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WORLD BANK - SUPPORT TO WATER RESOURCES MANAGEMENT IN THE DRINA RIVER BASIN

Background

- Project for "Support to the Water Resources Management in the Drina River Basin" extends within the three riparian states of BiH (FBiH and RS), Montenegro and Serbia.
- World Bank awarded the project in September 2014 to the Joint Venture (JV) with Consultant:
  - COWI AS of Norway as lead,
  - Stucky Limited from Switzerland and
  - Jaroslav Černi Institute (JCI) from Serbia.
- Sub Consultants of COWI:
  - CEStra, Belgrade and
  - Faculty of Civil Engineering of the University of Belgrade (FCS-UBG) and
  - and Regional Environmental Center for Central and Eastern Europe-REC (to COWI)

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Project Organisation Chart

- Coordination committee with authorities, responsible organisations, ISRBC and WB
- Consultant
- Countries' stakeholders

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Why the project?

- Key issues to be consider in Water Resources Management of the Drina River Basin:
  - The wide variety of competing water uses,
  - The River maintenance in general,
  - The extremes of floods and droughts that are aggravated by climate change,
  - Weak cooperation from the riparian states within the Drina Basin,
  - The urgent need for Integrated Water Resources Management (IWRM) and the need for convergence with EU water directives,
  - Improved coordination for data collection, control and analysis.

Riparian State	Surface Area km²	Portion of DRB	Portion State *(entity)* territory	No of Municipalities in Basin	Estimated Basin Population
Bosnia and Herzegovina	7,301	37.1%	14.3%	31	520,000
Republika Srpska	*(6,242)*	*(31.8%)*	*(25.7%)*	*(19)*	*450,000*
Federation of Bosnia and Herzegovina	(840)	(4.3%)	(3.2%)	(12)	70,000
Montenegro	6,219	31.6%	45.0%	10	150,000
Serbia	6,002	30.5%	7.7%	15	300,000
Albania	158	0.8%	0.5%	NA	NA
TOTAL	**19,680**	**100%**		**56**	**970,000**

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Objectives

- The overarching objective of the project is to support more **effective water resources management in DRB** taking into consideration:
  - ***sustainable water use,***
  - ***flood mitigation and***
  - ***environmental management,***
- while **involving stakeholder** consultations to ensure adequate public participation.
- The approach will **support** water management authorities in preparation of:
  - ***investment plans,***
  - ***strategic environmental assessment (SEA) and***
  - ***the river basin management plans.***

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Tasks

- Task 0 – Project Management
- Task 1 – Inception
- Task 2 – River Basin Assessment
- Task 3 – Institutional and Legal Assessment
- Task 4 – Hydrological Simulation Model
- Task 5 – Scenario Development
- Task 6 - Inventory of Changes
- Task 7 – Multi Criteria Analysis
- Task 8 – River Basin Data Management
- Task 9 – Capacity Building
- Task 10 – Stakeholder Consultation and Organisation

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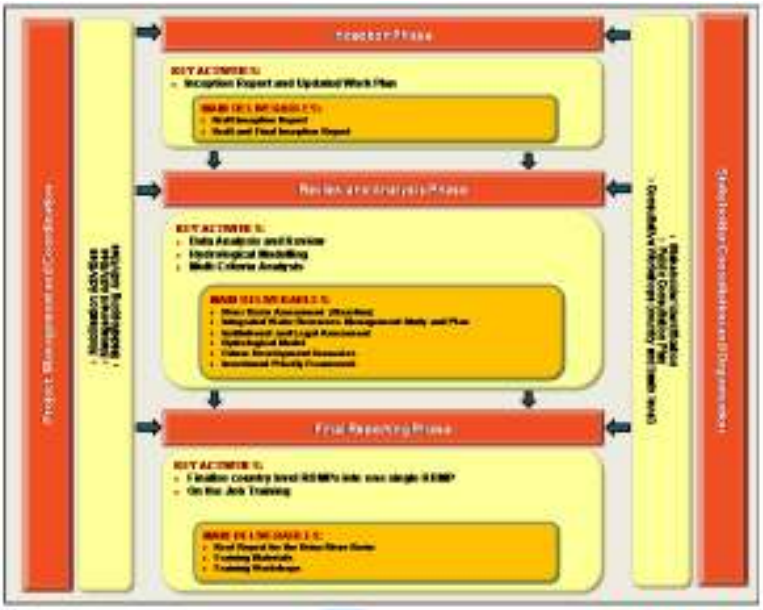

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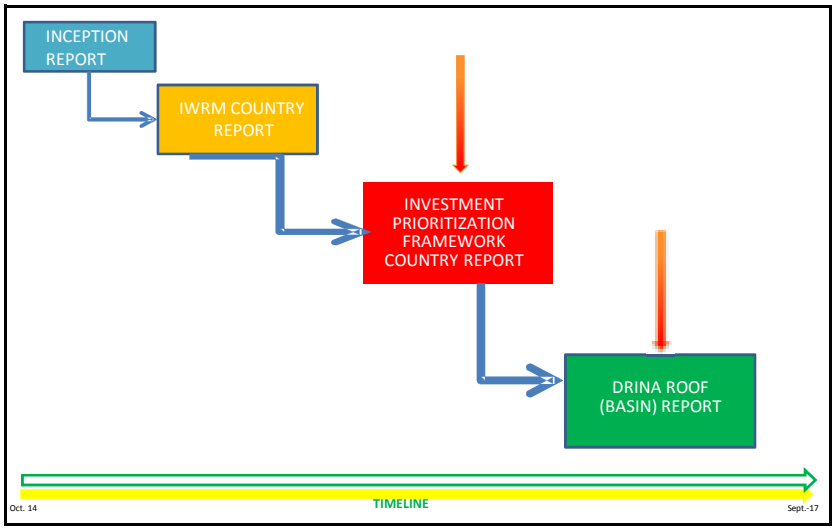
Deliverables



IWRM- Integrated Water Resources Management

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IPF Country Report Serbia

- Investment Prioritisation Framework Country Report (IPF Report) for the Serbian part of the Drina River Basin:
  - prepared in line with the project terms of reference (TOR),
  - following the findings made in the Inception Report and
  - the IWRM Country Report.
- The report presents the findings and results developed under project:
  - Task 5: Future River and Basin Scenarios,
  - Task 6 Investment Priority Framework and
  - Task 7: Multi-criteria evaluation of development scenarios.

IPF Country Report Serbia: Structure

- **Chapter 1** Introduction with background, project objectives and structure,
- **Chapter 2** Core water management development targets and key objectives which among others include provision of water supply, hydropower and environmental protection,
- **Chapter 3** Inventory of Changes for DRB development starting with a description of the short and long term goals for DRB development and management with a view to assessing risk (especially from floods) and ranking investment opportunities.
- **Chapter 4** Water management development options with an analysis of the strengths, weaknesses, opportunities and threats (SWOT).
- **Chapter 5** Modelling the impact of the development scenarios on the water balance (through WEAP modelling tool - Water Evaluation and Planning System by Stockholm Environment Institute)
- **Chapter 6** Multi criteria analysis of the development scenarios and includes a review of the costs and benefits and makes recommendations for additional investigations that may be necessary.
- **Chapter 7** Final proposal of basin development with optimal solution for the development of the basin has been provided.
- **Chapter 8** Conclusions and recommendations

General goals and drivers

- The goal of the river basin management plan is to provide identification of the measures for development and management of the water resources system by identifying:
  - **type of measures needed,**
  - **their temporal and spatial frames and**
  - **their combined economic, environmental, ecological and social impacts.**
- The **IWRM country report for Serbia** indicated the following **key drivers** that influence water resources management:
  - Water supply for the population,
  - Flood security for the population,
  - Water supply for agriculture (through irrigation),
  - Water supply for industry,
  - Hydropower production,
  - Environmental conservation,
  - Recreation and tourism and
  - Fisheries.

Methodology

- Comprehensive model of a water resources system - principal chain consists of 2 models:
  - the **hydrologic model** (surface water and groundwater system, lakes and reservoirs),
  - the **water resources management model** - socio-economic functions include (with WEAP software):
    - domestic, municipal and industrial water demand,
    - agricultural water demand,
    - hydropower production,
    - flood risk reduction,
    - recreation and tourism.
  - WEAP - Water Evaluation and Planning System by Stockholm Environment Institute tool used to set up the demand side and **define different scenarios under which water management options and alternatives could be explored.**
- Other types of models used "off-line" if specific problems need to be addressed more precisely: Hydraulic modelling for flood risks, climate change assessment, hydropower modeling, …
- **MCA and Financial analyses of the different scenarios**

Scenarios - inputs

- **Planning periods**:
  - Water resources management: the year 2020 for the short term and 2050 for the long term: e.g. 30 years for insight into the variability of climate, hydrologic and demographic tendencies that affect water management and development options.
  - Climate change effects are considered within two future time frames: 2011-2040 and 2041-2070, in respect to the baseline (reference) frame 1961-1990.
  - Water demand projections for each riparian state up until the year 2064 with water use provided for domestic, industrial and irrigation for the years 2044 and 2064 in tabular format.
- **Criteria for formulation of scenarios:**
  - Water management / financial – these criteria basically focus on the extent to which water can be stored, supplied, and managed for flood and drought mitigation, as well as on the cost effectiveness of the structural development options.
  - Environmental – these criteria deal with the environmental impacts of the structural development options, both during the construction and operating phases.
  - Socio-economic – these criteria address the extent to which the structural development options lead to socio-economic impacts – both positive and negative.

Development scenarios overview - Serbia

Assumptions	Green Growth	Reduced/Optimized HPP Maximization Scenario	"Full HPP Maximisation" Scenario
Domestic Water Supply	Present and future demand is secured	Present and future demand is secured	Present and future demand is secured
Industrial Water Supply	Present demand is secured	Present and future demand is secured	Present and future demand is secured
Irrigation Supply	Present demand is secured	Present and future demand is secured	Present and future demand is secured
Hydropower	No new HPP is developed Existing HPP made more efficient	6 in total (4 on Drina) Rogacica" HPP, "Tegare" HPP, "Dubravica" HPP, "Kozluk" HPP, (2 on Lim) Brodarevo I HPP, and Rekovici SHPP (1 PSHPP – Lim and Uvac Rivers)	10 in total (7 on Drina) Rogacica" HPP, "Tegare" HPP, "Dubravica" HPP, "Kozluk" HPP, "Drina I" HPP, "Drina II" HPP, "Drina III" HPP, " (3 on Lim) Brodarevo I HPP, Brodarevo II HPP and Rekovici SHPP (1 PSHPP – Lim and Uvac Rivers)
Other Power Supplies	More green energy options are developed (e.g. wind, solar etc.)	Still likely to rely on TPP for regularity of energy supply	Increase to reduce reliance on TPP
Flood Regulation	Present flood regulation is secured aslong as no new dams are needed	Present and future flood regulation is secured	Present and future flood regulation is secured
Water Quality	All planned WWTP are constructed, Municipal wild dumpsites in riverbanks are closed and cleaned up	Limited influence on water quality (sediments)	Limited influence on water quality (increase in sediments)
Minimum Environmental Flow	Minimum environmental flow is guaranteed for each water intake	Minimum environmental flow is guaranteed	Minimum environmental flow is guaranteed
Tourism	Tourism is controlled in protected areas (guided access, no conversion of protected habitats for infrastructure)	Moderate influence on tourism (recreation areas)	Moderate influence on tourism (recreation areas are created at new dam reservoir sites)
Climate change and Drought mitigation	Present drought period is mitigated by using water storage in existing dam reservoirs	Present and future drought periods are mitigated by using water storage in dam reservoirs	Present and future drought periods are mitigated by using water storage in existing and new reservoirs

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