Water management challenges in Central and Eastern Europe – implications for hydrological modelling

Tomasz Okruszko,
WULS, GWP CEE
Outlook

• Introduction
• Water management issues in CEE
• Examples of challenges
• Conclusions
Basic info

- Population 152 000 000 (25% Europe population)
- Area 2 030 000 km²
- 12 countries and 160 partner organisations,
- Established in 1998 (at Technical University Warsaw)
Floodplain Forests in Europe

- Alluvial and moist lowland forests
- Mediterranean wet lowland and alluvial forests and scrub

Adapted from UNEP-WCMC map
SWOT Analysis

• Conducted in period V- IX 2016 for planning purposes of GWP,

• Made on the basis of national documents regarding Water Framework Directive and Flood Directive implementation, River basin Management Plans, Sustainable Development Goals, Climate Policy and the interviews of partnership organisation,

• Compiled by dr Janos Feher – GWP Hungary.
## SWAT analysis

<table>
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<tr>
<th>Strengths</th>
<th>Weaknesses</th>
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<tbody>
<tr>
<td>• All countries have dedicated water ministries &amp; administration, strong policies, strategies &amp; laws on WRM and W&amp;S</td>
<td>• Poor state of / inadequate water related infrastructures in some countries</td>
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<td>• Countries need and believe in stakeholder engagement</td>
<td>• In some countries week implementation of policies</td>
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<td>• Most countries are guided by EU priority and policy framework</td>
<td>• Horizontal coordination between sectors &amp; national administration should be further improved</td>
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<td>• Most countries have good technical capacity and institutions</td>
<td>• Investment level in water resource management and infrastructure renewal is different between EU and non-EU countries of the region</td>
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<td>• There is acknowledgement for the need to coordinate across sectors</td>
<td>• Inadequate information and monitoring systems in some countries</td>
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<td>• Appreciation for knowledge lead solutions</td>
<td>• The knowledge level and understanding of IWRM decreased in most of the countries due to frequent changes in administration</td>
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<td>• Unfortunately, research capacity has been reduced on water related issues in most of the countries</td>
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### Opportunities

- Access to new climate funds to handle: climate variability, weather extremes, recent droughts & floods & IWRM
- Further strengthen IWRM policies/plans
- Update water & sanitation policies, and their implementation especially, but not exclusively in non-EU countries of the region
- Topical/supported - SDGs and nexus and need for integrative approaches re: building on WRM
- Water issues across sectors
- Due to increased brain drain, there is a need for capacity development and knowledge exchange

### Threats

- Low water investments in non-EU countries of the region
- In the light of climate change scenarios depleted water resources in some areas within the region
- Conflicting work force situations: Unemployment in some regions, which needs for job creation, while shortage in skilled employees – due to brain drain – undermining the economic development.
- Lack of cohesive policy frameworks, agreements (multinational and/or bilateral) for water quantity issues
- Not appropriate coordination and harmonisation between sectors
- Sustainability of local water management institutions
- Climate change, floods, droughts
Flood Directive
Changes in annual average flow predicted for 2021-2050 compared to 1971-2000
Important water bodies and regional organisation

Baltic Sea catchment area, HELCOM

Catchment of the Black Sea, Black Sea Commission

Danube River Basin District, ICPDR
Trends in mineral fertiliser rates in Europe

Total nitrogen and phosphorus fertiliser application, 2005; Source: http://ec.europa.eu/eurostat

*Fertilizer consumption measures the quantity of plant nutrients used per unit of arable land. Fertilizer products cover nitrogenous, potash, and phosphate fertilizers (including ground rock phosphate); Source: http://data.worldbank.org/indicator/
Changes in the agricultural landscape (1)

Historic land changes of Europe; Source: http://www.wur.nl/en

Legend:
- Settlement
- Grassland
- Cropland
- Other Land
- Forest
- Water

Fot. Dan Wołkowycki www.zielonewrota.pl

Global Water Partnership Central and Eastern Europe
Changes in the agricultural landscape (2)
Landscape features gaining interest e.g. small retention

<table>
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<tr>
<th>Water resources</th>
<th>Systems</th>
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<tbody>
<tr>
<td>Landscape (habitat) ret</td>
<td>Systems that create appropriate land use structure through the set up of arable lands, grasslands, forests, lands of ecological use, water holes</td>
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<tr>
<td>Soil retention</td>
<td>Crop systems that affect water management in soil profile, particularly the increase of potential water retention in soils</td>
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<tr>
<td>Ground waters</td>
<td>Cultivation and reclamation systems to inhibit the surface runoff and to increase the recharge of ground water reservoirs</td>
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<tr>
<td>Surface waters</td>
<td>Hydrotechnical systems of distribution and management of water including the construction of small reservoirs, outflow control from the draining systems</td>
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</tbody>
</table>
Conclusions

• We should care about the users (: 
• Working in different scales (however there is a bigger demand for projects on country and regional level),
• Being aware of landscape „dynamics”,
• Modelling of (semi)natural habitats,
• Including new elements in an agro-system, which should be checked for the effectiveness in improving water quantity and quality.