

EURO-INBO 2025 INTERNATIONAL CONFERENCE

Thematic session 2: Adapting to climate change: how to better
manage and prevent floods

Joint Flood Risk Management in the Sava River Basin

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Legal basis and milestones in cooperation

Framework Agreement on the Sava River Basin (2004)

- *International regime of navigation*
- *Sustainable water management*
- *Measures to prevent or limit hazards and reduce adverse consequences (floods, droughts, accidents, etc.)*

Protocol on Flood Protection to the FASRB (2015)

- *Flood Risk Management Plan*
- *Flood Forecasting, Warning and Alarm System*
- *Measures in emergencies and mutual assistance*

Climate Change in the Sava River Basin: Key Findings and Priorities

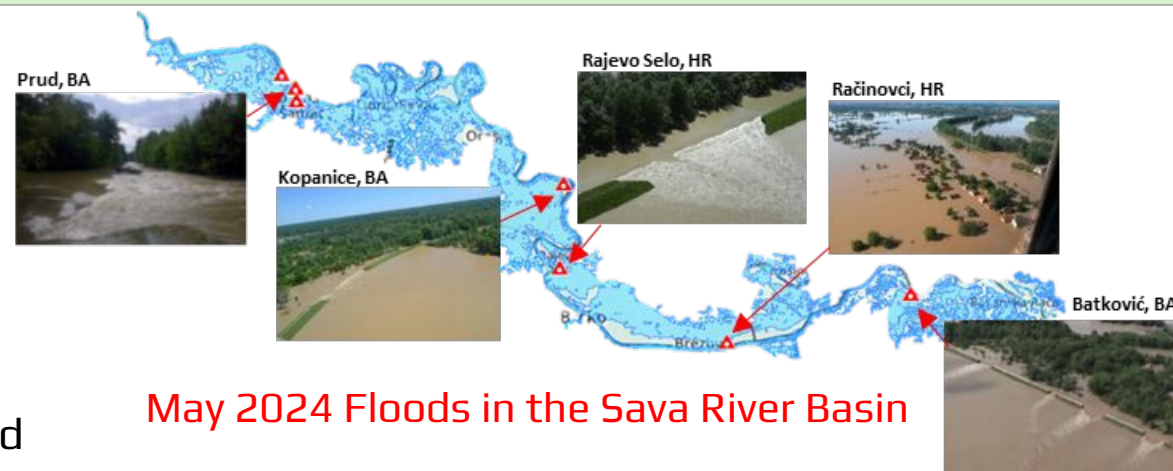
- **Multiple projects** (UNECE, World Bank, ICPDR, ISRBC)
- WATCAP (2015) - the most comprehensive climate-flood analysis

Key findings

- Significant increase in temperature across all seasons
- Precipitation to decline in spring-autumn, increase in winter
- Increase in peak flood discharges – current 100-year flood may become a 10-year event by 2100

Urgent priorities

- Improve monitoring
- Update & refine climate and hydrological models
- Forecasting/warning systems
- Strengthen adaptation capacity & ecosystem protection
- Develop flood hazard and risk maps using climate scenarios



| Country | Affected population | Evacuated population | Casualties | Total damage (€uro) | Cause |
|------------------------|---------------------|----------------------|------------|--|---------------------------------------|
| Bosnia and Herzegovina | 1,000,000 | 90,000 | 25 | 2,037,000,000 | Torrents, landslides, breach of dykes |
| Croatia | 380,000 | 15,000 | 3 | 300,000,000 (refers to Vukovarsko-Srijemska county) | Breach of dykes |
| Serbia | 1,600,000 | 32,000 | 51 | 1,532,000,000 | Torrents, landslides, breach of dykes |

FRM planning in the Sava River Basin

First Sava FRMP (2019)

Common FRM objectives

- avoidance of new flood risks
- reduction of existing risks
- strengthening resilience
- raising public awareness
- implementing solidarity principle

Areas of mutual interest – AMIs

- 251 ASPFR identified and grouped into 21 AMIs:
5,659 km² → 5.8% of the basin area; 1.4 million inhabitants

42 non-structural measures - 15 prevention, 11 protection, 16 preparedness

- 32 implemented; 5 in preparation; 5 left for the next cycle

38 national structural measures in AMIs

PFRA Update (2021)

15 implemented; 13 ongoing; 8 still not launched; 2 abandoned

1st exchange of PFRA & ASPFR data via Sava GIS

- Revisions and changes of AMIs - 19 AMIs covering cca. 5,734.5 km²

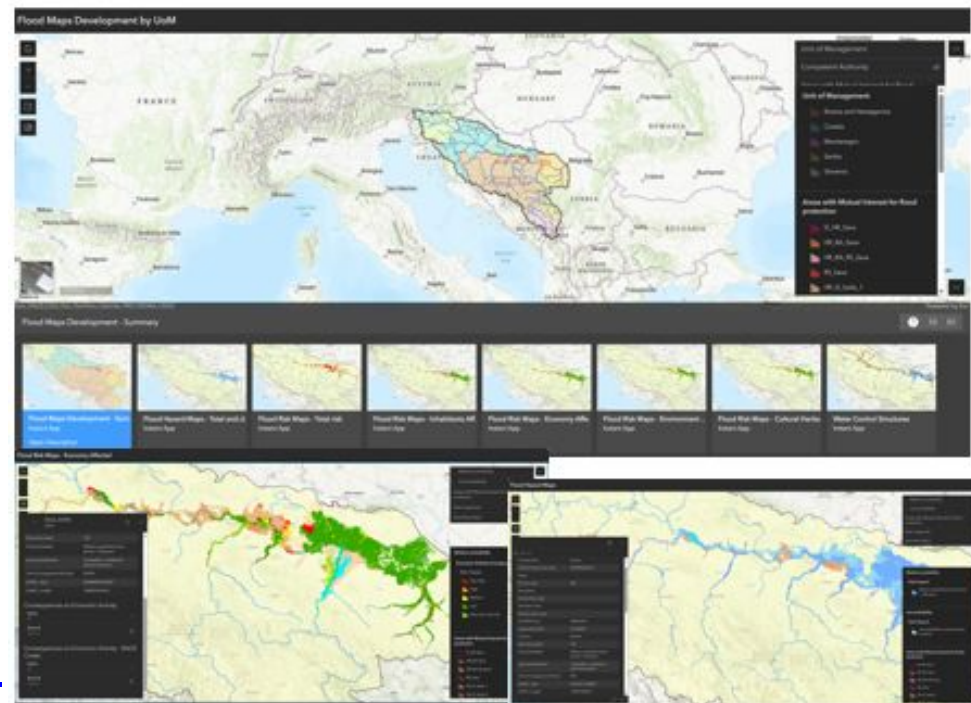
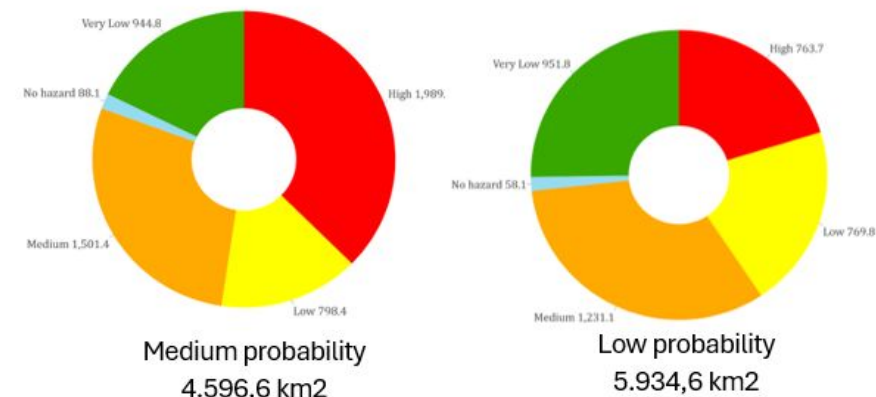


FRM planning in the Sava River Basin

Flood Maps Update (2024)

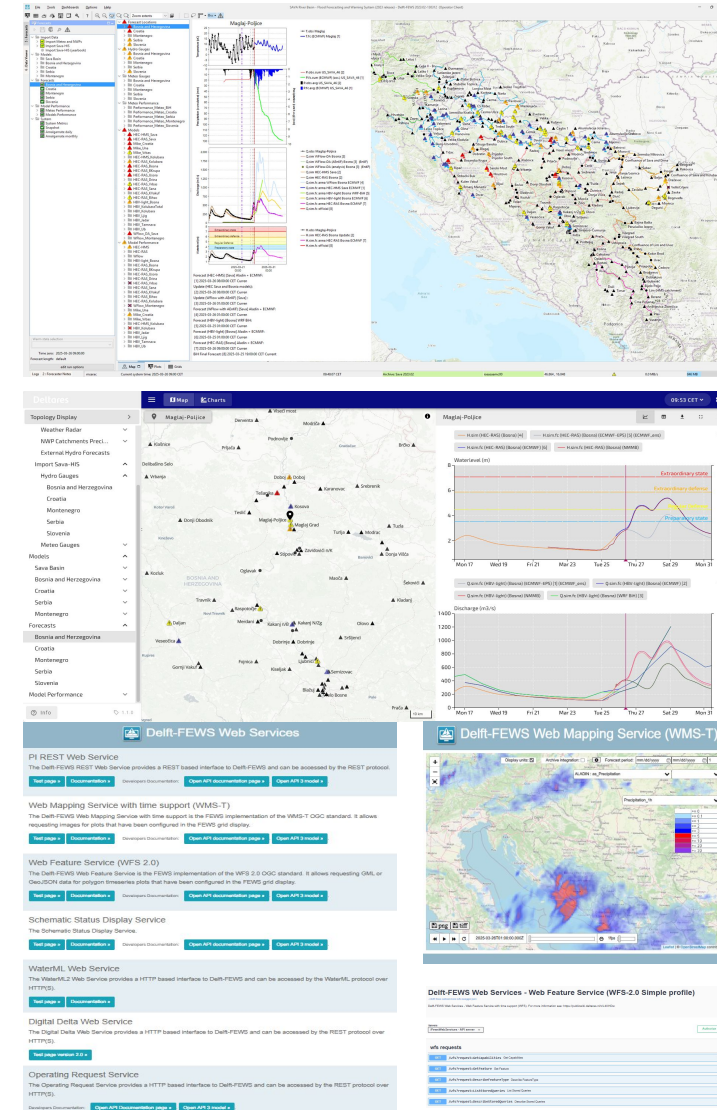
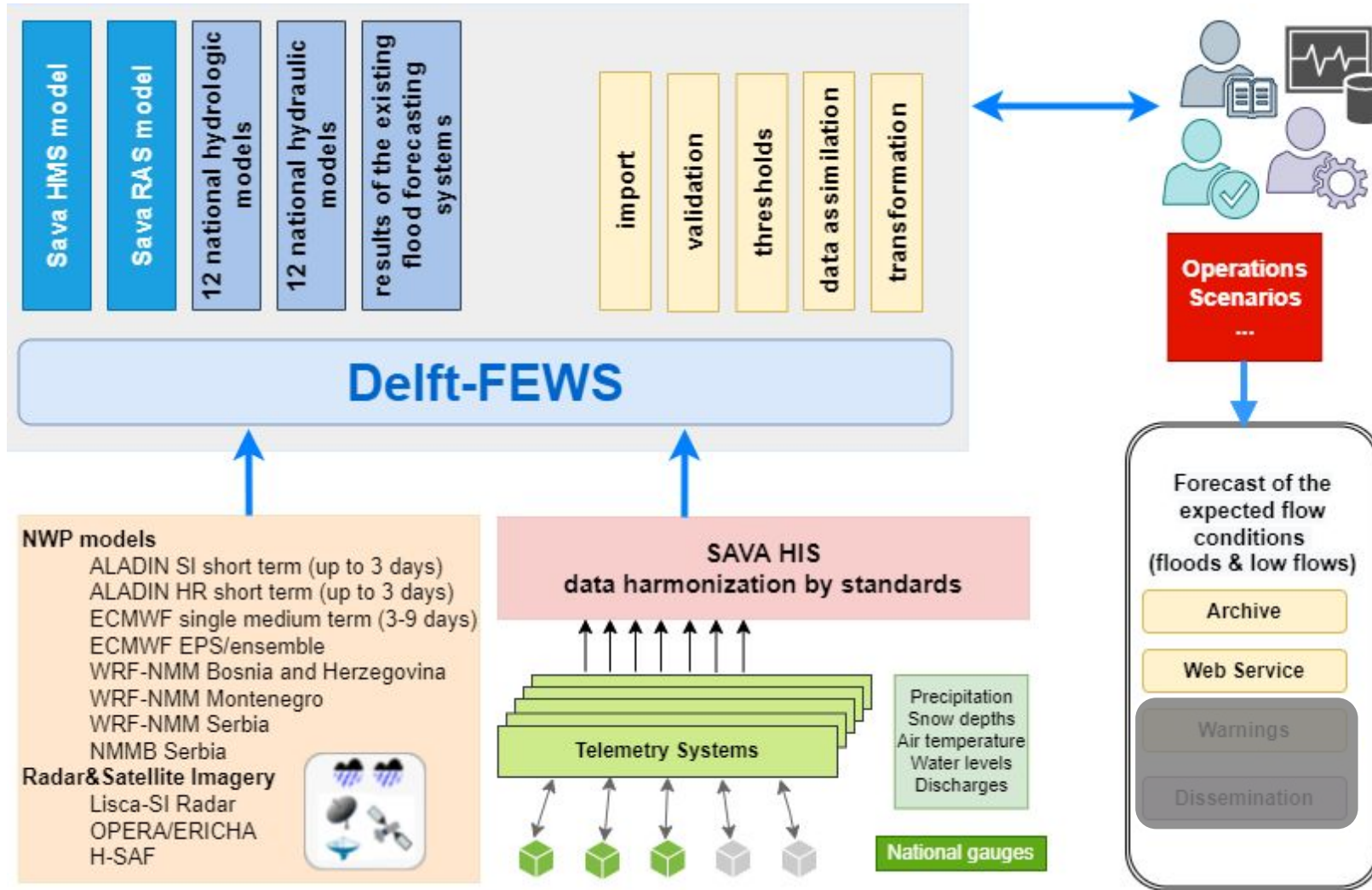
- Hazard classification of national hazard maps harmonized according to hydraulic parameters
- Hazard maps are based on two scenarios:
 - floods with a medium probability (likely return period of 100 years)
 - floods with a low probability, or extreme event scenarios (regardless of the return period)
- Simplified methodology used for classification of the potential adverse consequences associated with flood scenarios
- Report on flood maps prepared to meet the countries' obligations regarding data exchange from the Flood Protection Protocol.
- Flood maps portal established
 - data stored in the ISRBC database and published
 - Several interactive apps and dashboards developed
- Information (spatial and attribute data) in accordance with the EU FD Reporting Guidance presented

Flood hazards by classes in AMIs



Sava Flood Forecasting and Warning System

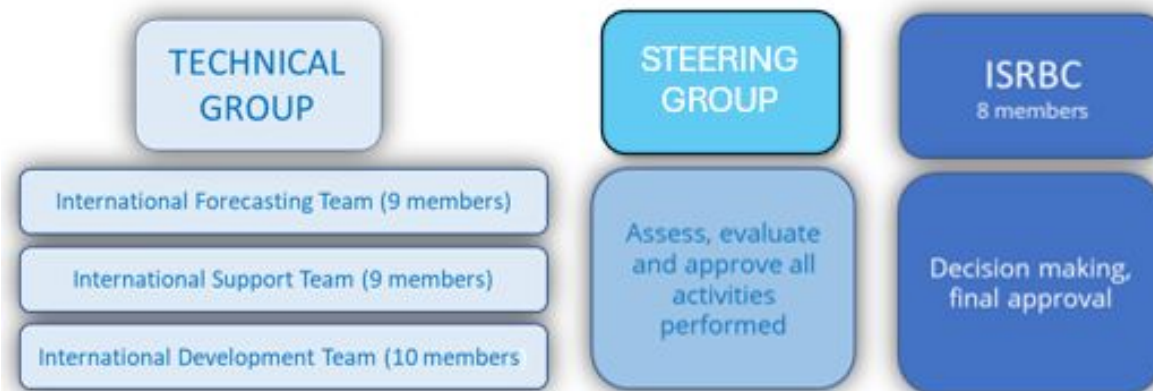
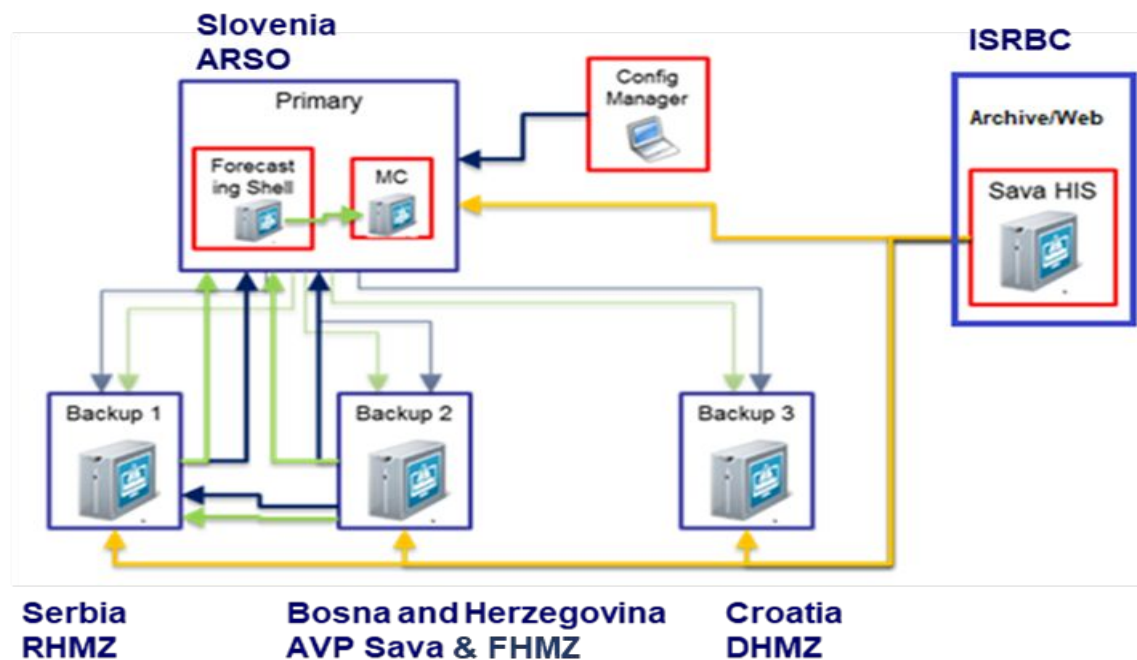
Sava FFWS (2018)



Sustainability of the Sava FFWS

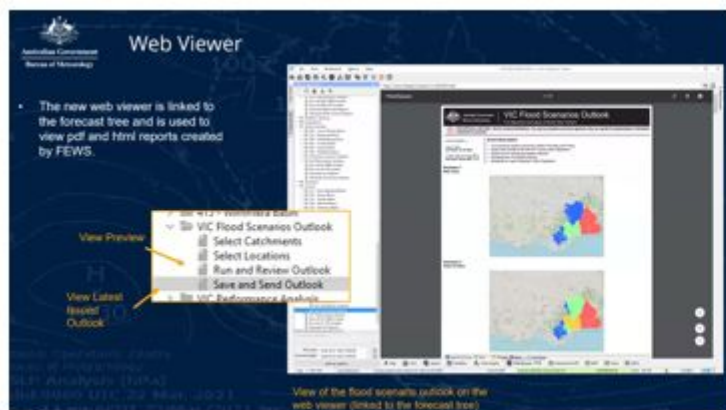
Sava FFWS MoU (2020):

- Structure, rights and obligations of the user and hosting organizations
- Evaluation and assessment of the work performed (technical and decision-making bodies established)
- Joint financing (by contribution of the countries)
- Regular training of the engaged personnel
- Further development



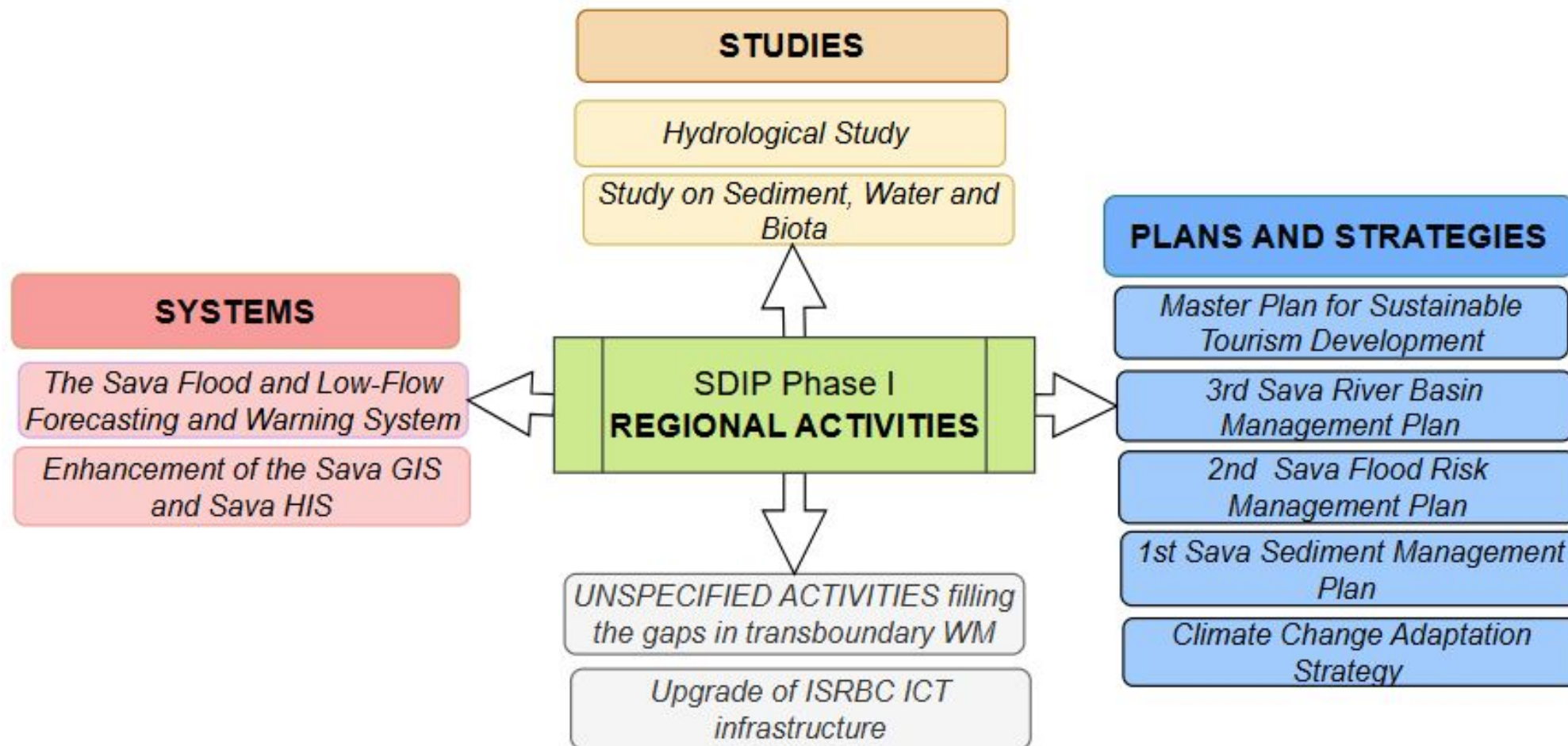
Sava FFWS 2nd phase - goals

- Development of high-resolution NWP models, satellite, and radar composite images
- Improvement of the meteorological and hydrological real-time data
- Enhancement of the existing basin-wide H&H models
- Implementation of the low flow forecasting into the existing platform
- Implementation of efficient flood and low flow forecasting and warning procedures and establishment of an internal web dissemination platform



Sava FFWS must be in line with
the long-term activities carried out by the WMO, specifically
"Early Warnings for All" and Hydro SOS

Other related activities of the ISRBC



Sava and Drina Rivers Corridors Integrated Development Program – Regional Component

THANK YOU FOR YOUR ATTENTION