

Joint Operational Programme  
Romania - Ukraine - Republic of Moldova 2007-2013

# EASTAVERT PROJECT

“The prevention and protection against floods in the upper Siret and Prut River Basins, through the implementation of a modern monitoring system with automatic stations” - MIS ETC 966

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13th International Conference « EUROPE-INBO 2015 »  
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# EASTAVERT PROJECT STUDY AREA

**Location(s) of the action:**  
Prut and Siret River Basins

**Romania:**

- counties (for Siret River): Suceava, Iasi, Neamț, Bacău;
- counties (for Prut River): Botoșani, Iasi, Vaslui, Galați.

**Ukraine:**

- Ivano-Francovsc region
- Chernivtsi region.

**Republic of Moldova:**

- Briceni, Edineț, Rîșcani departments



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# Partners

- **Ministry of Environment, Water and Forestry – PROJECT LEADER**
- Prut-Barlad Water Basin Administration-RO,
- Siret Water Basin Administration -RO,
- National Institute of Hydrology and Water Management – RO
- “Apele Moldovei” Agency -MO
- Dnister-Prut Basin Department of Water Resources-UA
- Chernivtsi Regional Centre on Hydrometeorology – UA
- State Scientific and Technical Centre for inter-sectorial and regional problems of the Environmental Safety and Resources Conservation “EcoResource” -UA

**Duration** – 22 months (prolonged to 25 months)

**Total value:**

**9.243.784,56 euro**

ENPI contribution - 8.287.607,98 euro

Partners contribution - 956.176,58 euro



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# Overall objective:

Assuring the protection of border areas in the upper Siret and Prut River Basins against flood risk, other natural hazards of the water cycle and accidental pollutions, and reducing the environmental, economic and social vulnerability of targeted localities from the border region against flood risk.

## Target Group and Beneficiaries:

- The **water authorities** from Romania, Ukraine and Republic of Moldova;
- Representatives of **environmental protection institutions** (local and regional Environmental Protection Agencies, Non-Governmental Organizations)
- The **political authorities**, from the Ministry of Environment, Water and Forests and the Ministry of Health, from Romania, Ukraine and Republic of Moldova, which are involved in the flood risk management, prevention of natural and manmade disasters, real time information dissemination.
- The **stakeholders and users of water bodies** (city halls, prefectures, county councils) placed in cross-border areas which will be informed about the flood monitoring and flood risk management systems;
- The **members of PIAC (Principal International Alert Centre)** involved in the protection of water against the extreme environmental conditions (floods, droughts, accidental pollutions by chemical and radioactive substances);



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# Project activities

**ACTIVITY 1:** Design of the hydrological information, forecasting and early warning system for reducing the environmental, economic and social vulnerability

**ACTIVITY 2:** Modernization of the hydrological information system (HIS), forecasting and early warning system (EWS) in Prut and Siret Basins for flood prevention

 **ACTIVITY 3:** Preparing the Flood Directive (2007/60/EC) reporting for the Preliminary Flood Risk Assessment and Flood Hazard and Risk Mapping along the Prut Floodplain and in Siret Basin, upstream Romania

 **ACTIVITY 4:** Collaboration for improving the framework of the bilateral Agreements in case of floods

**ACTIVITY 5:** Transparency      **ACTIVITY 6:** Management and coordination



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## ACTIVITY 2

### EASTAVERT Flood Forecasting and Warning Systems

In order to satisfy the specific needs for the real time forecasting in Prut and Siret transboundary River Basins the following general structure have been selected:

- A detailed spatial and temporal scale hydrological model will be configured for the upper part of the Siret and Prut River basins, in Ukraine, in order to provide short-term detailed rainfall-runoff capabilities. For the same area, for the routing and the flood inundation mapping needs, a hydraulic model will be implemented.
- Both type of models, for the uper part of Prut and Siret, in Ukraine, will be configured, calibrated within the activity for flood hazard and risk maps, and they will also be used for hazard maps generation.



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## ACTIVITY 2

### EASTAVERT Flood Forecasting and Warning Systems

- A second type of model, a conceptual hydrological rainfall-runoff model will be implemented, in order to satisfy the needs of medium term forecasts and scenarios for the Siret and Prut river basins at the entrance in Romania.
- These forecasts will be used both by the partners from Romania and Moldova, in order to optimize the operation of Stanca-Costesti reservoir for flood defense in Prut river basin, and by Romanian partners for optimize the operation of reservoirs on Siret river.
- This hydrological modeling system will use the same hydrological model that are implemented in HFMS-DESWAT system in Romania (NWSRFS: SAC-SMA, Snow17 and Lag&K), in order to benefit from the experience in model configuration and calibration, and for a better integration with the existing system.



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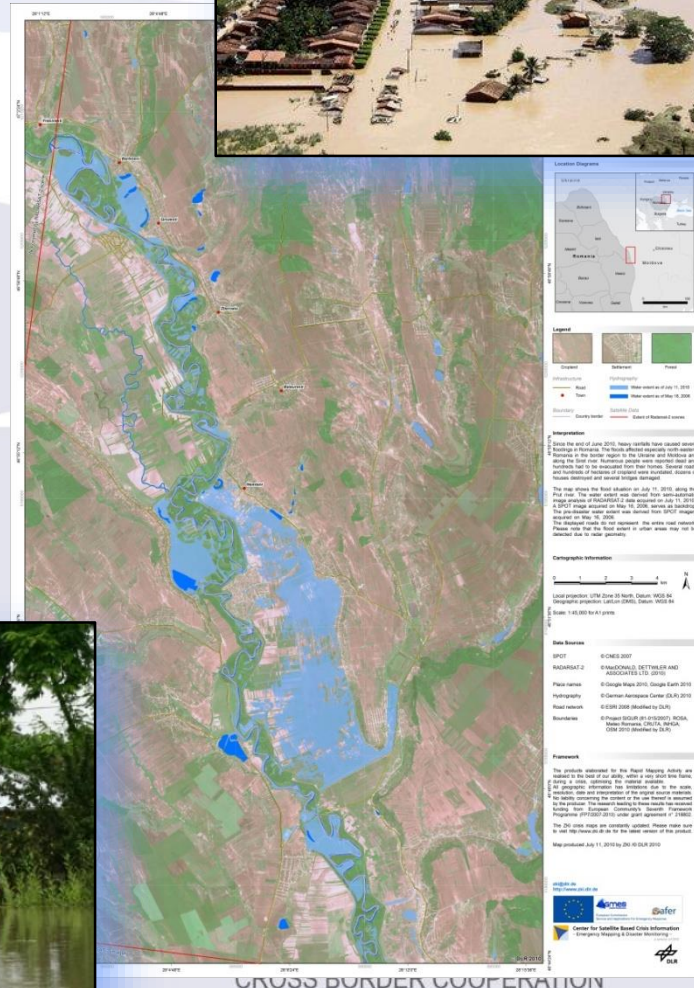
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## ACTIVITY 3

### Flood hazard and risk maps

- The effort for achieving such maps and related spatial data will be recover through the high benefits of the long-term development of the cross-border area based on the localities and population prevention and protection against floods, as well as on a strategic land development planning taking into consideration the historical events, flood hazard and vulnerability/risk.





# Geodatabase and information system

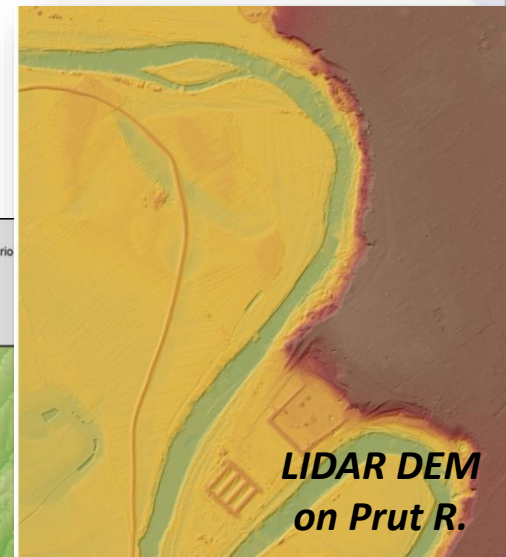
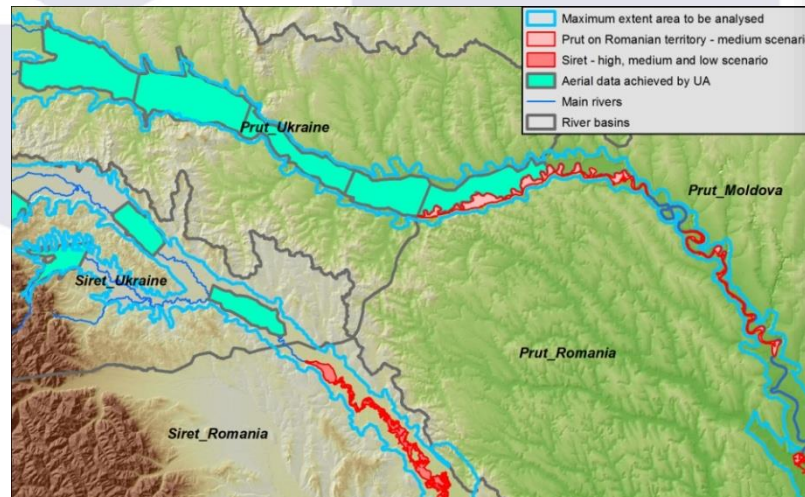
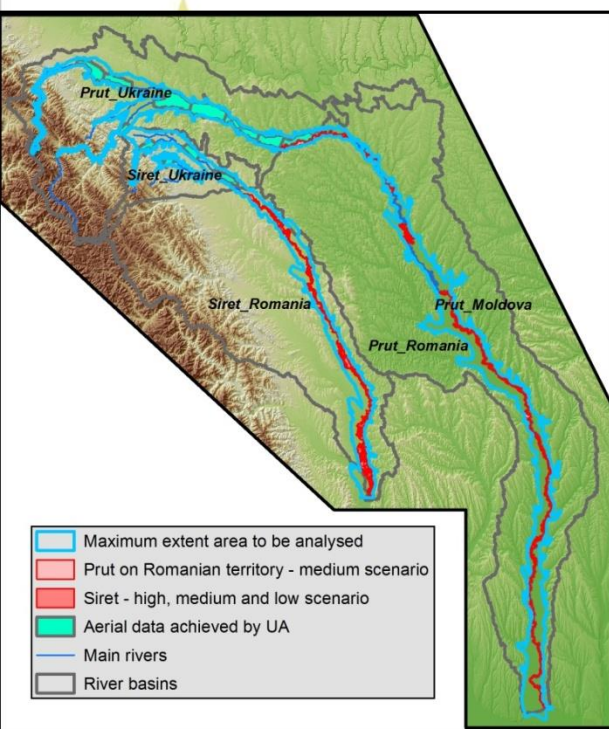
- Harmonization of spatial information is needed in Prut and Siret basins and the rivers must be conceived like a system which does not respect any border.
- One of the objective is to create a common database necessary for mapping historical floods, for production of hazard and risk maps etc.



NAME	OROFTIANA
RIVER	PRUT
START YEAR	1976
YEARS WITH NO DATA	1980-1982
DISTANCE FROM CONFLUENCE	7140
RIVER BASIN SURFACE	999
RIVER BASIN ELEVATION	9999
WARNING LEVEL 1	250
WARNING LEVEL 2	350
WARNING LEVEL 3	550
ELEVATION SYSTEM REFERENCE	Baltic Sea
LANDMARK ELEVATION	105
"0" STAGE POINT ELEVATION	99.2
GPS LAT_DMS	48:11:12.15
GPS LONG_DMS	26:21:41.09
GPS ELEVATION	100.3
MAXIMUM FLOW	999
DATA OF MAX. FLOW	2/2/2008
MAXIMUM LEVEL	867
DATA OF MAX. LEVEL	2/2/2010
FLOW 10% PROB	★
FLOW 1% PROB	★
FLOW 0.1% PROB	
FORECASTING	X
SEDIMENT LOAD	X

# Main data availability for hazard and risk maps

- At the present-day, only for the Siret River on Romanian territory has been reported detailed hazard and risk maps
- For Prut river on the Romanian territory, an existing LIDAR data set will be used, bathymetric surveying being in progress.
- The detailed aerial surveying data are achieved for UA's main vulnerable area to floods (about 820 sq. km)



# Risk matrix will be implemented

- The proposed method is started based on a FAME (The Flood risk and damage Assessment using Modelling and Earth observation techniques) report proposes the risk assessment using a matrix, as a function of the hazard level (P1, P2, P3) and exposure class (E0, E1, E2, E3).
- This scheme can be easily adjusted; the hazard level are replaced by flood magnitude of hazard level (respectively, water depth).

Exposure class	Hazard class		
	P1 100 < T < 1000	P2 10 < T < 100	P3 T < 10
E0	R0	R1	R1
E1	R1	R2	R3
E2	R2	R3	R4
E3	R2	R4	R4

where:

R0 = very low flood risk;

R1 = low flood risk;

R2 = medium flood risk;

R3 = high flood risk;

R4 = very high flood risk.

RISK			Hazard class		
			H1	H2	H3
			Low (<0.5)	Medium (0.5-1.5)	High (>1.5)
Vulnerability	V1	Low	R0	R0	R1
	V2	Medium	R1	R1	R2
	V3	High	R1	R2	R3





# Flood risk receptors to be assessed



## Population:

- Number of affected inhabitants
- Number of inhabitants located in the area of maximum water depth
- Health: hospitals, water supply
- Community: kindergartens, universities, schools, town halls, police offices



## Economic activity:

- Arable land
- Major industrial activity
- Small economic activity



## Cultural heritages:

- Churches
- Monuments
- Museums
- UNESCO sites



## Infrastructure:

- Railway - type: electric and nonelectric, international routes etc.
- Railway stations
- Roads – type: motorways, european, national, local etc.



## Environment:

- Nature 2000
- Natural parks
- Scientific res.
- UNESCO sites



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# CURRENT PLANNING REGARDING FLOODS MANAGEMENT IN ROMANIA

- *National Strategy for Flood Risk Management – 2010*
- *River Basin Development Plan*  
(*STRATEGIC PLAN for Water Management issues including FLOODS*)
- *Floods Defense Plans at the locality, county and river basin district level*  
(*EMERGENCY SITUATIONS PLAN*)
- *National Plan for Floods Protection, Prevention and Mitigation*  
(*PROJECT having as result FLOOD MEASURES PLANNING*)
- *Flood Risk Management Plan*  
(*Implementation of the FloodS Directive*)



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# CURRENT STATUS REGARDING FLOODS DIRECTIVE IMPLEMENTATION IN ROMANIA

## **FLOOD RISK MANAGEMENT PLAN**

*The flood risk management plan establish **the actions, the measures and the solutions for flood prevention, populations, goods and environmental protection against this phenomena**, contributing to assure for all areas in the country a sustainable economic development.*

### ***The minimum content of flood risk management plan:***

- ✓ conclusions of preliminary flood risk assessment;
- ✓ flood hazard and risk maps, among with the conclusions that result from their analyze
- ✓ establishing of flood risk management objectives
- ✓ proposed measures (prioritized) – in order to achieve the proposed flood risk management objectives, etc



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# **FLOOD RISK MANAGEMENT PLAN - CONTENT**

**Cap. 1 : River Basin general presentation**

**Cap. 2 : Flood risk at the River Basin Administration level**

**Cap. 3 : Description of the flood risk management objectives**

**Cap. 4 : Sinthesis and prioritization of the proposed measures**

**Cap. 5 : Description of the progress implementation monitoring**

**Cap. 6 : The abstract regarding the public information and consultation**

**Cap. 7 : The list of competent authorities**

**Other chapters (if it is applicable)**

*Description of cost – benefit methodology, when is available, used in the transnational context; Description of the coordination process at international basin level;*

*Description of the coordination process with W.F.D. (2000/60/CE Directive).*



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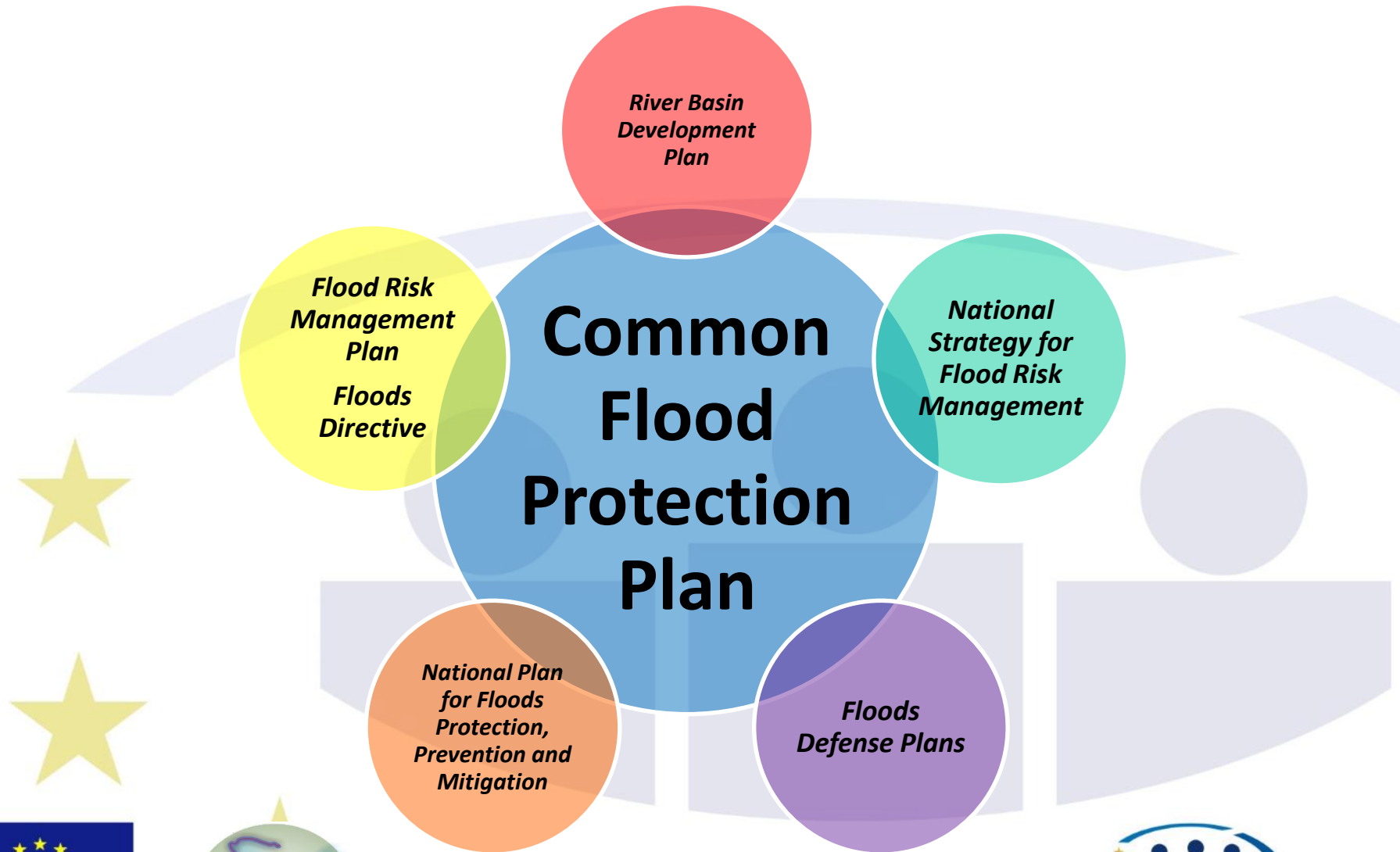


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# EASTAVERT – COMMON FLOOD PROTECTION PLAN



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# Thank you for your attention !



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