MECHANISMS AND PROCESSES FOR MANAGING WATER RESOURCES: BASIN MANAGEMENT PLANNING

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Excerpts from slides prepared for Water, Peace and Security tailor-made capacity development activities in Iraq. Please attribute authors when using materials.

Managing water resources in an integrated manner across levels

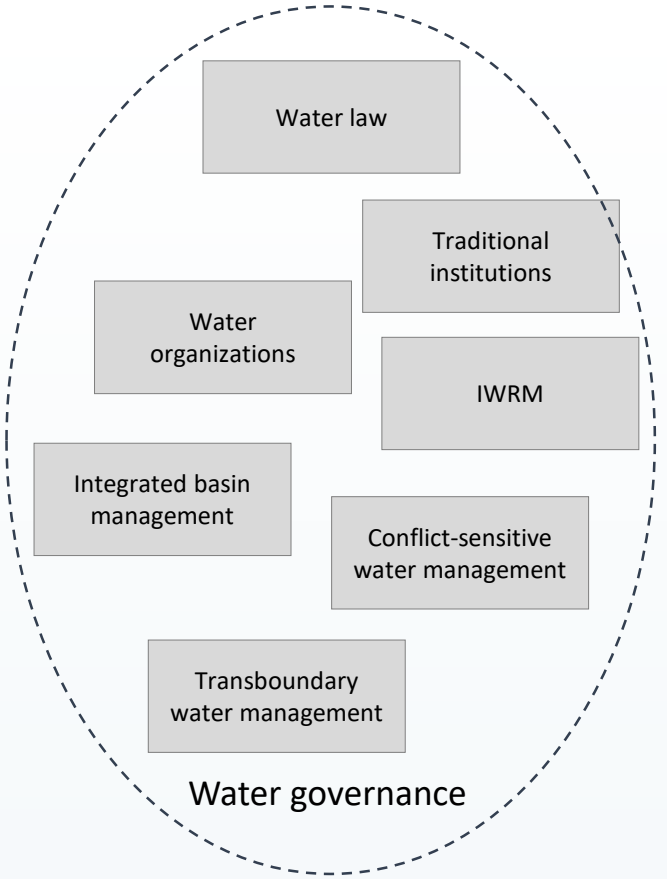
- Managing water resources depends on and is affected by
  - Different interests of different users
  - Historical developments
  - Priority of uses
  - Political and economic context

- Managing water resources has impacts on
  - State of the water resources themselves
  - People's lives and livelihoods
  - Political stability and peace

- Therefore need governance framework and management processes in plan that allow for most effective, sustainable and conflict-sensitive water management

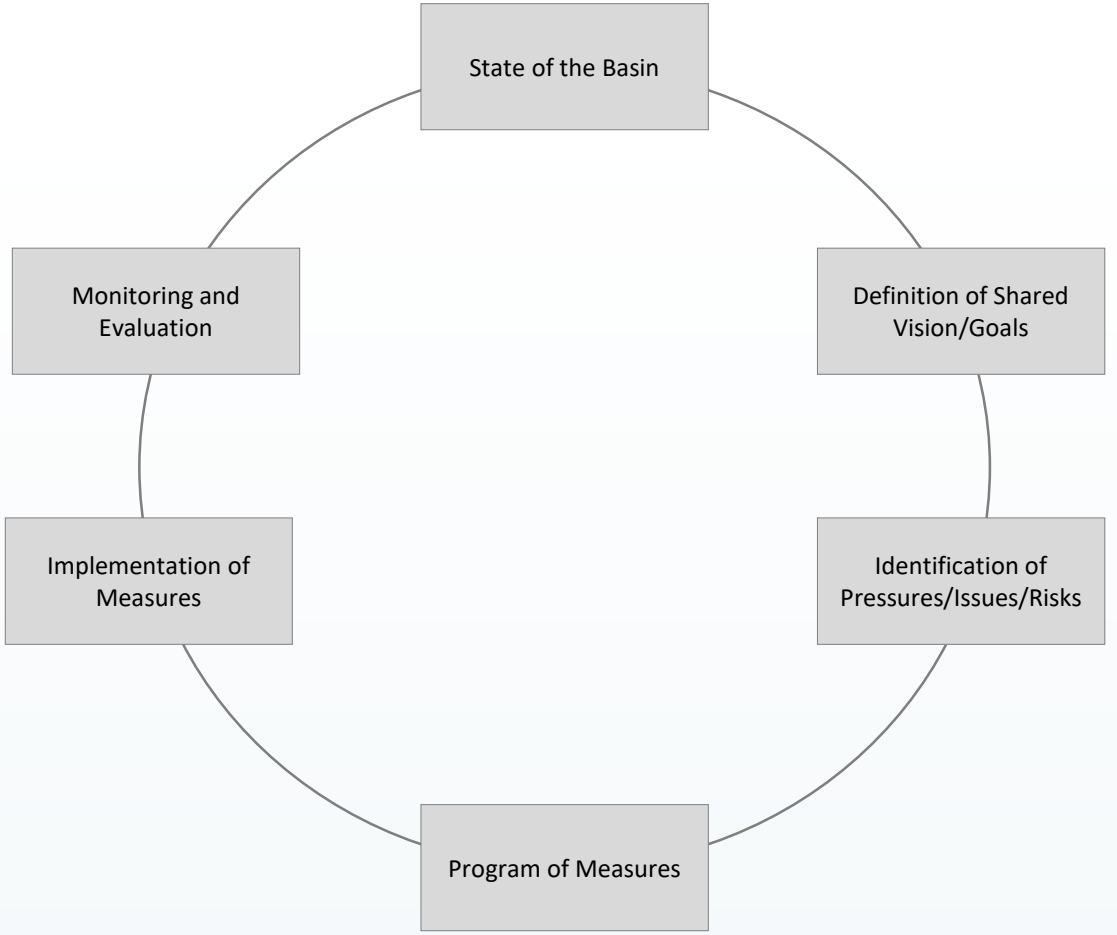
Different tools and approaches exist for water management

- Legal frameworks
- Organizations (water user organizations, basin organizations)
- Integrated water resources management
- Integrated basin management and planning
- Conflict-sensitive water management
- Transboundary water management
- ….



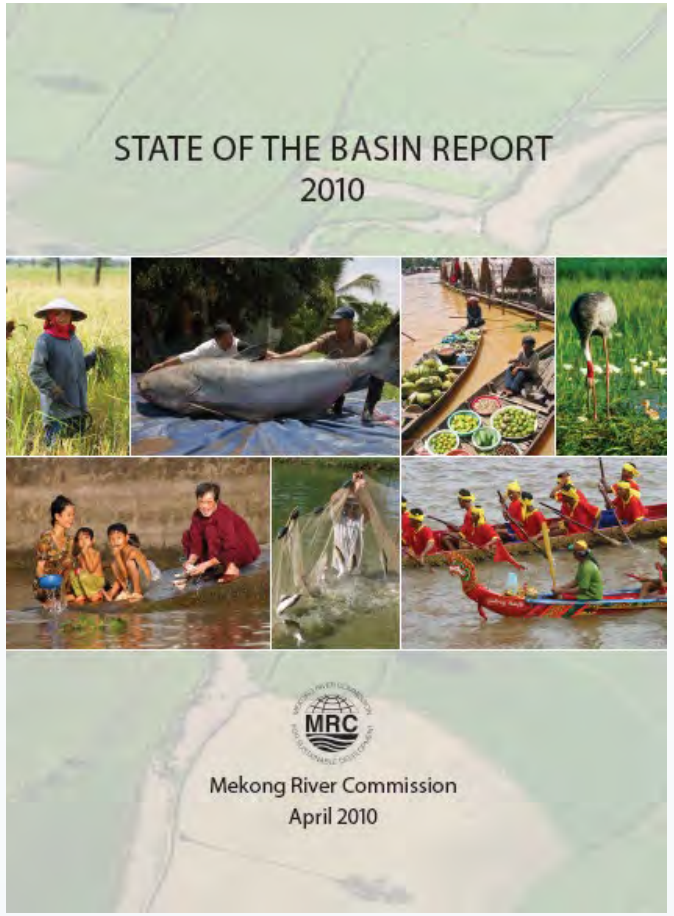
The basin management cycle

- Is an approach that helps structure plans and activities for managing water resources
- Aims at outlining clearly defined process and clear steps
- Can be applied at all governance levels
- Involves various actors and helps all actors to act in coordinated manner
- Allows to assess, foresee and then avoid conflicts over water resources
- Is applied in many of the world's basins – at transboundary, national and local level



Step 1: State of the water resource

- The state of the basin is the basis for any informed basin management at any governance level
- It allows to know exactly what the current situation of water resources are (snapshot of the resources at a certain point)
- Relies on continuous monitoring and regular updating (and publishing/sharing) of information on the resources
- Typically consists of
  - Delineation of the basin/sub-basin and its limits
  - Description of key characteristics (water quantity, quality, etc.)
  - Description of key uses
  - Contextual factors (economic development prospects, population growth, climate change)



Step 2: Shared Vision

- Objectives for basin management are defined in short vision that unites all water users and policy-makers
- Key question: „how do we want our water resources to look like“/“what is the desired state of the basin“
- Is linked to overall national socioeconomic development plans, environmental protection plans, etc.
- Allows to unite actors behind common goal and create cooperative context
- Examples:
  - „sustainable socio-economic development in the Nile Basin through the equitable utilization of, and benefit from, the common Nile Basin water resources“ (Nile)
  - „a well-managed water secure basin with prosperous inhabitants living in harmony with a healthy environment“ (Orange)

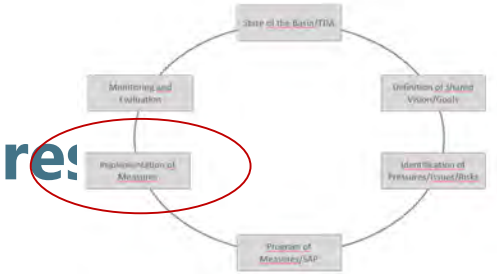
Step 3: Identification of Pressures and Impact

- Based on the state of the basin and the desired state defined in the shared vision, pressures and impacts are identified
- These are often called significant water management issues
- Knowing pressures and impacts in detail is the basis for planning and implementing measures to address those and move closer to the desired state of the resources
- Pressures: direct effects on the water resources from a certain change
- Impacts: environmental (and socioeconomic) consequences of a pressure
- Pressures and impacts can relate directly to water or to indirect effects, including conflict risks

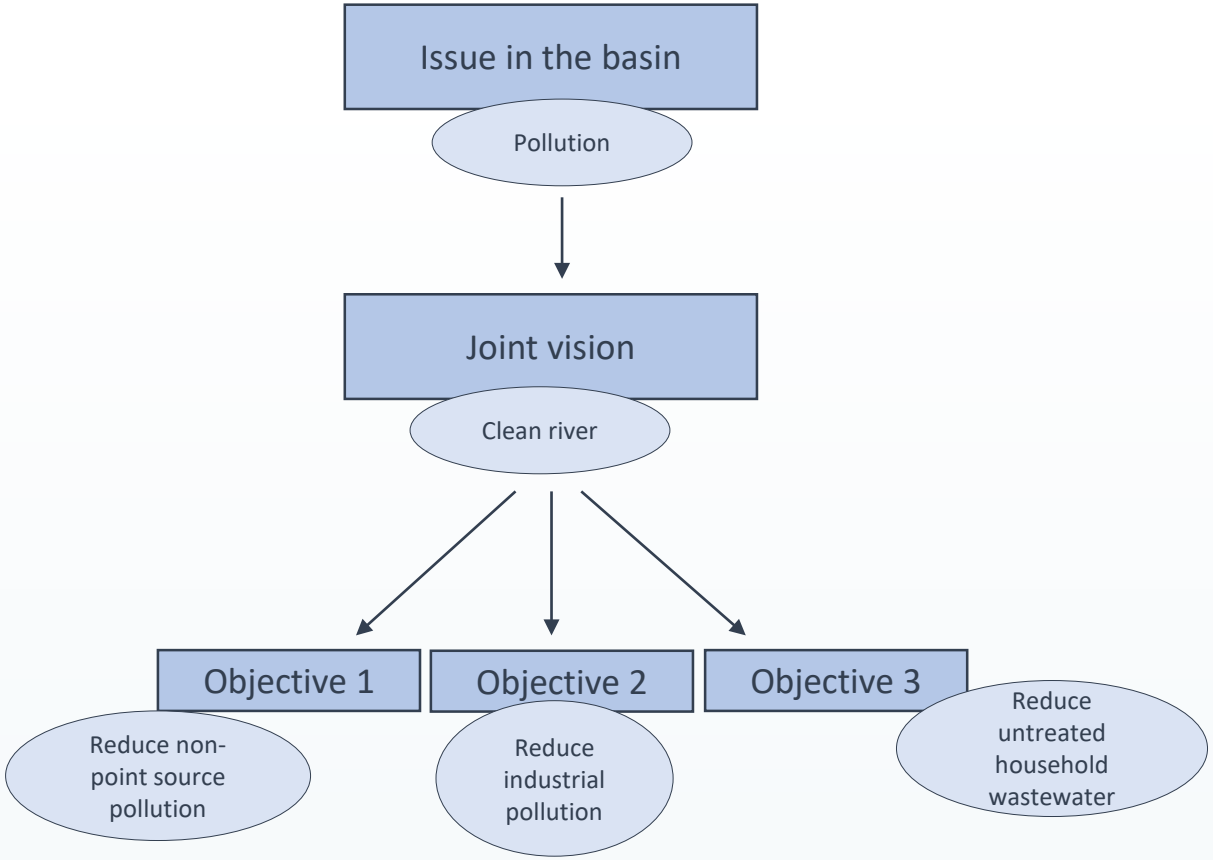
Step 4: Program of Measures

- The program of measures defines measures/activities that need to be implemented in order to move towards the desired state of resources
- Should be a structured list of measures and activities, including prioritization
- These measures need to be assessed with regards to achieving water management goals, but also possible side effects (e.g. conflict)
- Should also include a timeline, budgetary requirements and other relevant information for implementation
- Needs to include information about responsibilities of different actors

Step 5: Implementation of Measures



- Implementation of measures and activities is the most difficult part of basin management
- Consists of implementing pre-defined measures along a certain timeline (and prioritization)
- Various actors need to be involved in the implementation (based on overall set-up of water resources governance and management)



Step 6: Monitoring and Evaluatio

- Aims at assessing whether implemented measures have led to desired changes/improvements of water resoruces
- Allows to steer the basin management process (within the current and for the next cycle)
- Relies on regular monitoring efforts to understand changes in the system
- Allows also to assess every actor's contribution to/compliance with agreed upon rules and activities
- Should be reported regularly to policy-makers for decision-making and to wider public

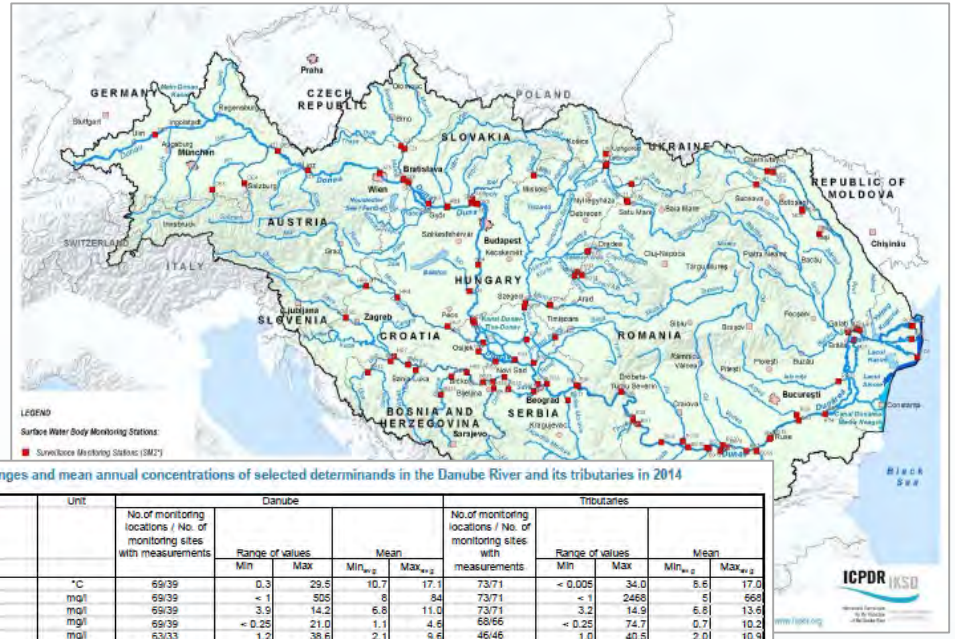
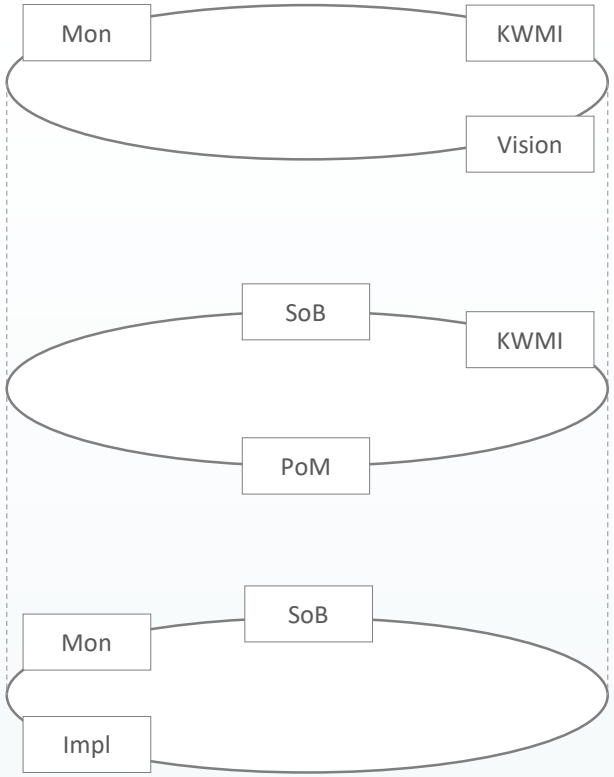


Table 3: Concentration ranges and mean annual concentrations of selected determinands in the Danube River and its tributaries in 2014

Determinand name	Unit	Danube					Tributaries				
		No.of monitoring locations / No. of monitoring sites with measurements	Range of values		Mean		No.of monitoring locations / No. of monitoring sites with measurements	Range of values		Mean	
			Min	Max	$Min_{w.g.}$	$Max_{w.g.}$		Min	Max	$Min_{w.g.}$	$Max_{w.g.}$
Temperature	°C	69/39	0.3	29.5	10.7	17.1	73/71	< 0.005	34.0	8.6	17.0
Suspended Solids	mg/l	69/39	< 1	505	6	84	73/71	< 1	2468	5	668
Dissolved Oxygen	mg/l	69/39	3.9	14.2	6.8	11.0	73/71	3.2	14.9	6.8	13.6
BOD_5	mg/l	69/39	< 0.25	21.0	1.1	4.6	68/66	< 0.25	74.7	0.7	10.2
COD_{Mn}	mg/l	63/33	1.2	38.6	2.1	9.6	46/46	1.0	40.5	2.0	10.9
COD_{Cr}	mg/l	63/33	< 1.00	57.0	6.1	36.6	71/69	< 2.00	431.1	< 2.50	83.7
TOC	mg/l	42/24	1.2	15.7	1.9	5.9	26/24	0.7	15.2	1.4	11.3
DOC	mg/l	6/6	1.3	5.9	1.9	2.6	4/4	0.5	7.4	0.9	6.2
pH		65/37	6.5	9.5	7.6	8.3	71/69	6.5	9.4	7.3	8.4
Alkalinity	mmol/l	67/37	0.3	4.9	1.6	3.6	63/61	0.9	8.4	1.2	6.9
Ammonium-N	mg/l	69/39	< 0.002	0.43	0.01	0.17	73/71	< 0.002	6.55	0.01	1.40
Nitrite-N	mg/l	69/39	< 0.0005	0.151	0.006	0.035	73/71	< 0.0005	0.24	0.0037	0.0739
Nitrate-N	mg/l	69/39	0.09	3.60	0.73	2.82	73/71	0.017	7.02	0.353	6.22
Total Nitrogen	mg/l	51/31	< 0.500	3.9	1.4	2.6	57/57	0.14	16.4	0.5	7.9
Organic Nitrogen	mg/l	31/21	< 0.025	2.48	0.03	0.85	28/26	0.009	2.89	0.12	1.54
Ortho-Phosphate-P	mg/l	66/38	< 0.0025	0.270	0.022	0.094	73/71	< 0.0015	0.545	0.006	0.241
Total Phosphorus	mg/l	67/37	0.015	0.492	0.046	0.172	67/67	< 0.0015	1.200	< 0.02	0.573
Total Phosphorus - Dissolved	mg/l	39/17	0.01	0.160	0.037	0.111	17/17	0.007	0.442	0.012	0.216
Chlorophyll-a	µg/l	54/26	< 0.0015	81.00	1.07	21.84	43/41	< 0.0015	209.70	< 0.0015	58.66
Conductivity 20°C	µS/cm	67/37	31	845	38	526	67/67	4.96	1567	24	1148
Calcium	mg/l	68/38	29.6	101.0	39.5	83.9	71/69	12.06	145.2	26.02	91.34
Sulphates	mg/l	59/31	11.4	75.0	18.5	50.8	51/49	5.68	195.0	9.34	128.55
Magnesium	mg/l	68/38	4.4	30.7	10.6	20.6	71/69	< 0.25	68	3.72	56.91
Potassium	mg/l	45/23	1.0	5.0	1.5	3.5	39/37	< 0.03	76.0	0.99	15.76
Sodium	mg/l	45/23	3.40	30.00	10.37	21.40	39/37	1.7	80.2	4.08	55.28
Manganese	mg/l	16/12	0.001	0.16	< 0.0025	0.05	18/18	< 0.0005	0.63	< 0.0005	0.171
Iron	mg/l	16/12	< 0.005	5.95	< 0.005	0.692	25/25	< 0.001	2.91	< 0.001	0.667
Chlorides	mg/l	68/38	7.7	79.0	14.2	32.2	73/71	0.15	251.9	1.64	168.56
Silicates (SiO2)	mg/l	13/7	1.3	8.4	2.9	8.4	12/10	0.7	26.1	1.7417	20.4
Silicates(SiO2), dissolved	mg/l	14/10	< 0.200	19	2.8	8.7	20/20	0.36	16.2	1.642	12.514
Macrozoobenthos- saprobic index		22/14	1.89	28.82	1.89	2.82	22/22	1.78	3.09	1.87	2.96

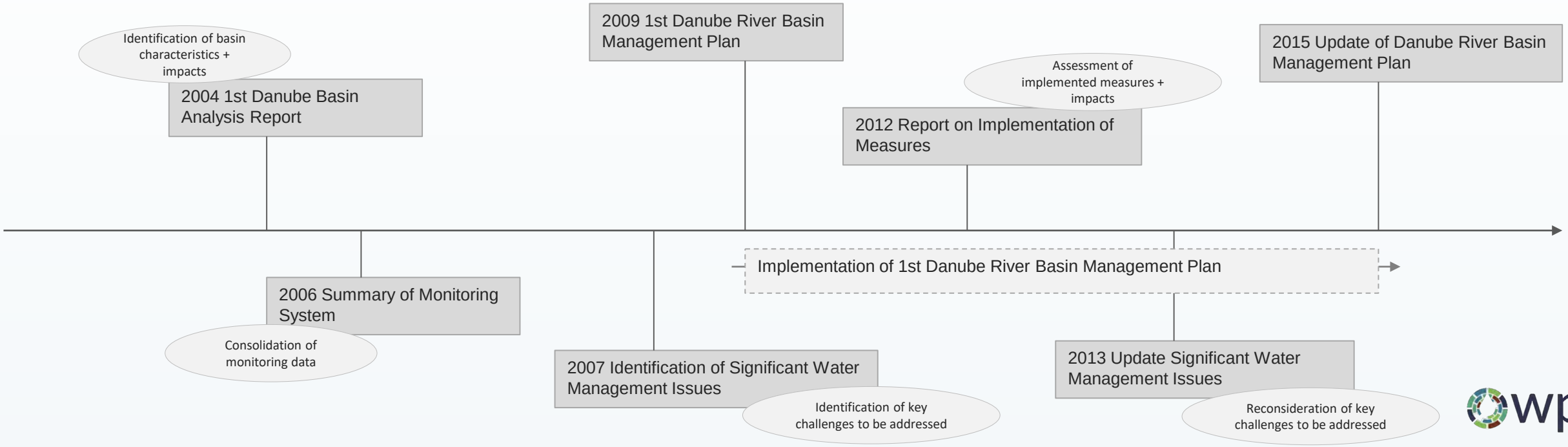
Management cycles at different governance levels

- Different actors play an important role in the management cycle and different activities/steps are being carried out by different actors and at different levels
- These actors need to be included adequately to avoid and mitigate conflict
- This makes coordination between them very important to ensure effectiveness
- This requires
  - Clear legal framework
  - Clearly defined responsibilities of different institutions
  - Implementation and enforcement of law
  - Willingness to involve different actors
  - Equal treatment and fairness



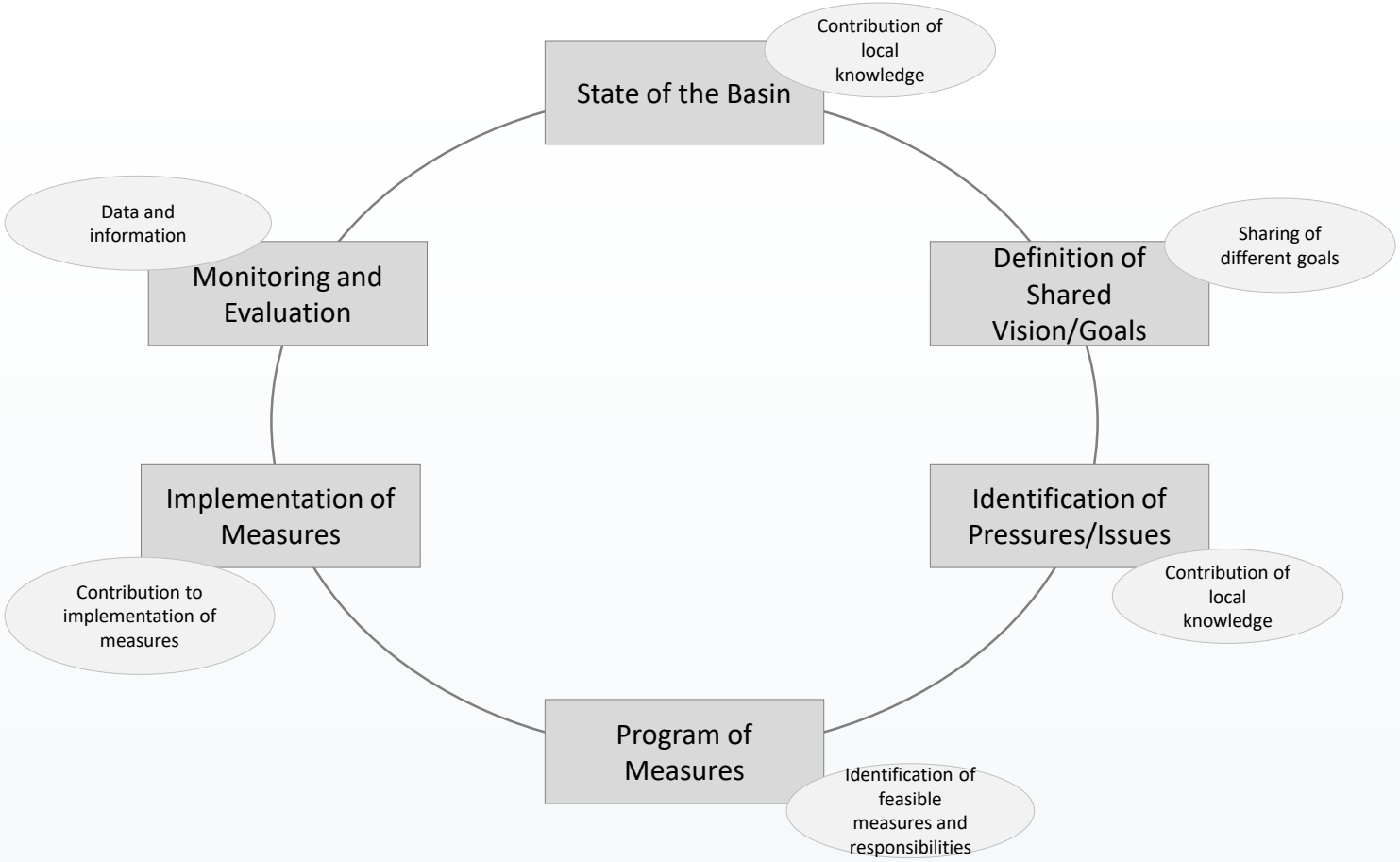
Example: Basin management process in the Danube River Basin

- In the Danube River Basin, basin management processes are guided by the basin management cycle since the 2000s
- The process takes 6 years and is regularly repeated, with plans and programs of measures being updated



Stakeholder involvement in basin management

- The involvement of stakeholders is particularly important in water resources management
- They can contribute important things to each step of the cycle
- Their involvement is required for successful basin management and implementation
- Lack of involvement can lead to inefficiencies, grievances and conflicts



Example: Stakeholder involvement in Danube countries

- All steps of the development of the DRBMP (basin analysis, identification of key water management issues, drafting of plan, drafting of PoM) are accompanied by public consultation
- Detailed schedule is set up that allows several months for stakeholder feedback
- Done through stakeholder meetings/workshops and online comment opportunities on documents/submission
- Time table for DRBMP
  - Publication of work plan 12/2012
  - Comments and endorsement (06/2013)
  - Consultations on significant water management issues (until 06/2014)
  - Consultation on draft DRMBP (until 06/2015)
  - Finalization of plan (end 2015)

Conclusions

- Effective, sustainable and conflict-sensitive water management requires a well-structured and clear management process
- The basin management process/cycle can provide guidance on how to manage water resources at and across different governance levels
- It consists of different steps that depend on each other and move along certain timelines
- It involves various stakeholders at different governance levels and encourages their collaboration

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