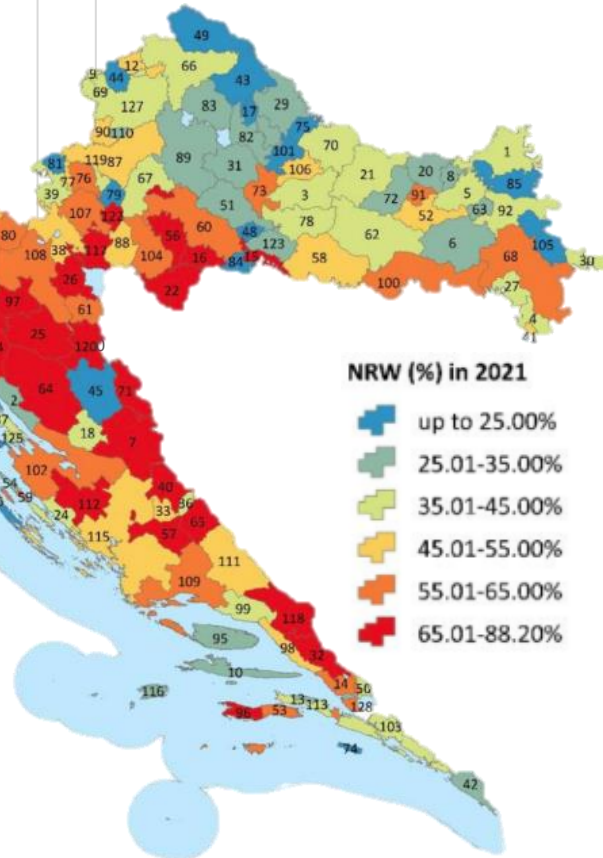
PUBLIC WATER UTILITY SECTOR IN CROATIA

Real Losses (Leakage) %



Croatia: No. 3 in terms of real water losses in the EU

Spatial distribution of the **Non-Revenue Water (NRW)** share in Croatia – current PWSPs level



- **Connection rate** to water supply systems ~ **90%**
- **Connection rate** to sewerage systems ~**68%** for agl. > 2.000 PE or **9%** u agl. < 2.000 PE, appropriate treatment in % significantly less than conn. rate
- Current service areas: **160 Public Water Service Providers (PWSPs)**; 128 dealing with water supply
- Ongoing (politically challenging) reform process for the **aggregation of 160 PWSPs to 41**
- Total water delivered to final users (**billed**) **244 mill. m³/year**, total water **supplied** amounted to **478 mill. m³/year**,
- Average rate of **Non-revenue Water (NRW)** around **50%**, varying between ~ 25% up to around ~ 80% per PWSP
- Impacts of **climate change** on water availability and demand
- Requirements **new EU Drinking Water Directive**
- Obligations from EU **National Recovery and Resilience Plan (NRRP)** for Croatia

CROATIA WATER LOSS REDUCTION ASA (P178797)

- Financed by **European Commission**, DG REFORM
- **Main beneficiary:** Ministry of Economy and Sustainable Development
- **Objective:** *Improve the **institutional capacity** of relevant public authorities and PWSPs to **reduce excessive losses** from water supply systems. This will contribute to increased operational efficiency and financial sustainability of the Croatian water services sector and enhance water security and resilience of service provision more broadly.*
- **Project period:** April 2022 – November 2023
- **Project team** established in May 2022: World Bank team, 5 interdisciplinary local experts, 1 additional international water loss expert



CROATIA WATER LOSS REDUCTION OVERVIEW PROJECT ACTIVITIES

- Stocktaking report: **Comprehensive data collection** from centrally available sources and via questionnaire (130 questions) to PWSPs
- **12 consultation workshops** with PWSPs and additional consultative meetings with water authorities delivered
- **6 capacity building workshops** with PWSPs and additional consultative meetings with water authorities delivered
- Integration of **international best practice**: Global expertise from international expert and IWA Water Loss Specialist Group (Water Loss Conference, Prague 2022)
- Peer-to peer exchange and **study tour** to Portugal
- **Five deliverables finalized and adopted** according to schedule (Stocktaking Report, Indicators for Utility Performance Evaluation, Tools and training material for water loss reduction, Recommendations for National Monitoring Body, ***Draft National Loss Reduction Action Plan***)



Draft National Loss Reduction Action Plan

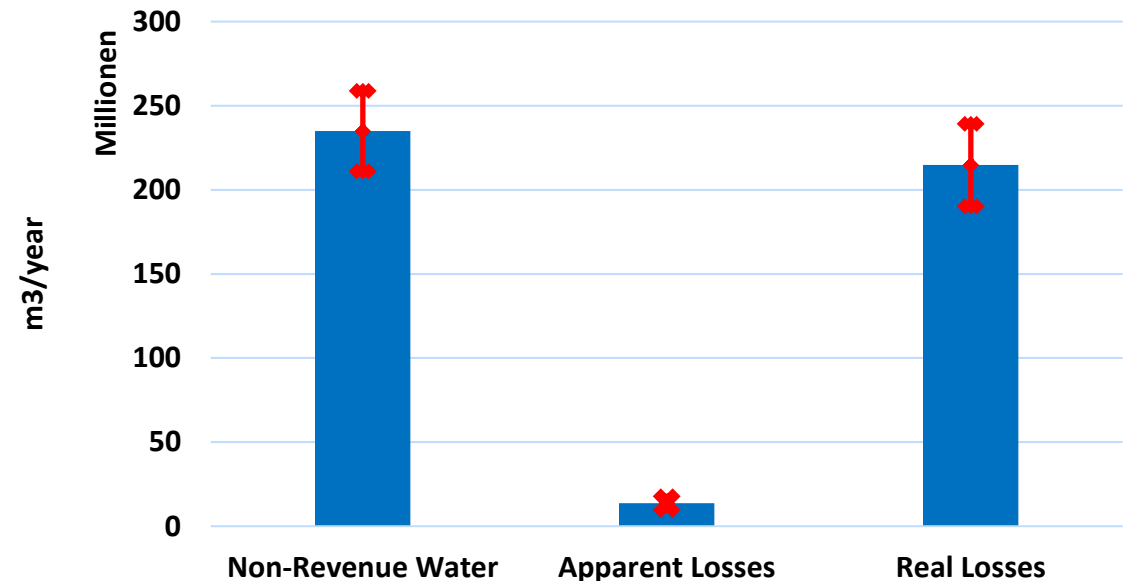
WATER BALANCE

NLRAP- Extended water balance on the Croatian level based on the 2021 data (values in m3/year)

Volume from Own Sources 479,123,913		Water Exported to another PWSP 43,154,197				Billed Water Exported to another PWSP
Water Imported from another PWSP 42,853,707	System Input Volume (corrected for known errors) 521,977,620	Water Supplied 478,823,423	Authorized Consumption 250,499,832	Billed Authorized Consumption 243,865,747	Revenue Water 243,865,747	Billed Metered Consumption 243,865,747
				Unbilled Authorized Consumption 6,634,086	Non-Revenue Water 234,957,677	Billed Unmetered Consumption
			Water Losses 228,323,591	Apparent Losses 13,577,145		Unbilled Metered Consumption
				Real Losses 214,746,446		Unauthorized Consumption 7,051,613
					Customer Metering Inaccuracies (and data handling errors) 6,525,532	
				Leakage on Mains		
				Leakage and Overflows at Storage Tanks		
				Leakage on Service Connections up to point of customer metering		

Result of **analysis of 95% confidence** of the calculation of Water Balance components on the national level in Croatia (IWA metodologije)

- Determination of **priorities in the implementation of activities to improve the accuracy of measurement or estimation of water quantities**, thus the monitoring of real losses, or the state of the system.



Draft National Loss Reduction Action Plan

OVERVIEW MEASURES AND ESTIMATED COSTS

Measures / established methodology methodologies

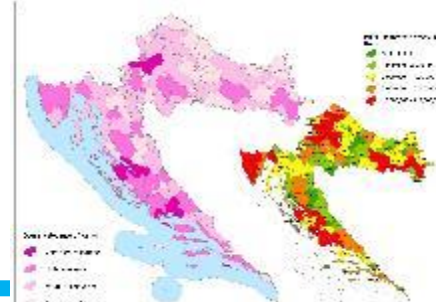
Costs

Responsibility	Number	Group
PWSP measures	I	System data improvement measures
	II	Water supply system optimization measures
	III	Measures to divide the system into DMAs
	IV	System pressure control and management measures
	V	Active leakage control measures
	VI	Measures to address apparent losses
	VII	Planning and mains replacement measures
	VIII	Institutional strengthening measures
	IX	Analysis and reporting measures
	X	Technical (external) assistance to PWSPs to implement the measures
MESD measures	XI	Establishment of the PWSP benchmarking system and performance indicators (establishment of the national database, training PWSPs to report to the Ministry)
		Costs of the national control body for the reduction of losses (expert assistance for the verification and implementation of PWSPs' action and investment plans during NLRAP implementation)

Responsibility	Number	Group	Amount (EUR)
PWSP measures	I-IX	Measures total	1,654,430,000
	X	Technical assistance to PWSPs to implement the measures (3% of the value of Measures I-IX)	49,630,000
MESD measures	XI	Establishment of the PWSP benchmarking system and KPI (establishment of the national database, training PWSPs to report to the MESD)	1,000,000
		Costs of the national control body for the reduction of losses (expert assistance for expert verification of PWSPs' action and investment plans during NLRAP implementation)	2,660,000
Measures total			1,707,710,000

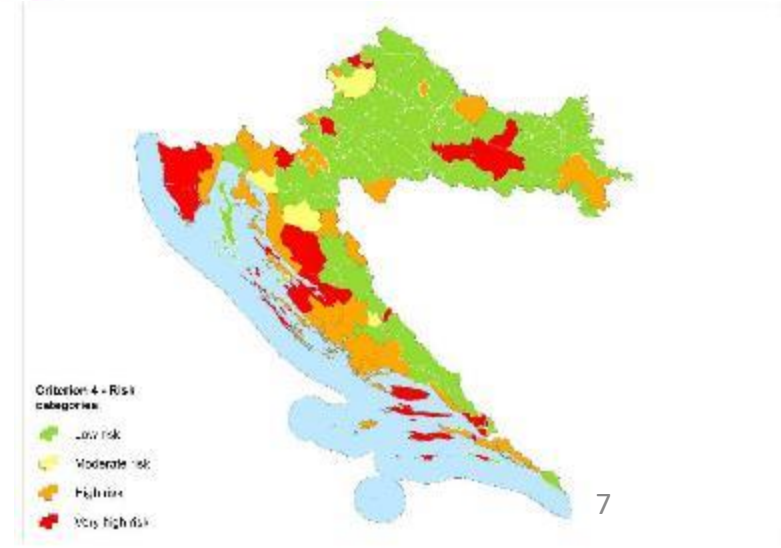
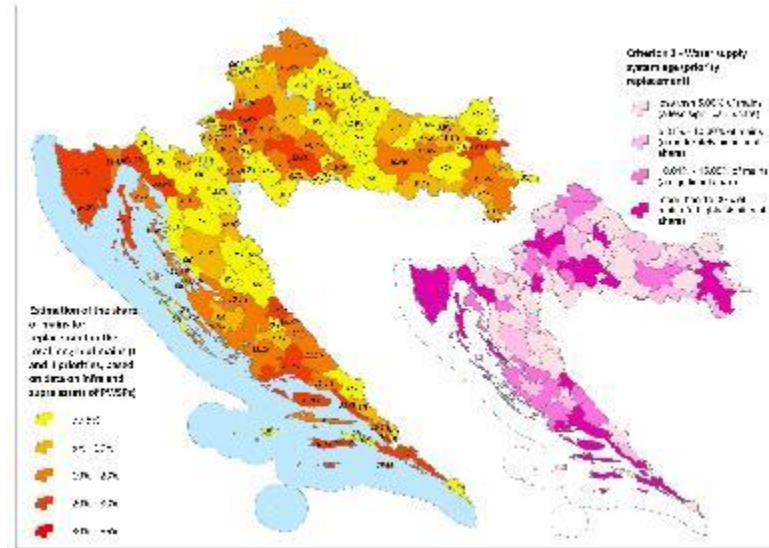
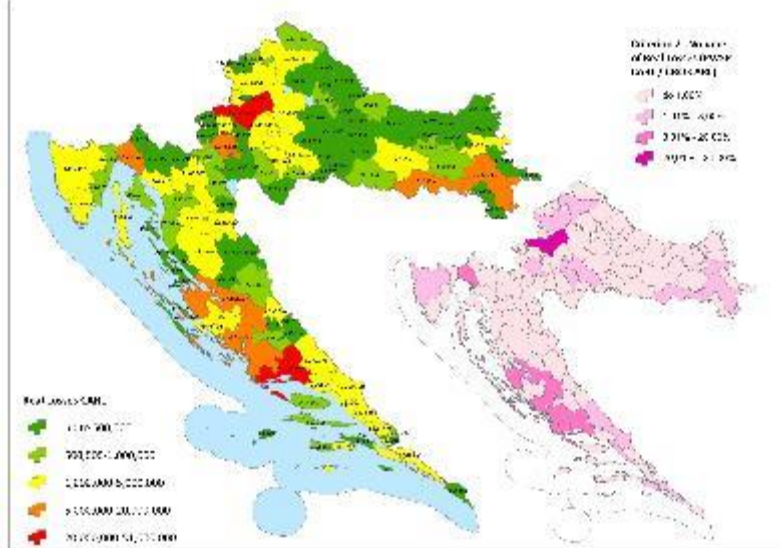
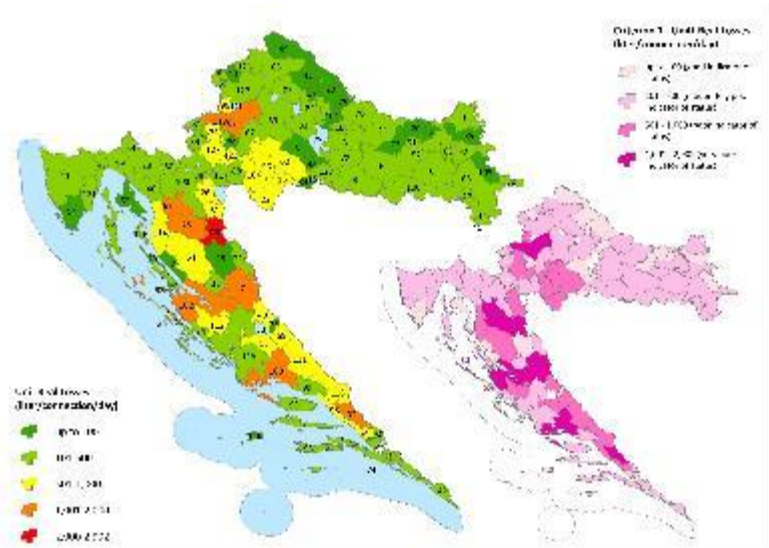
Draft National Loss Reduction Action Plan

WATER LOSS RELEVANCE



Prioritization of measures

- It is necessary to implement all the foreseen measures (in the scope/amounts adjusted to the priority on the national level, as well as to the needs of individual PWSPs or service areas).
- For financially demanding measures and investments prioritisation, **relevance of the losses** were assessed using 4 weighted criteria:
 - Criterion 1 - Unit Real Losses
 - Criterion 2 - Volume of PWSPs Real Losses
 - Criterion 3 - Water supply system age
 - Criterion 4 - Risks associated with limitations in available water volumes and climate change



Draft National Loss Reduction Action Plan

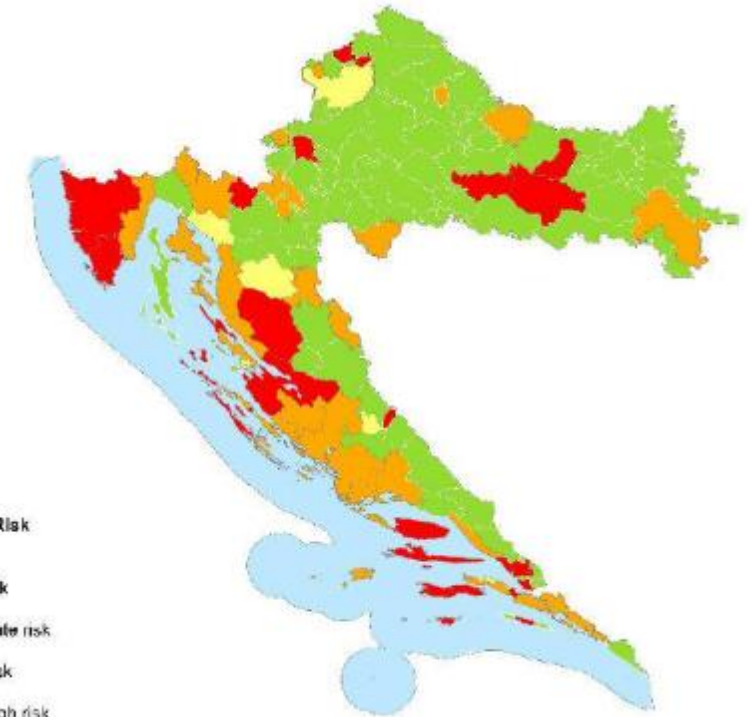
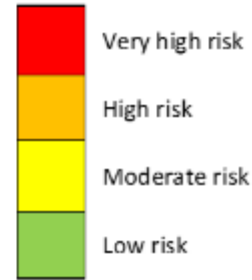
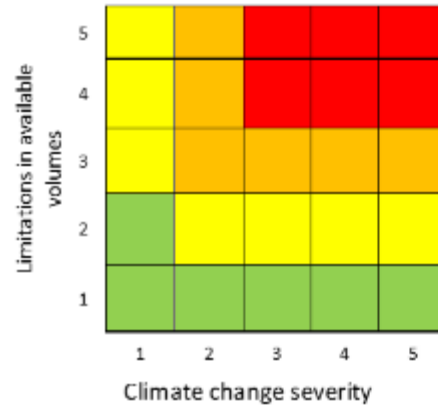
WATER AVAILABILITY, CLIMATE CHANGE SCENARIOS, RISKS

Criterion 4 - Risks associated with limitations in available water volumes and climate change)

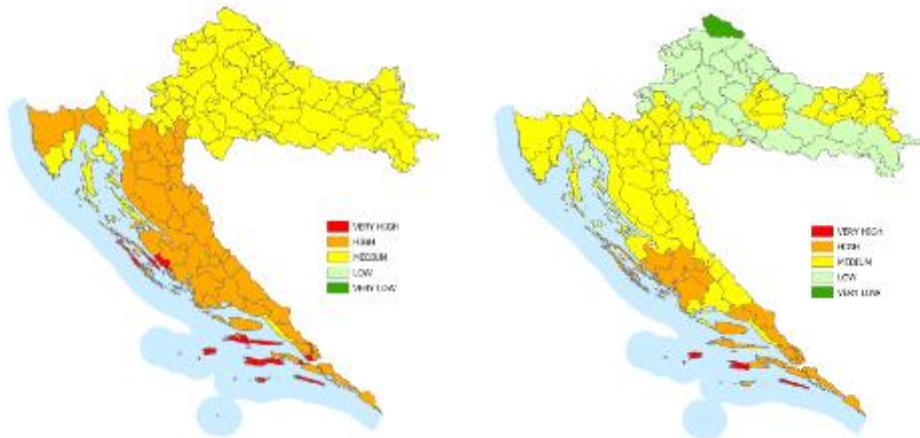


Limitations in available water volumes

Risk matrix



Spatial distribution of risks according to the risk matrix, limitations in available water volumes and climate change severity

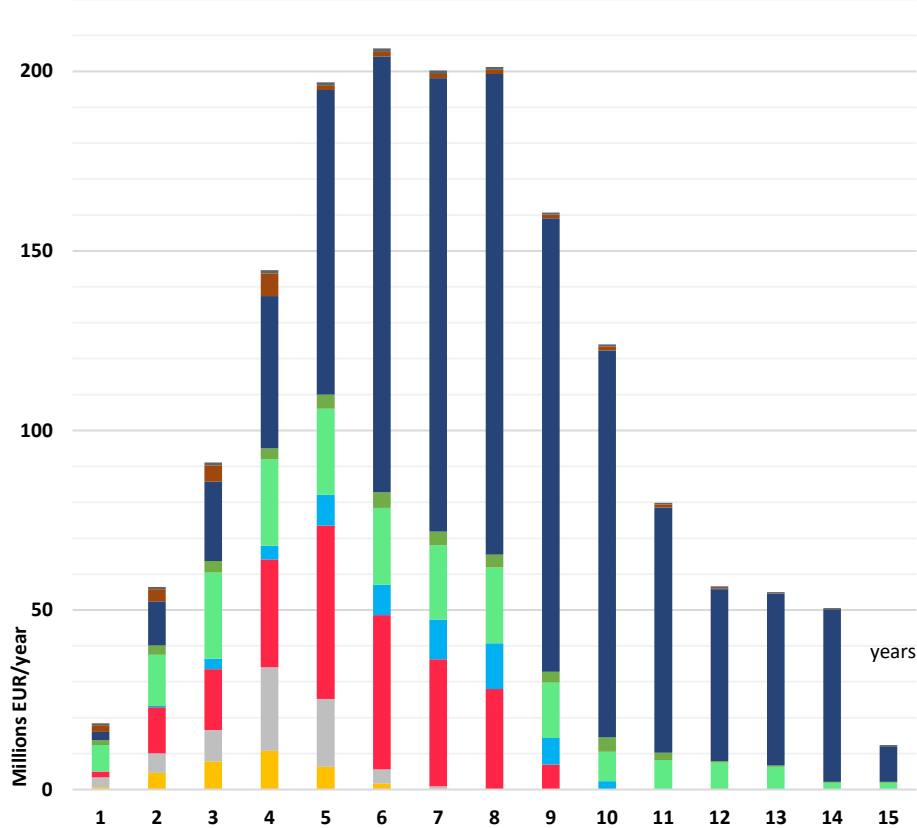


Climate change scenarios

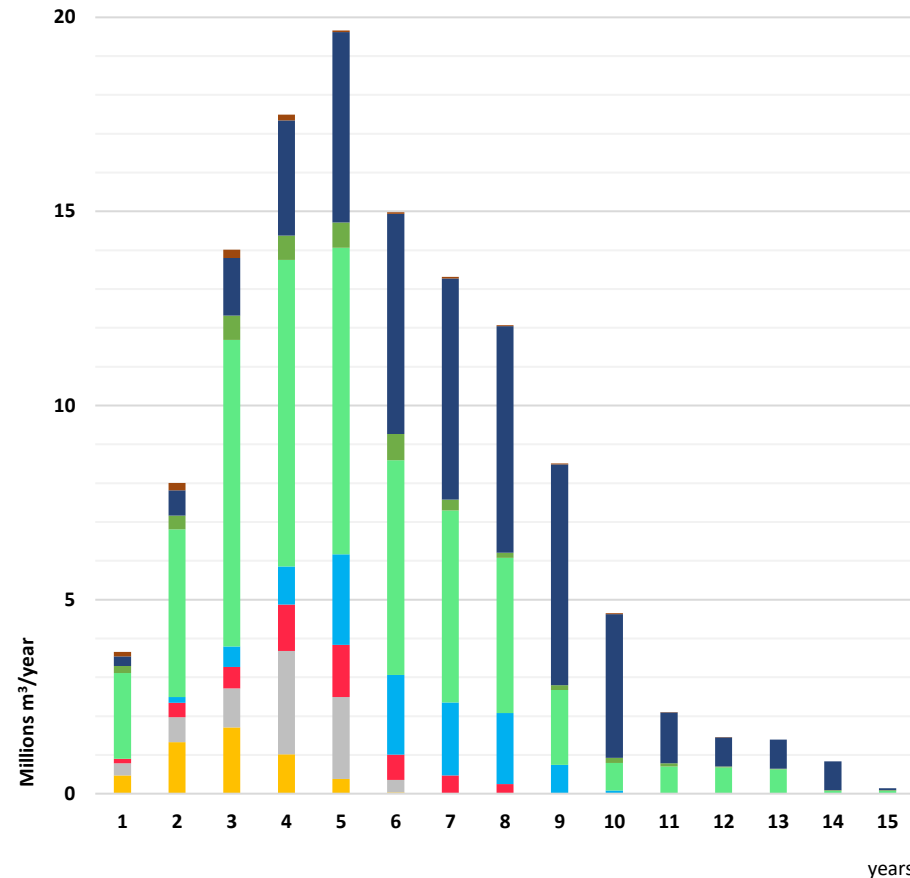
Draft National Loss Reduction Action Plan

INVESTMENT STRUCTURE

Investments (EUR/year)



Effects (m³/year)



Investments costs and effects by investment years (EUR/year)

- Analysis and reporting measures
- Institutional strengthening measures
- Planning and mains replacement measures
- Measures to address apparent losses
- Active leakage control measures
- System pressure control and management measures
- Measures to divide the system into DMAs
- Water supply system optimization measures
- System data improvement measures

PROJECTION OF POTENTIAL SOURCES OF FINANCING

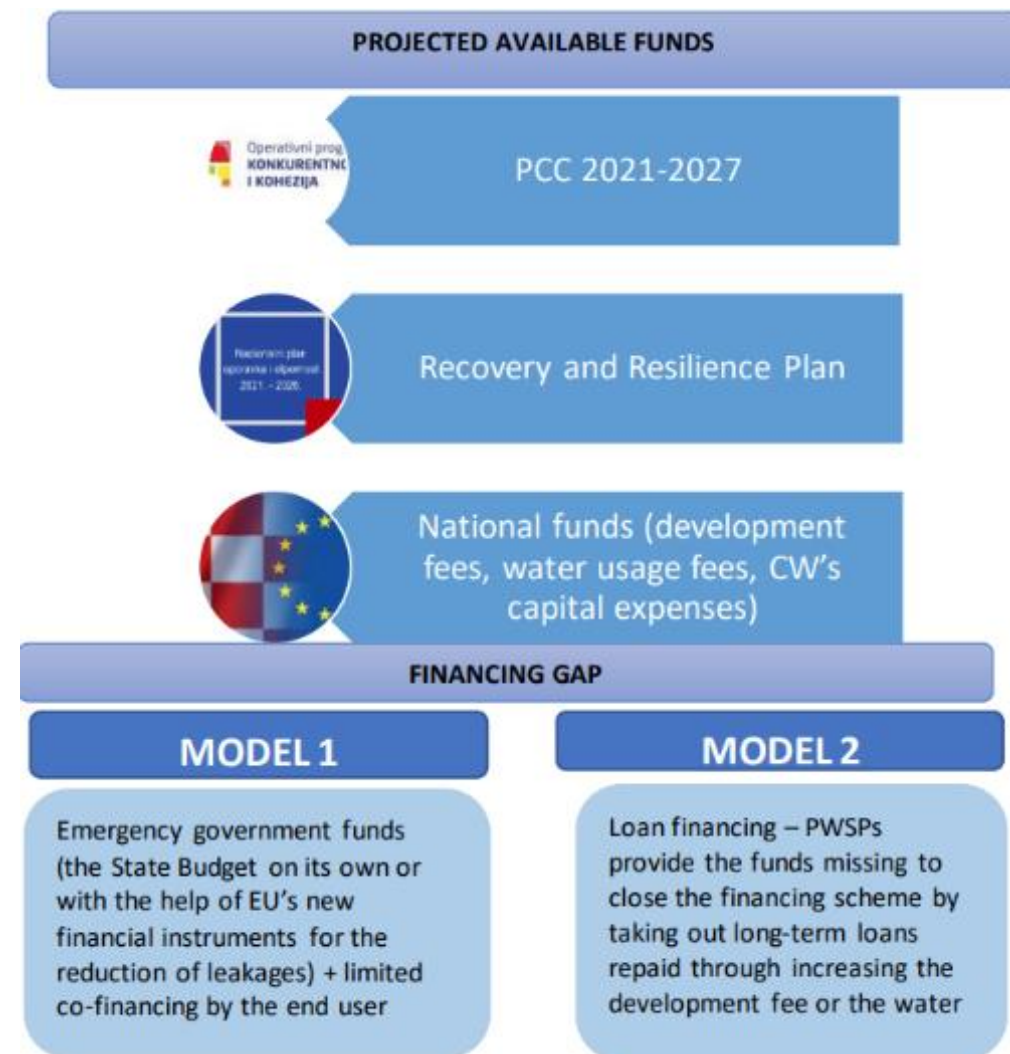
Estimated total financing needs: EUR 1,707 million

Total projected available funds: EUR 675 million

Financial gap: EUR 1,032 million (or 60,41% of the total projected investment value of the measures)

Due to significant financial gap, two models are discussed:

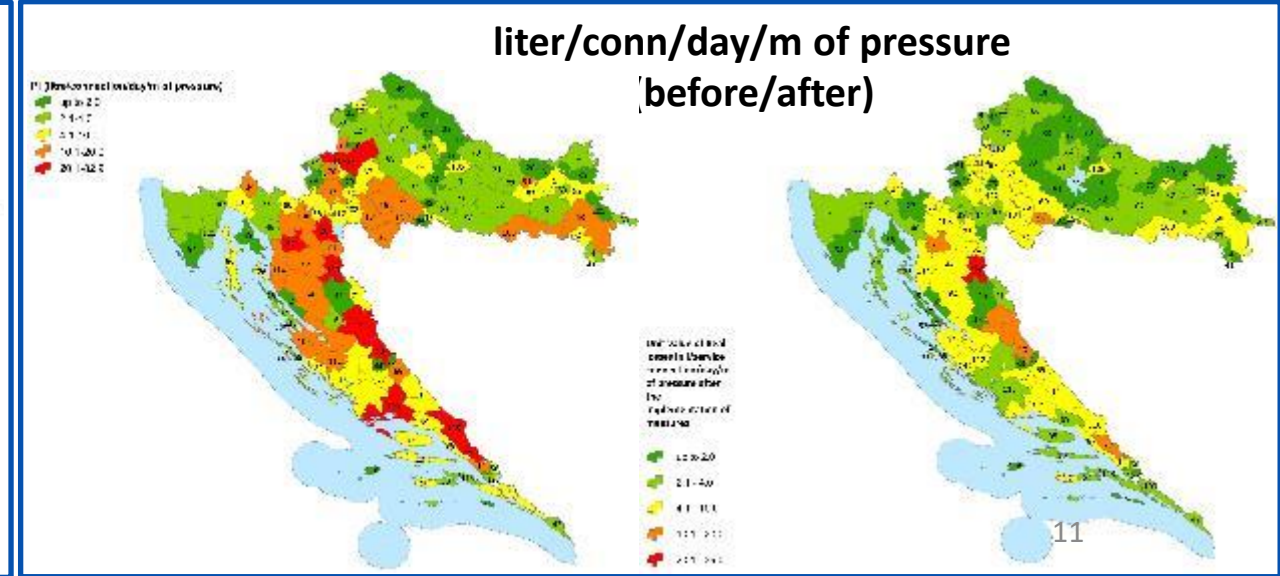
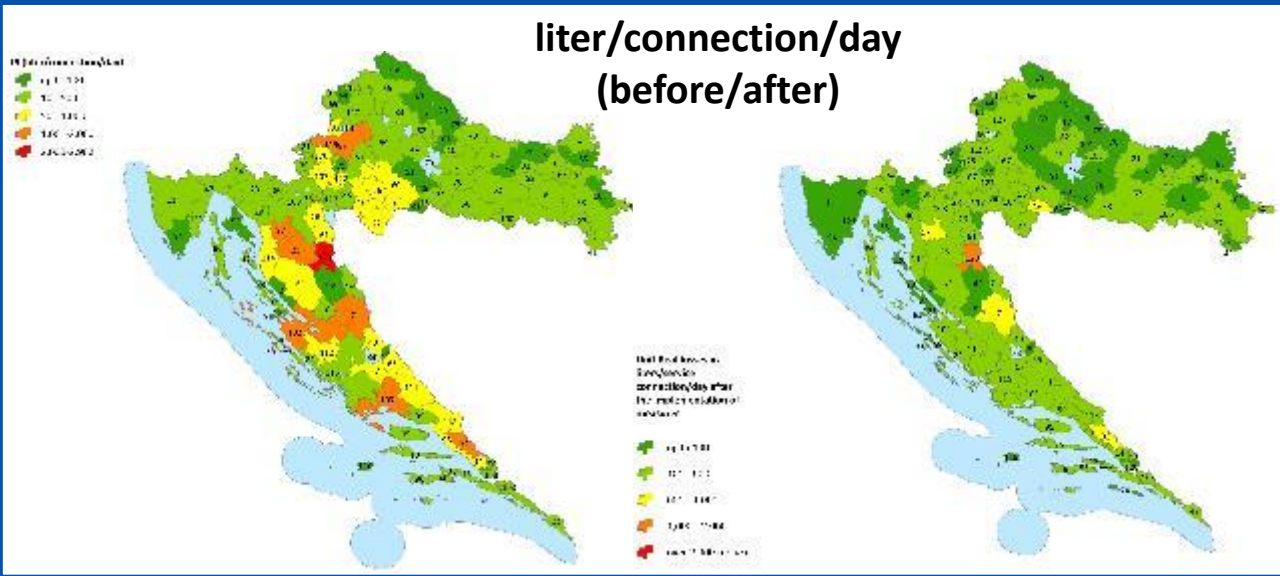
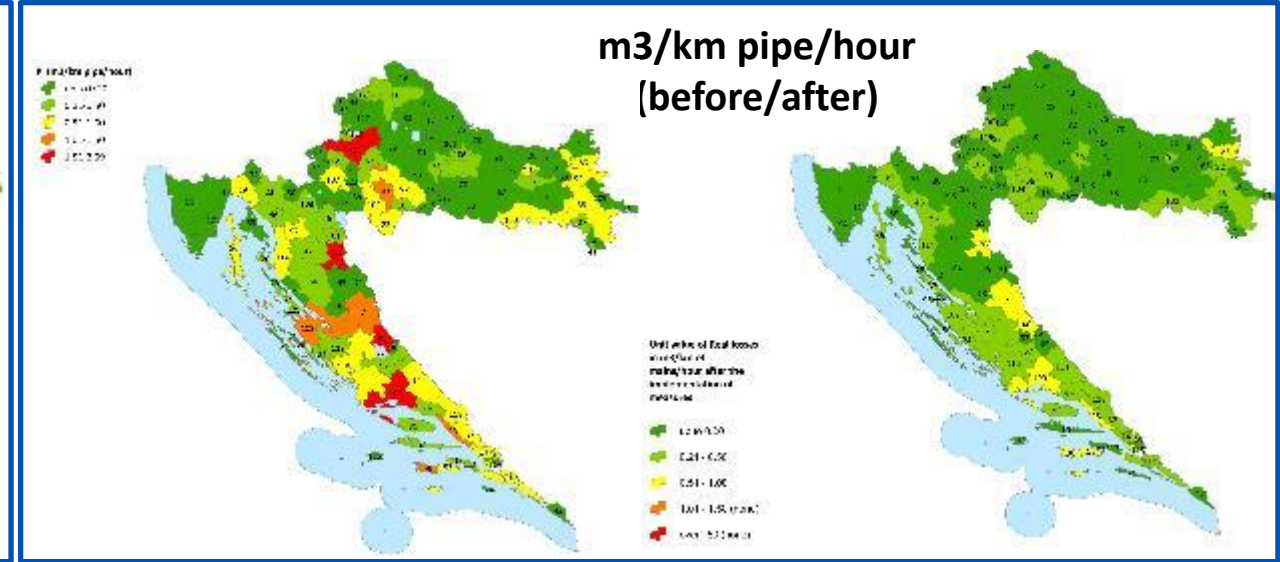
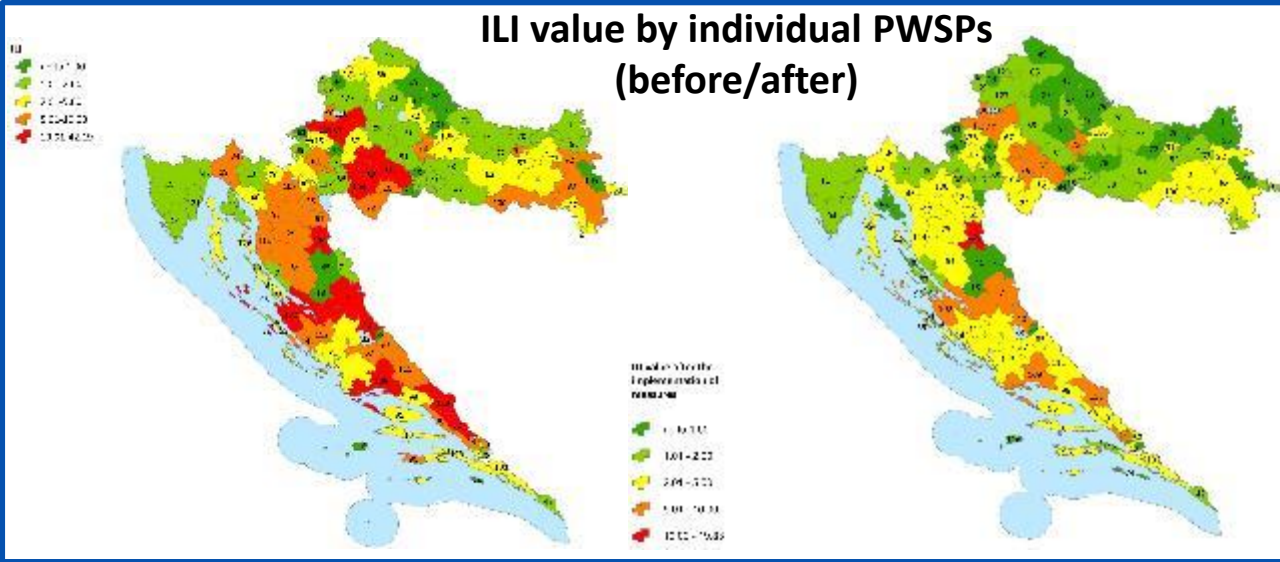
- **MODEL 1:** Emergency government funds and limited funds of the end users
- **MODEL 2:** Loan financing (IFI loans as a more favorable option or loans from commercial banks) through charging the future water price or through increasing the development fee



Draft National Loss Reduction Action Plan

PLAN IN MAPS

Volumetric indicators of water losses after (15 years) implementation of measures - 122.3 million m³/year or 50% volume or NRW level 30%



Draft National Loss Reduction Action Plan

IMPORTANCE OF NLRAP

- The NLRAP is the first **comprehensive document prepared to improve the water loss reduction** in Croatia.
- A **detailed analysis of the current situation was conducted** on a qualitative basis, **key problems** in the operation of numerous PWSPs **were identified**, and **key groups of measures and sub-measures for the implementation** of the NLRAP were defined, applicable at all levels, from individual PWSPs to the national level with assessment of the impact of the implementation of the proposed measures.
- As part of the analysis of the current situation, **a database of all PWSPs in Croatia with the most important technical, operational, organizational and personnel data was created**.
- The **proposed actions are intended to cover all areas that have an impact on water loss reduction** and also aim to **raise awareness of the importance of long-term implementation** of all actions.
- A particular **contribution** of the **Croatian NLRAP** is the **applicability of the elaborated methodology** for water loss reduction and **NLRAP preparation in other countries** and in PWSPs **outside the borders of Croatia**.



Thank you!

rmair@worldbank.org
grizeljsimicv@hp-ing.hr