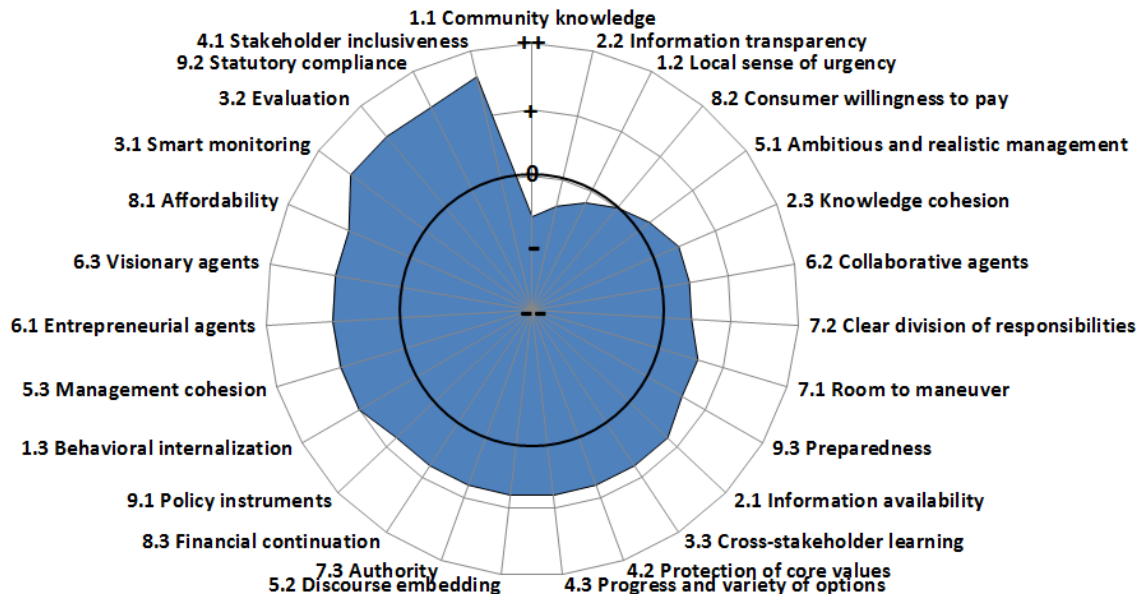


## INDICATORS OF THE WATER GOVERNANCE CAPACITY FRAMEWORK

(Version June 2021)



*Governance capacity assessment of the city of Amsterdam*

### Key publications

Koop S.H.A., Koetsier, L., Doornhof, A., Reinstra, O., Van Leeuwen, C.J., Brouwer, S., Dieperink, C., Driessen, P.P.J. (2017) Assessing the Governance Capacity of Cities to Address Challenges of Water, Waste, and Climate Change. *Water Resources Management*. 31(11), 3427-3443. [DOI 10.1007/s11269-017-1677-7](https://doi.org/10.1007/s11269-017-1677-7)

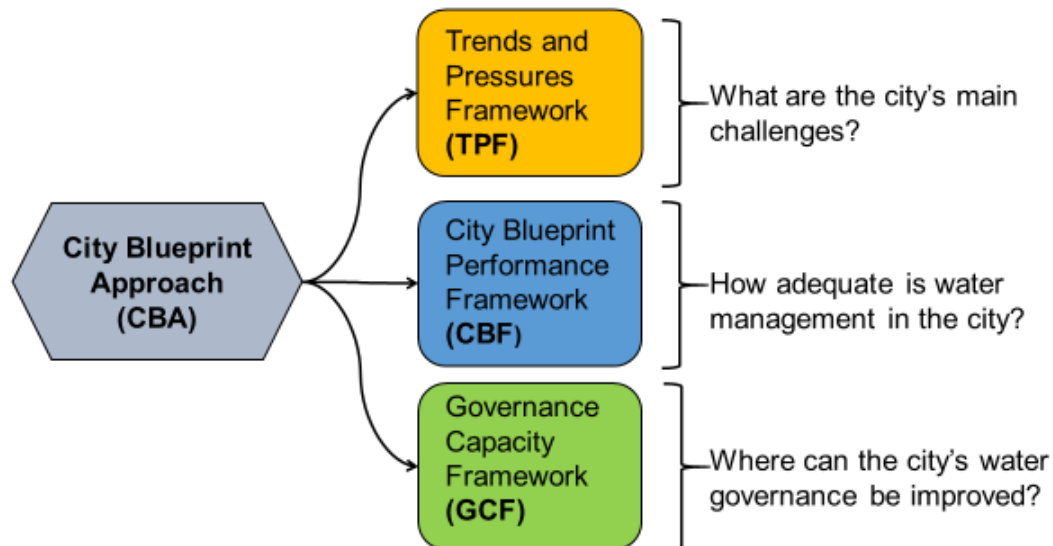
Schreurs, E., Koop, S.H.A., Van Leeuwen, C.J (2018). Application of the City Blueprint Approach to assess the challenges of water management and governance in Quito (Ecuador). *Environment, Development and Sustainability* 20(2): 509-525. [DOI 10.1007/s10668-017-9916-x](https://doi.org/10.1007/s10668-017-9916-x)

Aartsen M., Koop S.H.A., Hegger D.L.T., Goswami B., Oost J. and Van Leeuwen C.J. (2018) Towards meaningful science-policy interaction: Lessons from a systematic water governance analysis in the city of Ahmedabad, India *Regional Environmental Change* 18(8) 2445–2457; <https://doi.org/10.1007/s10113-018-1363-1>

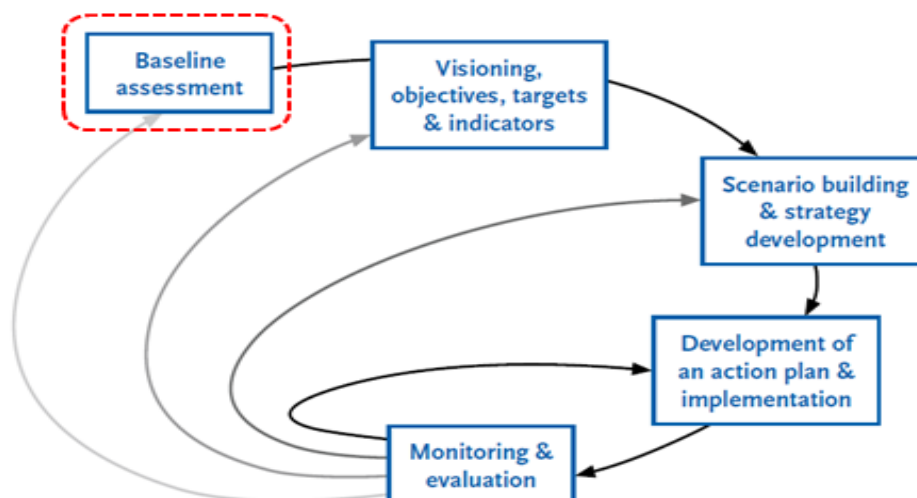
Madonsela B.T., Koop, S.H.A., Van Leeuwen, C.J., Carden, K.J, (2019). Evaluation of Water Governance Processes Required to Transition towards Water Sensitive Urban Design—An Indicator Assessment Approach for the City of Cape Town. *Water* 2019, 11(2), 292; <https://doi.org/10.3390/w11020292>

## 1. Introduction of the City Blueprint Approach

The **City Blueprint Approach** is a diagnosis tool and consist of three complementary frameworks. The main challenges of cities are assessed with (1) the *Trends and Pressures Framework (TPF)*. How cities are managing their water cycle is done with (2) the *City Blueprint Framework (CBF)*. Where cities can improve their water governance is done with (3) the *Governance Capacity Framework (GCF)*.



The City Blueprint Approach is a method to assess the sustainability of Integrated Water Resources Management (IWRM) in municipalities and regions. It is a baseline assessment and a first step in the strategic planning process in cities, depicted in the red box below.



The City Blueprint Approach has been developed in a learning-by-doing fashion. The first version of the City Blueprint Framework (CBF) was published in 2012. A first review and update was published in 2015 leading to two separate frameworks, i.e. the Trends and Pressures Framework (TPF) and the first revision of the CBF (Koop and Van Leeuwen 2015a). In 2017 Koop et al. (2017) developed the Governance Capacity Framework (GCF). In 2019 further discussions about the need to include the World Bank Governance indicators, air pollution, female participation, investment freedom and updating the data base with 2018 and 2019 data in the TPF led to a revision and further simplification of TPF as provided in this document. As a consequence a minor revision was introduced in the CBF (regrouping and deletion of one indicator).

### Further information:

- <https://www.ipr.northwestern.edu/our-work/research-tools-apps/water-insecurity/>
- <http://www.watershare.eu/>

## 2. The Governance Capacity Framework (GCF)

This document provides the method for the application of the Governance Capacity Framework (GCF) to five water-related challenges in cities. The GCF is a governance capacity assessment method consisting of three dimensions, nine key conditions and 27 indicators.

| Dimensions | Condition                        | Indicators  |
|------------|----------------------------------|---|
| Knowing    | 1 Awareness                      | 1.1 Community knowledge<br>1.2 Local sense of urgency<br>1.3 Behavioral internalization               |
|            | 2 Useful knowledge               | 2.1 Information availability<br>2.2 Information transparency<br>2.3 Knowledge cohesion                |
|            | 3 Continuous learning            | 3.1 Smart monitoring<br>3.2 Evaluation<br>3.3 Cross-stakeholder learning                              |
| Wanting    | 4 Stakeholder engagement process | 4.1 Stakeholder inclusiveness<br>4.2 Protection of core values<br>4.3 Progress and variety of options |
|            | 5 Management ambition            | 5.1 Ambitious and realistic management<br>5.2 Discourse embedding<br>5.3 Management cohesion          |
|            | 6 Agents of change               | 6.1 Entrepreneurial agents<br>6.2 Collaborative agents<br>6.3 Visionary agents                        |
| Enabling   | 7 Multi-level network potential  | 7.1 Room to manoeuver<br>7.2 Clear division of responsibilities<br>7.3 Authority                      |
|            | 8 Financial viability            | 8.1 Affordability<br>8.2 Consumer willingness-to-pay<br>8.3 Financial continuation                    |
|            | 9 Implementing capacity          | 9.1 Policy instruments<br>9.2 Statutory compliance<br>9.3 Preparedness                                |

### 3. Application of the framework

The GCF is applied on five water-related governance challenges:

1. Water scarcity
2. Flood risk
3. Wastewater treatment
4. Solid waste treatment
5. Urban heat islands

These challenges are the most reoccurring water related challenges that will steadily increase in importance and frequency due to climate change and urbanization. These '*governance challenges*' typically have fragmented scopes, viewpoints and responsibilities. As there are many causes leading to complexity, uncertainty and disagreement, there is no single best approach to solve governance challenges. In fact, it is an iterative process that requires governance capacity to find dynamic long-term solutions that are supported with flexible intermittent targets to anticipate on emerging barriers and changing situations.

A triangular method is applied:

1. An analyses of policy documents and reports provide preliminary scores of the twenty-seven indicators for each of the five governance challenges
2. At least fifteen interviewees, three for each of the five governance challenges, need to be selected. The most relevant stakeholders are identified, their interdependencies are plotted and key persons from different levels of decision-making are selected. There are twenty-seven predefined questions that the research needs to answer, one for each indicator and specifically asked with regards to the five governance challenges. The questions are open, non-technical, with follow-up questions to either target specific elements or for further clarification.
3. After the interviews the participants receive the predefined questions with the preliminary indicator scores and are asked to provide constructive feedback and additional information that can be included in the final scoring.

The 27 indicators all have a specific pre-defined question that the researcher needs to answer to for each of the five governance challenges using documents, reports and in-depth interviews. The answers provide the basis for the indicator score based on a Likert-type method which is specific for each of indicator. Here we provide these pre-defined questions and Likert-type scoring method for each of the twenty-seven indicators.

## 4. Assessment method

### Condition 1: Awareness

Awareness refers to the understanding of causes, impact, scale and urgency of the water challenge.

#### Indicator 1.1: Community knowledge

**Predefined question:** To what extent is knowledge regarding the current and future risks, impacts, and uncertainties of the water challenge dispersed throughout the community and local stakeholders which may results in their involvement in decision-making and implementation?

|           |                             |  |
|-----------|-----------------------------|--|
| <b>++</b> | <b>Balanced awareness</b>   | Nearly all members of the community are aware of and understand the actual risks, impacts and uncertainties. The water challenge is addressed the local level. Local communities and stakeholders are familiar with or are involved in the implementation of adaptation measures   |
| <b>+</b>  | <b>Overestimation</b>       | The community is knowledgeable and recognize the many existing uncertainties. Consequently, they often overestimate the impact and probability of incidents or calamities. The water challenge has been raised at the local political level and policy plan may be co-developed together with local communities          |
| <b>0</b>  | <b>Underestimation</b>      | Most communities have a basic understanding of the water challenge. However the current risks, impacts and frequencies are often not fully known and underestimated. Future risks, impacts and frequencies are often unknown. Some awareness has been raised amongst or is created by local stakeholders and communities |
| <b>-</b>  | <b>Fragmented knowledge</b> | Only a small part of the community recognizes the risks related to the water challenge. The most relevant stakeholders, have limited understanding of the water challenge. As a result, the issue is hardly or not addressed at the local governmental level   |
| <b>--</b> | <b>Ignorance</b>            | The community, local stakeholders and decision-makers are unaware or ignore the water challenge. This is demonstrated by the absence of articles on the issue in newspapers, on websites or action groups addressing the issue   |

### Five most consulted sources

Van Aalst MK, Cannon T and Burton I (2008) Community level adaptation to climate change: The potential role of participatory community risk assessment. *Glob Environ Chang* 18:165-179

Adger WN, Dessai S, Goulden M, Hulme M, Lorenzoni I, Nelson DR, Naess LO, Wolf J and Wreford A (2009) Are there social limits to adaptation to climate change? *Clim Chang* 93:335-354

Ballard A (2008) *Adaptive Capacity Benchmarking: A Handbook and Toolkit*. Hungerford, UK Berkshire

Gifford R (2011) The Dragons of Inaction: Psychological Barriers That Limit Climate Change Mitigation and Adaptation. *Am Psychol* 66:290-302

Raaijmakers R, Krywkow J and Van Der Veen A (2008) Flood risk perceptions and spatial multi-criteria analysis: An exploratory research for hazard mitigation. *Nat Hazards* 46:307-322

## Indicator 1.2: Local sense of urgency

**Predefined question:** To what extent do actors have a sense of urgency, resulting in widely supported awareness, actions, and policies that address the water challenge?

|           |   |   |
|-----------|---|---|
| <b>++</b> | <b>Strong demand for action</b>                                   | There is a general sense of importance regarding the water challenge. There is continuous, active, public support and demand to undertake action and invest in innovative, ground-breaking solutions. This is evident, since the issue receives much media attention and action plans are implemented   |
| <b>+</b>  | <b>General sense of urgency of long-term sustainability goals</b> | There is increasing understanding of the causes, impacts, scale and urgency of the water challenge. It leads to general sense of urgency of the need for long-term sustainable approaches. However, measures requiring considerable efforts, budget, or substantial change with sometimes uncertain results are often receiving only temporal support. The water challenge is a main theme in local elections |
| <b>0</b>  | <b>Moderate willingness for small changes</b>                     | There is growing public awareness and increasing worries regarding the water challenge. However, the causes, impact, scale and urgency are not widely known or acknowledged leading to the support for only incremental changes. It is a side topic in local elections  |
| <b>-</b>  | <b>Raising of awareness by small groups</b>                       | A marginalized group (e.g. the most vulnerable, environmentalists, NGOs) express their concerns, but these are not widely recognized by the general public. Adaptation measures are not an item on the political agenda during elections  |
| <b>--</b> | <b>Resistance</b>   | There is generally no sense of urgency and sometimes resistance to spend resources to address the water challenge. It is not an item on the political agenda during elections, as is evident from the lack of (media-) attention  |

### Five most consulted sources

Marshall NA, Park S, Howden SM, Dowd AB and Jakku ES (2013) Climate change awareness is associated with enhanced adaptive capacity. *Agric Syst* 177:30-34

McCombs M (2004) *Setting the Agenda: The Mass Media and Public Opinion*. Cambridge, UK: Polity Press

O'Connor RE, Bord RJ and Fisher A (1999) Risk perceptions, general environmental beliefs, and willingness to address climate change. *Risk Anal* 19:461-471

Sampei Y and Aoyagi-Usui M (2009) Mass-media coverage, its influence on public awareness of climate-change issues, and implications for Japan's national campaign to reduce greenhouse gas emissions. *Glob Environ Chang* 19:203-212

UNEP (2006) United Nations Environmental Programme. *Raising awareness of climate change. A handbook for government focal points*. Nairobi, Kenya

### Indicator 1.3: Behavioral internalization

**Predefined question:** To what extent do local communities and stakeholders try to understand, react, anticipate and change their behavior in order to contribute to solutions regarding the water challenge?

|           |   |  |
|-----------|---|--|
| <b>++</b> | <b>Full internalisation</b>               | Because actors are fully aware of the water challenge, their causes, impacts, scale and urgency, the it is integrated into long-term and joint strategy, practices and policies. All actors are encouraged to participate. At this point, the water challenge is integrated into everyday practices and policies |
| <b>+</b>  | <b>Moderate internalisation</b>           | Awareness has evolved to mobilization and action. There are various incentives for actors to change current practices and approaches regarding the water challenge. The water challenge, however, is not yet fully integrated into clear strategy, practices and policies  |
| <b>0</b>  | <b>Exploration</b>                        | There is a growing awareness, often as a result of local, exploratory research regarding the causes and solutions of the water challenge. There are only incremental changes in actions, policy and stakeholder's behaviour  |
| <b>-</b>  | <b>Recognized as an external pressure</b> | The water challenge is partly recognized, mainly due to external pressure instead of intrinsic motivations. There is no support to investigate its origin or to proceed to action or changing practices  |
| <b>--</b> | <b>Unawareness</b>                        | There is unawareness of the water challenge with hardly any understanding of causes and effects or how current practices impact the water challenge, the city or future generations  |

#### Five most consulted sources

Australian Government. Australian public service commission (2015). Changing behaviour: A public policy perspective. <http://www.apsc.gov.au/publications-and-media/archive/publications-archive/changing-behaviour>

Ballard A (2008) Adaptive Capacity Benchmarking: A Handbook and Toolkit. Hungerford, UK Berkshire

Gifford R (2011) The Dragons of Inaction: Psychological Barriers That Limit Climate Change Mitigation and Adaptation. Am Psychol 66:290-302

Institute for Government. Mindspace the practical guide. Influencing behaviour through public policy. [http://www.instituteforgovernment.org.uk/sites/default/files/publications/MINDSPACE-Practical-guide-final-Web\\_1.pdf](http://www.instituteforgovernment.org.uk/sites/default/files/publications/MINDSPACE-Practical-guide-final-Web_1.pdf)

Manning C (2009) The Psychology of Sustainable Behavior. Tips for empowering people to take environmentally positive action. Minnesota Pollution Control Agency <https://www.pca.state.mn.us/sites/default/files/p-ee1-01.pdf>

## Condition: 2 Useful knowledge

This condition describes the qualities of information with which actors have to engage in decision-making.

### Indicator 2.1: Information availability

**Predefined question:** To what extent is information on the water challenge available, reliable, and based on multiple sources and methods, in order to meet current and future demands so as to reveal information gaps and enhance well-informed decision-making?

|           |   |  |
|-----------|---|--|
| <b>++</b> | <b>Comprehensive information enabling long-term integrated policy</b> | A comprehensive and integrated documentation of the issue can be found on local websites and policy papers. It is characterized with adequate information, an integrated description of social, ecological and economic processes regarding the water challenge, as well as goals and policies. Furthermore, progress reports on effective implementation can be found                           |
| <b>+</b>  | <b>Information enhancing integrated long-term thinking</b>            | Strong effort is put in providing integrated information from various fragmented sources. Information gaps are identified and attempted to be bridged. This may be clear from extensive documentation on the long-term process. Also citizen knowledge may be taken into account   |
| <b>0</b>  | <b>Information fits demand, limited exploratory research</b>          | Information on the water challenge is available. Knowledge on understanding or tackling the water challenge is progressing and is produced in a structural way. Knowledge gaps are hardly identified due to lock-in into existing disciplines and policy. This is apparent from the quantity of factual information, but the causes, risks and impacts of long-term processes are lacking behind |
| <b>-</b>  | <b>Information scarcity and limited quality</b>                       | Limited information is available which does not grasp the full extent of the water challenge. In some cases not all information is of sufficient quality to generate a comprehensive overview  |
| <b>--</b> | <b>Lack of information</b>  | No information on the water challenge can be found. Or the scarce available information is of poor quality   |

### Five most consulted sources

Füssel H (2007) Adaptation planning for climate change: Concepts, assessment approaches, and key lessons. *Sustain Sci* 2:265-275

Van Rijswick M, Edelenbos J, Hellegers P, Kok M and Kuks S (2014) Ten building blocks for sustainable water governance: an integrated method to assess the governance of water. *Water Int* 39:5, 725-742

Lemos MC, Kirchhoff CJ and Ramprasad V (2012) Narrowing the climate information usability gap. *Na Clim Change* 2:789-794

Van Leeuwen CJ (2007). Introduction. In: Van Leeuwen, CJ and Vermeire TG (eds) *Risk Assessment of Chemicals. An Introduction*, 2nd edn. Springer, Berlin, 1- 36

Ford JD and King D (2015) A framework for examining adaptation readiness. *Mitigation Adapt Strateg Glob Chang* 20:505-526



## Indicator 2.2: Information transparency

**Predefined question:** To what extent is information on the water challenge accessible and understandable for experts and non-experts, including decision-makers?

|           |   |   |
|-----------|---|---|
| <b>++</b> | <b>Easy access to cohesive knowledge</b>          | Information is easily accessible on open source information platforms. There are multiple ways of accessing and sharing information. Information is often provided by multiple sources and is understandable for non-experts  |
| <b>+</b>  | <b>Sharing of partly cohesive knowledge</b>       | All interested stakeholders can access information. Action has been taken to make knowledge increasingly understandable. Still, it is a time-consuming search through a maze of organizations, protocols and databases to abstract cohesive knowledge and insights  |
| <b>0</b>  | <b>Sharing of very technical knowledge</b>        | There are protocols for accessing information; however, it is not readily available. Although information is openly available, it is difficult to access and comprehend because it is very technical. The water challenge is reported on local websites and reports |
| <b>-</b>  | <b>Low sharing of fragmented knowledge</b>        | Information is sometimes shared with other stakeholders. However, information is inaccessible for most stakeholders. Furthermore, knowledge is often technical and difficult to understand for non-experts. The water challenge may be addressed on local websites  |
| <b>--</b> | <b>Not transparent and inaccessible knowledge</b> | Information is limitedly available and shared. sharing may be discouraged. The information that is available is difficult to understand. The water challenge is not addressed on local websites   |

### Five most consulted sources

Hanger S, Pfenninger S, Dryfus M and Patt A (2013) Knowledge and information needs of adaptation policy-makers: a European study. *Reg Environ Change* 13:91-101

Manning C (2009) The Psychology of Sustainable Behavior. Tips for empowering people to take environmentally positive action. Minnesota Pollution Control Agency  
<https://www.pca.state.mn.us/sites/default/files/p-ee1-01.pdf>

OECD (2015) Organization for Economic Cooperation and Development: OECD Principles on Water Governance. OECD Ministerial Council Meeting. Paris, France

UNDP (2013) United Nations Development Programme. User's guide on Assessing Water Governance. Oslo, Norway

Brown RR and Farrelly MA (2009) Delivering sustainable urban water management: a review of the hurdles we face. *Water Sci Technol* 59:839-846

### Indicator 2.3: Knowledge cohesion

**Predefined question:** To what extent is information cohesive in terms of using, producing and sharing different kinds of information, usage of different methods and integration of short-term targets and long-term goals amongst different policy fields and stakeholders in order to deal with the water challenge?

|           |   |   |
|-----------|---|---|
| <b>++</b> | <b>Implementation of cohesive knowledge</b>     | Stakeholders are engaged in long-term and integrated strategies. Information can be found that is co-created knowledge and will contain multiple sources of information, multiple and mixed methods taking into account the socio-, ecological and economic aspects of the water challenge                                  |
| <b>+</b>  | <b>Substantial cohesive knowledge</b>           | Sectors cooperate in a multidisciplinary way, resulting in complete information regarding the water challenge. Besides multiple actors, multiple methods are involved to support information. Too many stakeholders are involved, sometimes in an unbalanced way. Knowledge about effective implementation is often limited |
| <b>0</b>  | <b>Insufficient cohesion between sectors</b>    | Data collection within sectors is consistent and is sustained in multiple projects for about two to three election periods. Knowledge on the water challenge, however, is still fragmented. This becomes clear from different foci of the stakeholders as stated in their organisation's strategies and goal setting        |
| <b>-</b>  | <b>Low-cohesive knowledge within sectors</b>    | Information that is found is sector specific and information is inconsistent within and between sectors   |
| <b>--</b> | <b>Non-cohesive and contradicting knowledge</b> | A lack of data strongly limits the cohesion between sectors. Information that is found can even be contradictory  |

#### Five most consulted sources

Hegger D, Lamers M, Van Zeijl-Rozema A and Dieperink C (2012) Conceptualising joint knowledge production in regional climate change adaptation projects: Success conditions and levers for action. *Environ Sci Policy* 18:52-65

Longsdaele KG, Gawith MJ, Johnstone K, Street RB, West CC and Brown AD (2010) Attributes of Well-Adapting Organisations. For the Adaptation Sub-Committee, UK Climate Impact Programme

OECD (2011) Organization for Economic Cooperation and Development: Water Governance in OECD Countries: A Multi-level Approach. OECD Studies on Water. Paris, France

Rowley J (2007) The wisdom hierarchy: Representations of the DIKW hierarchy. *J Inform Sci* 33:163-180

Zins C (2007) Conceptual approaches for defining data, information, and knowledge. *JASIST* 58:479-493

### Condition 3: Continuous learning

Continuous learning and social learning is essential to make water governance more effective. The level of learning differs from refining current management, critical investigation of fundamental beliefs or questioning underlying norms and values.

#### Indicator 3.1: Smart monitoring

**Predefined question:** To what extent is the monitoring of process, progress, and policies able to improve the level of learning (i.e., to enable rapid recognition of alarming situations, identification or clarification of underlying trends)? Or can it even have predictive value?

|           |   |  |
|-----------|---|--|
| <b>++</b> | <b>Useful to predict future developments</b>    | Monitoring system is adequate in recognizing alarming situations, identifying underlying processes and provides useful information for identifying future developments. Reports of monitoring will display discrepancies between fundamental beliefs and practices. The monitoring is changed in order to act upon these findings by altering the fundamental beliefs. Often regulatory frameworks are changed, new actors are introduced, new risk management approach are used |
| <b>+</b>  | <b>Useful to recognize underlying processes</b> | The abundant monitoring provides sufficient base for recognizing underlying trends, processes and relationships. Reports of monitoring will display discrepancies between assumptions and real process dynamics. Acting upon these findings by altering the underlying assumptions characterizes this level of smart monitoring. Often also system boundaries are re-defined, new analysis approach introduced, priorities are adjusted and new aspects are being examined       |
| <b>0</b>  | <b>Quick recognition of alarming situations</b> | Monitoring system covers most relevant aspects. Alarming situations are identified and reported. This leads to improvement of current practices regarding the technical measures. There is only minor notification of societal and ecological effects  |
| <b>-</b>  | <b>Reliable data but limited coverage</b>       | Monitoring occurs, however the monitoring system does not cover all facets of the water challenge, with sometimes incomplete description of the progress and processes of technical and policy measures. Monitoring is limited to singular effectiveness or efficiency criteria and cannot identify alarming situations  |
| <b>--</b> | <b>Irregular, poor quality or absent</b>        | There is no system to monitor the water challenge or monitoring is irregular   |

#### Five most consulted sources

Hinkel J (2011) Indicators of vulnerability and adaptive capacity: Towards a clarification of the science-policy interface. *Glob Environ Chang* 21:198-208

Pahl-Wostl C (2009) A conceptual framework for analysing adaptive capacity and multi-level learning processes in resource governance regimes. *Glob Environ Chang* 19:354-365

Van Leeuwen CJ (2007) Introduction. In: Van Leeuwen, CJ and Vermeire TG (eds) *Risk Assessment of Chemicals. An Introduction*, 2nd edn. Springer, Berlin, 1- 36

Danilenko A, Van Den Berg C, Macheve B, Moffitt JL (2014). *The IBNET Water Supply and Sanitation Blue Book 2014: The International Benchmarking Network for Water and Sanitation Utilities Databook* 2nd ed. Edition

UNESCO. Monitoring progress in the water sector: A selected set of indicators

[http://www.unwater.org/downloads/TFIMR\\_Annex\\_FinalReport.pdf](http://www.unwater.org/downloads/TFIMR_Annex_FinalReport.pdf)

### Indicator 3.2: Evaluation

**Predefined question:** To what extent are current policy and implementation continuously assessed and improved, based on the quality of evaluation methods, the frequency of their application, and the level of learning?

|           |  |   |
|-----------|--|---|
| <b>++</b> | <b>Exploring the fitness of the paradigm</b> | Frequent and high quality evaluation procedures fully recognize long-term processes. Assumptions are continuously tested by research and monitoring. Evidence for this is found in sources (primarily online documents) that report on the learning process and progress. Uncertainties are explicitly communicated. Also, the current dominant perspective on governance and its guiding principles are questioned |
| <b>+</b>  | <b>Changing assumptions</b>                  | There is continuous evaluation, hence continuous improvements of technical and policy measures and implementation. Innovative evaluation criteria are used. This is evidenced by reports containing recommendations to review assumptions or explicitly indicating the innovative character of the approach   |
| <b>0</b>  | <b>Improving routines</b>                    | The identified problems and solutions are evaluated based on conventional (technical) criteria. Current practices are improved. This becomes clear from information of the used and existing criteria, the small changes recommended in reports and short-term character  |
| <b>-</b>  | <b>Non-directional evaluation</b>            | Evaluation is limited regarding both frequency and quality. Evaluation occurs sometimes, using inconsistent and even ad-hoc criteria. Also the evaluation is not systematic. There is no policy on the performance of evaluations, only the evaluation(s) itself are reported   |
| <b>--</b> | <b>Insufficient evaluation</b>               | There is no evaluation of technical or policy measures regarding the water challenge. Otherwise it is not documented  |

#### Five most consulted sources

Brown R, Ashley R and Farrelly M (2011) Political and Professional Agency Entrapment: An Agenda for Urban Water Research. *Water Resour Manag* 25:4037-4050

Gupta J, Termeer C, Klostermann J, Meijerink S, Van Den Brink M, Jong P, Nooteboom S and Bergsma E (2010) The Adaptive Capacity Wheel: A method to assess the inherent characteristics of institutions to enable the adaptive capacity of society. *Environ Sci Policy* 13:459-471

Pahl-Wostl C, Tàbara D, Bouwen R, Craps M, Dewulf A, Mostert E, Ridder D and Taillieu T (2008) The importance of social learning and culture for sustainable water management. *Ecol Econ* 64:484-495

Sabatier PA and Weible CM (1999) *Theory of the policy process*. Third edition, Westview press

Termeer CJAM, Dewulf A, Breeman G and Stiller SJ (2015) Governance Capabilities for Dealing Wisely With Wicked Problems. *Adm Soc* 47:680-710

### Indicator 3.3: Cross-stakeholder learning

**Predefined question:** To what extent are stakeholders open to and have the opportunity to interact with other stakeholders and deliberately choose to learn from each other?

|           |  |   |
|-----------|--|---|
| <b>++</b> | <b>Putting cross-stakeholder learning into practice</b>      | There is recognition that the water challenge is complex and that cross-stakeholder learning is a precondition for adequate solutions and smooth implementation. This is evidenced by broad support for policy measures and implementation. Moreover, continuous cross-stakeholder learning programs are in place or may be institutionalized           |
| <b>+</b>  | <b>Open for cross-stakeholder learning</b>                   | Stakeholder interaction is considered valuable and useful for improving policy and implementation. Various initiatives for cross-stakeholder learning have been deployed, yet the translation into practice appears difficult. The programs may not be structural and the learning experience may not be registered and shared                          |
| <b>0</b>  | <b>Open for stakeholder interaction</b>                      | Stakeholders are open to interaction, though not much learning is going on due to the informative character of the interaction. Often, a number of stakeholders, that do not necessarily share interests or opinions, are involved in the decision-making process   |
| <b>-</b>  | <b>Small coalitions of stakeholders with shared interest</b> | Interaction occurs in small coalitions based on common interests. Opinions of those outside the coalition are generally withheld. Only information for the shared point of view is sought. This is evidenced by the finding of only one perspective regarding the water challenge or few perspectives that are supported by means of circle-referencing |
| <b>--</b> | <b>Closed attitude towards cross-stakeholder learning</b>    | There is no contact with other parties, contact may even be discouraged. This is apparent from limited sharing of experience, knowledge and skills. No information is shared outside organisation and sector, nor is external information used  |

#### Five most consulted sources

Ansell C and Gash A (2008) Collaborative governance in theory and practice. J Pub Admin Resear Theor 18:543-571

Berkes F (2009) Evolution of co-management: Role of knowledge generation, bridging organizations and social learning. J Environ Manage 90:1692-1702

EEA (2007) European Environmental Agency. Public participation: Contributing to better water management. Experience from eight case studies across Europe. Report no 3/2014

Muro M and Jeffrey P (2008) A critical review of the theory and application of social learning in participatory natural resource management processes. J Environ Plan Manage 51:325-344

Pahl-Wostl C, Craps M, Dewulf A, Mostert E, Tabara D and Taillieu T (2007) Social learning and water resources management. Ecol Soc 12

#### Condition 4: Stakeholder engagement process

Stakeholder engagement is required for common problem framing, gaining access to a wide variety of resources and creating general support that is essential for effective policy implementation.

##### Indicator 4.1: Stakeholder inclusiveness

**Predefined question:** To what extent are stakeholders interact in the decision-making process interaction (i.e., are merely informed, are consulted or are actively involved)? Are their engagement processes clear and transparent? Are stakeholders able to speak on behalf of a group and decide on that group's behalf?

|           |  |  |
|-----------|--|--|
| <b>++</b> | <b>Transparent involvement of committed partners</b> | All relevant stakeholders are actively involved. The decision-making process and the opportunities for stakeholder engagement are clear. It is characterised by local initiatives specifically focussing on water such as local water associations, contractual arrangements, regular meetings, workshops, focus groups, citizen committees, surveys |
| <b>+</b>  | <b>Timely, over-inclusive and active involvement</b> | Stakeholders are actively involved. It is still unclear how decisions are made and who should be involved at each stage of the process. Often too many stakeholders are involved. Some attendants do not have the mandate to make arrangements. Stakeholder engagement is abundantly done for often overlapping issues                               |
| <b>0</b>  | <b>Untimely consultation and low influence</b>       | Stakeholders are mostly consulted or informed. Decisions are largely made before engaging stakeholders. Frequency and time-period of stakeholder engagement is limited. Engagements are mainly ad hoc consultations where stakeholders have low influence on the end-result  |
| <b>-</b>  | <b>Non-inclusive involvement</b>                     | Not all relevant stakeholders are informed and only sometimes consulted. Procedures for stakeholder participation are unclear. If involved, stakeholders have but little influence   |
| <b>--</b> | <b>Limited supply of information</b>                 | No stakeholders are included, or their engagement is discouraged. Information cannot be found on the extant decision-making process.   |

##### Five most consulted sources

EEA (2007) European Environmental Agency. Public participation: Contributing to better water management. Experience from eight case studies across Europe. Report no 3/2014

Glucker A, Driessen PPJ, Kolhoff A and Runhaar HAC (2013) Public participation in environmental impact assessment; why, who and how? Environ Impact Assess Rev 43:104-111

OECD (2015b) Organization for Economic Cooperation and Development: Stakeholder Engagement for Inclusive Water Governance. Paris, France

Van Rijswick M, Edelenbos J, Hellegers P, Kok M and Kuks S (2014) Ten building blocks for sustainable water governance: an integrated method to assess the governance of water. Water Int 39:5, 725-742

Ridder D, Mostert E, and Wolters HA (2005) Learning together to manage together. HarmoniCOP, Osnabrück: University of Osnabrück

#### Indicator 4.2: Protection of core values

**Predefined question:** To what extent 1) is commitment focused on the process instead of on early end-results? 2) do stakeholders have the opportunity to be actively involved? 3) are the exit procedures clear and transparent? (All three ensure that stakeholders feel confident that their core values will not be harmed.)

|           |   |   |
|-----------|---|---|
| <b>++</b> | <b>Maximal protection of core values</b>          | Stakeholders are actively involved and have large influence on the end-result. There are clear exit possibilities and leading to more stakeholders more committed to the process. The participation opportunities and procedure of implementation are clear.  |
| <b>+</b>  | <b>Requisite for early commitment to output</b>   | Stakeholders are actively involved and expected to commit themselves to early outcomes in the process. Hence relevant stakeholders may be missing in contractual arrangements as they do not want to commit themselves to decisions to which they have not yet contributed. At this point involved stakeholders have influence on the end-result and therefore the output serves multiple interests |
| <b>0</b>  | <b>Suboptimal protection of core values</b>       | As stakeholders are consulted or actively engaged for only short periods, alternatives are insufficiently considered. Influence on end-result is limited. Decisions comply with the interests of the initiating party primarily. There are no clear exits in the engagement process   |
| <b>-</b>  | <b>Non-inclusive and low influence on results</b> | The majority of stakeholders is engaged, but the level of engagement is low (informative or sometimes consultative). There is a low influence on the result which invokes resistance, for example on internet platforms and newspapers  |
| <b>--</b> | <b>Insufficient protection of core values</b>     | Because stakeholders are hardly engaged or informed, core values are being harmed. Implementation and actions may be contested in the form of boycotts, legal implementation obstructions and the invoking of anti-decision support. There may be distrust and an absence of participation  |

#### Five most consulted sources

CIS Working Group 2.9 (2003) Common Implementation Strategy for the Water Framework Directive. Guidance document, Luxembourg: Official Publications of the European Communities

OECD (2015a) Organization for Economic Cooperation and Development: OECD Principles on Water Governance. OECD Ministerial Council Meeting. Paris, France

Pahl-Wostl C, Nilsson C, Gupta J and Tockner K (2011) Societal learning needed to face the water challenge. *Ambio*, 40:549-553

Reed MS (2008) Stakeholder participation for environmental management: A literature review. *Biol Conserv* 141:2417-2431

Ridder D, Mostert E, and Wolters HA (2005) Learning together to manage together. *HarmoniCOP*, Osnabrück: University of Osnabrück

### Indicator 4.3: Progress and variety of options

**Predefined question:** To what extent are procedures clear and realistic, are a variety of alternatives co-created and thereafter selected from, and are decisions made at the end of the process in order to secure continued prospect of gain and thereby cooperative behavior and progress in the engagement process?

|           |  |   |
|-----------|--|---|
| <b>++</b> | <b>Active engagement with choice selection at the end of the cooperation</b> | There is active engagement of all relevant stakeholders and clarity of participation procedure and realistic deadlines. The range of alternatives is fully explored and selection of the best alternatives occurs at the end of the process. Reviews of stakeholder meetings provide the alternatives addressed. Stakeholders are engaged throughout the whole process as specified in contractual agreements         |
| <b>+</b>  | <b>Active involvement with abundant choice variety</b>                       | Stakeholders are actively involved and there is sufficient room for elaborating alternatives. Procedures, deadlines and agreements are unclear. There is no or few specification on deadlines in terms of dates. Due to inexperience with active stakeholder engagement, decisions are taken too early in the process leading to the exclusion of argument and solutions. Hence, decisions may not be fully supported |
| <b>0</b>  | <b>Consultation or short active involvement</b>                              | There is a clear procedure for consultation or short active involvement of stakeholders, but the opportunities to consider all relevant alternatives is insufficient. Decisions are therefore still largely unilateral and solutions suboptimal. The suboptimal character of a solution can be observed from evaluations or difference in opinions  |
| <b>-</b>  | <b>Rigid procedures limit the scope</b>                                      | Informative and consultative approaches are applied, according rigid procedures with low flexibility. The period of decision-making is short with a low level of stakeholder engagement. These unilateral decision-making processes may lead to slow and ineffective implementation. The latter can be observed from critique via public channels   |
| <b>--</b> | <b>Lack of procedures limit engagement and progress</b>                      | The lack of clear procedures hinder stakeholder engagement. This unilateral decision-making limits progress and effectiveness of both decision-making and implementation. It might result in conflicting situations. Often, much resistance can be found online and implementation may be obstruct  |

#### Five most consulted sources

Bryson JM, Crosby BC and Stone MM (2006) The design and implementation of cross-sector collaborations: Propositions from the literature. PAR 66:44-55

Pahl-Wostl C (2009) A conceptual framework for analysing adaptive capacity and multi-level learning processes in resource governance regimes. Glob Environ Chang 19:354-365

Ridder D, Mostert E, and Wolters HA (2005) Learning together to manage together. HarmoniCOP, Osnabrück: University of Osnabrück

UNDP (2008) United Nations Development Program: Governance Principles, Institutional Capacity and Quality. New York, USA

Yee S (2010) Stakeholder engagement and public participation in environmental flows and river health assessment. Australia-China Environment Development Partnership. River Health and Environmental Flow in China <http://watercentre.org/portfolio/rhef/attachments/technical-reports/stakeholder-engagement-and-public-participation-in-eflows-and-river-health-assessments>



## Condition 5: Management Ambitions

Policy ambitions assesses if current policy is ambitious, feasible, well-embedded in local context and if it forms a cohesive set of long-term and short-term goals within and across sectors.

### Indicator 5.1: Ambitious and realistic management

**Predefined question:** To what extent are goals ambitious (i.e., identification of challenges, period of action considered, and comprehensiveness of strategy) and yet realistic (i.e., cohesion of long-term goals and supporting flexible intermittent targets, and the inclusion of uncertainty in policy)?

|           |   |  |
|-----------|---|--|
| <b>++</b> | <b>Realistic and ambitious strategy</b> | Policy is based on modern and innovative assessment tools and policy objectives are ambitious. Support is provided by a comprehensive set of intermittent targets, which provide clear and flexible pathways. Assessment tools and scenarios analyses identify tipping points that may be found in policy documents  |
| <b>+</b>  | <b>Long-term ambitious goals</b>        | There is a long-term vision that incorporates uncertainty. However, it is not supported by a comprehensive set of short-term targets. Hence, achievements and realistic targets are difficult to measure or estimate. Visions are often found online as an organisation's strategy. They often entail a description of the water challenge and need for action |
| <b>0</b>  | <b>Confined realistic goals</b>         | There is a confined vision of the water challenge. Ambition are mostly focused on improving the current situation where unchanging conditions are assumed and risk and scenarios analyses are lacking  |
| <b>-</b>  | <b>Short-term goals</b>                 | Actions and goals mention sustainability objectives. Actions and goals are "quick fixes" mainly, not adhering to a long-term vision or sustainable solutions. Uncertainties and risks are largely unknown  |
| <b>--</b> | <b>Short-term, conflicting goals</b>    | Goals consider only contemporary water challenges, are short-sighted and lack sustainability objectives. Goals are arbitrary and sometimes conflicting and the character of policy is predominantly reactive   |

### Five most consulted sources

Aall C, Groven K and Lindseth G (2007) The scope of action for local climate policy: The case of Norway. *Global Environ Polit* 7:83-101

Biesbroek GR, Swart RJ, Carter TR, Cowan C, Henrichs T, Mela H, Morcecroft MD and D Rey (2010) Europe Adapts to Climate Change: Comparing National Adaptation Strategies. *Glob Environ Chang* 20:440-450

Brown RR and Farrelly MA (2009) Delivering sustainable urban water management: a review of the hurdles we face. *Water Sci Technol* 59:839-846

STOWA (2016) Stichting Toegepast Onderzoek Waterbeheer. Deel 2: Sturen op verandering van aanpak en werkwijze.

Termeer C, Biesbroek R and Van Den Brink M (2012) Institutions for adaptation to climate change: Comparing National Adaptation strategies in Europe. *EPS* 11:41-53

## Indicator 5.2: Discourse embedding

**Predefined question:** To what extent is sustainable policy interwoven in historical, cultural, normative and political context?

|           |   |  |
|-----------|---|--|
| <b>++</b> | <b>Embedding of sustainable implementations</b> | Local context is used smartly to accelerate policy implementation. Innovations are subdivided into suitable phases which are more acceptable and effectively enables sustainable practices. Effective policy implementation is enabled by a general consensus that long-term integrated policy is needed to address the water challenge          |
| <b>+</b>  | <b>Consensus for sustainable actions</b>        | There is a consensus that adaptation is required, but substantial effort is necessary as there is little experience in addressing the water challenge in a long-term integrated approach. Furthermore, the decision-making periods are long as trust relations with new unconventional partners need to be built                                 |
| <b>0</b>  | <b>Low sense of urgency embedded in policy</b>  | Current policy fits the local context. The water challenge is increasingly identified, framed and interwoven into local discourse, but the disregard of uncertainty prevents a sense of urgency that is necessary to adopt adequate adaptation measures. Decision making often results in very compromised small short-term policy changes       |
| <b>-</b>  | <b>Persistent reluctance and poor embedding</b> | Actors feel reluctant to execute current policy as it conflicts with their norms and values. Policy hardly takes the local context and existing discourses into account. And the policy does not correspond with societal demands. This may lead to distrust between actors, inefficient use of resources and ineffective overall implementation |
| <b>--</b> | <b>policy mismatch</b>                          | Cultural, historical and political context is largely ignored, leading to arduous policy implementation. Actors may not understand the scope, moral or to whom it applies or how to implement it (total confusion)   |

### Five most consulted sources

Ambrus M, Gilissen H K and Van Kempen JJH (2014) Public values in water law: A case of substantive fragmentation? *Utrecht Law Review* 10:8–30

Campbell JL (2002) Ideas, politics, and public policy

Hajer M and Versteeg W (2005) A decade of discourse analysis of environmental politics: Achievements, challenges, perspectives. *J Environ Policy Plan* 7:175-184

Schmidt VA (2001) Discourse and the legitimation of economic and social policy change in Europe. In *Globalization and the European Political Economy*, ed. SWeber, 229–72 New York: Columbia Univ. Press

Van Rijswick M, Edelenbos J, Hellegers P, Kok M and Kuks S (2014) Ten building blocks for sustainable water governance: an integrated method to assess the governance of water. *Water Int* 39:5, 725-742

### Indicator 5.3: Management cohesion

**Predefined question:** To what extent is policy relevant for the water challenge, and coherent regarding 1) geographic and administrative boundaries, and 2) alignment across sectors, government levels, and technical and financial possibilities?

|           |   |   |
|-----------|---|---|
| <b>++</b> | <b>Cohesive synergetic policies</b>       | Policies are coherent and comprehensive within and between sectors. There is an overarching vision resulting in smooth cooperation. Goals are jointly formulated, evaluated and revised to adapt to new challenges. This is evidenced by thematic instead of sectoral approaches. Many inter-sectoral meetings, interdisciplinary reports and cohesiveness in goals and strategies are formulated |
| <b>+</b>  | <b>Overlapping comprehensive policies</b> | There is cross-boundary coordination between policy fields to address the water challenge. Policies are cohesive, but have not yet resulted in broad multi-sectoral actions. Efforts to harmonize different sectors are evident by employee functions or assignments and protocols  |
| <b>0</b>  | <b>Fragmented policies</b>                | Policy is fragmented and based on sector's specific scope and opportunities for co-benefits are hardly explored. However, effort may be made to balance the resource allocation between sectors   |
| <b>-</b>  | <b>Opposing sectoral policies</b>         | Overall water and climate adaptation policy is characterised by fragmentation and imbalance between sectors. The majority of resources is spent on the dominant policy field and overlap between sectors lead to inefficient use of resources   |
| <b>--</b> | <b>Incompatible policies</b>              | Policies between and within sectors are strongly fragmented and conflicting. This is evidenced by contradicting objectives and the squandering use of resources   |

#### Five most consulted sources

Corfee-Morlot JL, Kamal-Chaoui MG, Donovan I, Cochran A, Robert A and Teasdale PJ (2009) Cities Climate Change and Multilevel Governance. Environmental Working Papers No. 14, OECD OECD Publishing

Head BW and Alford J (2015) Wicked Problems: Implications for Public Policy and Management. Adm Soc 47:711-739

Lockwood M, Davidson J, Curtis A, Stratford E and Griffith R (2010) Governance principles for natural resource management. Soc Nat Resour 23:986-1001

OECD (2011) Organization for Economic Cooperation and Development: Water Governance in OECD Countries: A Multi-level Approach. OECD Studies on Water. Paris, France

OECD (2015) Organization for Economic Cooperation and Development: OECD Principles on Water Governance. OECD Ministerial Council Meeting. Paris, France

## Condition 6: Agents of change

In order to drive change, agents of change are required to show direction, motivate others to follow and mobilize the resources required.

### Indicator 6.1: Entrepreneurial agents

**Predefined question:** To what extent are the entrepreneurial agents of change enabled to gain access to resources, seek and seize opportunities, and have influence on decision-making?

|           |  |   |
|-----------|--|---|
| <b>++</b> | <b>Long-term support for entrepreneurship</b>        | There is recognition of the need for continuous innovation, hence applied research is enabled that explores future risk management and supports strategy formulation. The experiments yield increased benefits and new insights. This is recognized by other actors, thereby providing access to new resources. Continuous experimentation is secured by long-term and reliable resource allocation |
| <b>+</b>  | <b>Tentative experimental entrepreneurship</b>       | There is a growing understanding of the water challenge's uncertainty, complexity and need for innovative approaches that entail a certain level of risk. Tentative experimental projects set in but are paid by conventional resources. Projects are small-scale pilots  |
| <b>0</b>  | <b>Conventional and risk-averse entrepreneurship</b> | Entrepreneurial agents of change are better able to seize low-risk opportunities. Therefore opportunities for innovative approaches and synergies are hardly pursued. Small changes can be observed   |
| <b>-</b>  | <b>Room for short-sighted entrepreneurship</b>       | Agents of change struggle to gain access to resources to address imminent water challenges. Windows of opportunity to identify and to act upon perceived risks are limited. Opportunities to address stakeholders with potential access to resources are rarely seized  |
| <b>--</b> | <b>Insufficient entrepreneurship</b>                 | Ignorance for risk and threats leads to ineffective rigid governance and lack of opportunity for entrepreneurial agents to enable improvements. Moreover, distrust by other actors and potential investors, further decrease access to resources  |

### Five most consulted sources

Biggs R, Westley FR and Carpenter SR (2010) Navigating the back loop: Fostering social innovation and transformation in ecosystem management. *Ecol Soc* 15:28

Brouwer S, and Biermann F (2011) Towards adaptive management: examining the strategies of policy entrepreneurs in Dutch water management. *Ecol Soc* 16:5

Brouwer S, Huitema D, Biermann F (2009) Towards adaptive management: The strategies of policy entrepreneurs to direct policy change. Proceedings of the 2009 Amsterdam Conference on the Human Dimensions of Global Environmental Change

Folke C, Hahn T, Olsson P and Norberg, J (2005) Adaptive governance of social-ecological systems

Head BW and Alford J (2015) Wicked Problems: Implications for Public Policy and Management. *Adm Soc* 47:711-739

## Indicator 6.2: Collaborative agents

**Predefined question:** To what extent are actors enabled to engage, build trust-collaboration, and connect business, government, and sectors, in order to address the water challenge in an unconventional and comprehensive way?

|           |   |   |
|-----------|---|---|
| <b>++</b> | <b>Agents of change enhances wide-spread synergetic collaboration</b>       | There is on-going build-up of productive and synergetic collaborations. Facilitators may even be administered to coordinate this through mediation and authority. There is a conception of the ideal collaboration composition  |
| <b>+</b>  | <b>Agents of change can push for collaboration between new stakeholders</b> | There is an understanding that water challenges requires long-term and integrated solutions. Hence, wide-spread collaborations between a variety of stakeholders and sectors are being established. New collaborations with unconventional actors, result, more and more, in valuable new insights and effective networks |
| <b>0</b>  | <b>Agent are enabled to enhance conventional collaboration</b>              | Traditional coalitions are preserved to maintain status quo. There is trust within these coalitions. There is limited space to create new collaborations. If new collaboration occurs solutions are still mostly sectoral and short- to mid-term  |
| <b>-</b>  | <b>Insufficient opportunities for collaborative agents</b>                  | There is insufficient opportunity for agents of change to go beyond conventional collaboration. The current collaborations are deemed sufficient to deal with the water challenge whereas the vision is limited to ad hoc command and control approaches  |
| <b>--</b> | <b>Lack of collaborative agents</b>   | Collaboration is discouraged, because of a strong hierarchical structure. There is distrust between stakeholders and the willingness and thereby opportunities for collaborative agents are largely lacking   |

### Five most consulted sources

Emerson K, Nabatchi T and Balogh S (2012) An Integrative Framework for Collaborative Governance. *Public Adm Res Theory* 22:1-29

Gupta J, Termeer C, Klostermann J, Meijerink S, Van Den Brink M, Jong P, Nooteboom S and Bergsma E (2010) The Adaptive Capacity Wheel: A method to assess the inherent characteristics of institutions to enable the adaptive capacity of society. *Environ Sci Policy* 13:459-471

Ison R, Collins K, Colvin J, Jiggins J, Roggero PP, Seddaiu G, Steyaert P, Toderi M and Zanolla C (2011) Sustainable Catchment Managing in a Climate Changing World: New Integrative Modalities for Connecting Policy Makers, Scientists and Other Stakeholders. *Water Resour Manag* 25:3977-3992

Patterson J, Smith C and Bellamy J (2013) Understanding enabling capacities for managing the 'wicked problem' of nonpoint source water pollution in catchments: A conceptual framework. *J Environ Manage* 128:441-452

Termeer C, Biesbroek R and Van Den Brink M (2012) Institutions for adaptation to climate change: Comparing National Adaptation strategies in Europe. *EPS* 11:41-53

### Indicator 6.3: Visionary agents

**Predefined question:** To what extent are actors in the network able to manage and effectively push forward long-term and integrated strategies which are adequately supported by interim targets?

|           |   |  |
|-----------|---|--|
| <b>++</b> | <b>Long-term vision supported by short-term targets</b>     | Visionary agents of change in different positions and with different backgrounds actively and successfully promote a sustainable and long-term vision regarding the water challenge, that is communicated clearly. Short-term targets fit the long-term visions. There is interest and employment in trend analysis.                                 |
| <b>+</b>  | <b>Long-term vision with flawed communication</b>           | There is a clear long-term, integrated and sustainable-oriented vision. There is still some discrepancy between short-term targets and implementation strategies and the long-term vision from visionary agents of change. This means that agents are not always clear in their formulation regarding the effect and impact of envisioned strategies |
| <b>0</b>  | <b>Defense of status quo</b>                                | The visions of the existing agents of change are limited to promoting the business as usual. They do not oppose nor promote long-term, integrative thinking. Interest or employment in trend analysis is limited   |
| <b>-</b>  | <b>Unilateral and short-term vision</b>                     | There is a unilateral vision regarding the water challenge, which considers a limited groups of actors. The vision often has a short-term focus, with a maximum of 3 to 4 years  |
| <b>--</b> | <b>Deficient sustainability vision and short-term focus</b> | There is a lack of visionary agents that promote change towards a long-term, sustainable vision regarding the water challenge. Diverging expectations and objectives of stakeholders are the result. This may be evidenced by indecisiveness or even conflicts. Long-term and integrative initiatives may also be blocked                            |

#### Five most consulted sources

Boal KB and Hooijberg R (2000) Strategic leadership research: Moving on. *Leadership Quarterly* 11:515-549

Ford JD and King D (2015) A framework for examining adaptation readiness. *Mitigation Adapt Strateg Glob Chang* 20:505-526

Pahl-Wostl C, Nilsson C, Gupta J and Tockner K (2011) Societal learning needed to face the water challenge. *Ambio*, 40:549-553

Schultz L and Fazey I (2009) Effective leadership for adaptive management. *Adaptive Environmental Management: A Practitioner's Guide*. 295-303

Westley F and Mintzberg H (1989) Visionary Leadership and Strategic Management. *SMJ* 10:17-32

## Condition 7: Multi-level network potential

Urban water governance involves a plethora of actors and interests from all levels of government, organizations and (private) stakeholders. For sustainable solutions, working in networks is an essential determinant for effective solutions.

### Indicator 7.1: Room to manoeuvre

**Predefined question:** To what extent do actors have the freedom and opportunity to develop a variety of alternatives and approaches (this includes the possibility of forming ad hoc, fit-for-purpose partnerships that can adequately address existing or emerging issues regarding the water challenge)?

|           |  |   |
|-----------|--|---|
| <b>++</b> | <b>Freedom to develop innovative solutions</b>       | There is a common and accepted long-term vision for dealing sustainably with the water challenge. Within the boundaries of this vision, actors are given the freedom to develop novel and diverse approaches and partnerships, resulting in continuous improvements and exploration. These partnerships are most likely institutionalized   |
| <b>+</b>  | <b>Redundancy to address uncertainty</b>             | There is recognition that a high degree of freedom is necessary to deal with complex situations in the form of experiments and looking for new unconventional collaborations. There is a dynamic mix of cooperative partnerships and a redundant set of diverging alternative solutions. A clear overall vision to steer research is however lacking  |
| <b>0</b>  | <b>Limited room for innovation and collaboration</b> | Actors are given the means to perform predefined tasks for dealing with problems that are framed with a narrow, short-term and technical-oriented scope. There is limited room to deviate. Solutions are sought in own sectoral field and expertise   |
| <b>-</b>  | <b>Limited autonomy</b>                              | Only a few actors receive some degree of freedom, there are limited opportunities to develop alternatives, and there is hardly any opportunity to form partnerships with unconventional actors  |
| <b>--</b> | <b>Strictly imposed obligations</b>                  | The actions of stakeholders are strictly controlled and there are rigid short-term targets. Freedom to form new partnerships is strongly limited as actor network composition is fixed and small. There are no resources made available for exploring alternatives that might be more effective or efficient whereas many actors that are affected by the water challenge do not have a voice |

### Five most consulted sources

Folke C, Hahn T, Olsson P and Norberg, J (2005) Adaptive governance of social-ecological systems

Gupta J, Termeer C, Klostermann J, Meijerink S, Van Den Brink M, Jong P, Nooteboom S and Bergsma E (2010) The Adaptive Capacity Wheel: A method to assess the inherent characteristics of institutions to enable the adaptive capacity of society. *Environ Sci Policy* 13:459-471

STOWA (2016) Stichting Toegepast Onderzoek Waterbeheer. Deel 2: Sturen op verandering van aanpak en werkwijze

Stigt R, Driessen PPJ, Spit TJM (2013) Compact City Development and the Challenge of Environmental Policy Integration: A Multi-level Governance Perspective. *Env Pol Gov* 23:221-233

Suhardiman D and Giordano M (2012) Process-focused analysis in transboundary water governance research. *International Environmental Agreements: Politics, Law and Economics* 12:299-308

## Indicator 7.2: Clear division of responsibilities

**Predefined question:** To what extent are responsibilities clearly formulated and allocated, in order to effectively address the water challenge?

|           |  |  |
|-----------|--|--|
| <b>++</b> | <b>Dynamic, fit-for-purpose cooperations</b>   | There are many synergetic cooperations within the urban water network that can provide solutions for the water challenge. The roles and responsibilities are clearly divided amongst actors. These cooperations are dynamic and result in fit-for-purpose problem solving necessary to solve complex, multi-level and unknown challenges |
| <b>+</b>  | <b>Innovative cooperative strategies</b>       | Actors recognize that knowledge and experience are scattered within the local network. Therefore, extra effort is made to bundle the scattered expertise and to reach fit-for-purpose division of clear roles and responsibilities. New cooperation compositions are explored  |
| <b>0</b>  | <b>Inflexible division of responsibilities</b> | Responsibilities are divided over a limited set of conventional actors. Opportunities for new cooperation and more effective division of responsibilities are not seized or even recognized. Sometimes conventional actors get more tasks to deal with new water challenges  |
| <b>-</b>  | <b>Barriers for effective cooperation</b>      | Authorities are fragmentized or they lack interest. Moreover, miscommunication and lack of trust are causes that block effective water governance  |
| <b>--</b> | <b>Unclear division of responsibilities</b>    | There is an unclear division of responsibilities and often the relationships are over-hierarchical. Everybody expects someone else to make required effort and trust is hardly found   |

### Five most consulted sources

Mees H (2014) Responsible Climate Change Adaptation - Exploring, analysing and evaluating public and private responsibilities for urban adaptation to climate change. (198 p.)

Mees HLP, Dijk J, Van Soest D, Driessen PPJ, Van Rijswick MHFMW and Runhaar H (2014) A method for the deliberate and deliberative selection of policy instrument mixes for climate change adaptation. Ecol Soc 19

OECD (2011) Organization for Economic Cooperation and Development: Water Governance in OECD Countries: A Multi-level Approach. OECD Studies on Water. Paris, France

OECD (2015) Organization for Economic Cooperation and Development: OECD Principles on Water Governance. OECD Ministerial Council Meeting. Paris, France

WaterAid (2011) Policy guidelines. Water resource management. A WaterAid in Nepal publication



### Indicator 7.3: Authority

**Predefined question:** To what extent are legitimate forms of power and authority present that enable long-term, integrated and sustainable solutions for the water challenge?

|           |                                       |   |
|-----------|---------------------------------------|---|
| <b>++</b> | <b>Strong well-embedded authority</b> | Long-term, integrated approaches regarding the water challenge are well embedded in policy and regulatory authorities. Authoritative figures receive much support both politically and by society. Their opinions and statements also receive much media attention  |
| <b>+</b>  | <b>Stirring authority</b>             | There is recognition of the need for long-term and integrated approaches by both the public and the political arena. Sustainability approaches regarding the water challenge are now implemented as declarations of intent and sustainability principles in policy and regulation. Legitimate authorities are assigned to coordinate long-term integrated policy and implementation |
| <b>0</b>  | <b>Restricted authority</b>           | The water challenge is addressed as long as the status quo is not questioned. Long-term policy visions are limited and new policy mainly needs to fit into existing fragmented structure. This means small (technical) changes are occurring  |
| <b>-</b>  | <b>Unfruitful attempts</b>            | The water challenge is put forward by individuals or a groups of actors, but there is only little interest which is also fragile due to poor embedding of sustainability principles in current policy mechanisms, interests, and budget allocation. The challenge may have been mentioned in reviews or reports but left unaddressed  |
| <b>--</b> | <b>Powerlessness</b>                  | The addressing of the water challenge is regularly overruled with contradicting and competing interests and so it is hardly included in policy, regulation or administrative principles   |

#### Five most consulted sources

Evans B, Joas M, Sundback S and Theobald K (2006) Governing local sustainability. *J Environ Plan Manage* 49:849-867

Gibbs DC, Longhurst J and Braithwaite C (1998) 'Struggling with sustainability': weak and strong interpretations of sustainable development within local authority policy. *Environ Plan A* 30:1351-1365

Huxham C and Vangen S (2005) *Managing to Collaborate: The theory and Practice of Collaborative Advantage*. New York: Routledge

Van Rijswick M, Edelenbos J, Hellegers P, Kok M and Kuks S (2014) Ten building blocks for sustainable water governance: an integrated method to assess the governance of water. *Water Int* 39:5, 725-742

Wilson E (2006) Adapting to climate change at the local level: The spatial planning response. *Local Environment* 11:609-625

### Condition 8: Financial viability

Sufficient financial resources are crucial for good water governance. Willingness to pay for water challenge adaptation services is important to gain access to reliable funding for long-term programs. At the same time, water and climate adaptation services need to be affordable for everyone including poor people or people being disproportionately affected.

#### Indicator 8.1: Affordability

**Predefined question:** To what extent are water services and climate adaptation measures available and affordable for all citizens, including the poorest?

|           |   |   |
|-----------|---|---|
| <b>++</b> | <b>Climate adaptation affordable for all</b>                | Programs and policies ensure climate adaptation for everyone. This includes public infrastructure and private property protection. The solidarity principle is clearly percolated in policy and regulation  |
| <b>+</b>  | <b>Limited affordability of climate adaptation services</b> | Serious efforts are made to support climate adaptation for everyone, including vulnerable groups. There is often recognition that poor and marginalized groups are disproportionately affected by the water challenge. This is increasingly addressed in policy and regulation    |
| <b>0</b>  | <b>Unaffordable climate adaptation</b>                      | Basic water services are affordable for the vast majority of the populations, however poor people and marginalized communities have much difficulty to afford climate adaptation measures to protect themselves against impacts such as extreme heat, flooding or water scarcity. |
| <b>-</b>  | <b>Limited affordability of basic water services</b>        | A share of the population has serious difficulty to pay for basic water services such as neighbourhoods with low-income or marginalized groups. There is hardly any social safety net regarding water services, let alone for climate adaptation measures                         |
| <b>--</b> | <b>Unaffordable basic water services</b>                    | Basic water services are not affordable or even available for a substantial part of the population. This may be due to inefficient or obsolete infrastructure, mismanagement or extreme poverty   |

#### Five most consulted sources

Dodman D and Satterthwaite D (2008) Institutional capacity, climate change adaptation and the urban poor. *IDS Bulletin*, 39:67-74

Fankhauser S and Tepic S (2007) Can poor consumers pay for energy and water? An affordability analysis for transition countries. *Energy Policy* 35:1038-1049

OECD (2011) Organization for Economic Cooperation and Development: Water Governance in OECD Countries: A Multi-level Approach. *OECD Studies on Water*. Paris, France

Raje DV, Dhobe PS and Deshpande AW (2002) Consumer's willingness to pay more for municipal supplied water: A case study. *Ecol Econ* 42:391-400

UNDP (2008) United Nations Development Program: Governance Principles, Institutional Capacity and Quality. New York, USA

## Indicator 8.2: Consumer willingness to pay

**Predefined question:** How is expenditure regarding the water challenge perceived by all relevant stakeholders (i.e., is there trust that the money is well-spent)?

|           |  |  |
|-----------|--|--|
| <b>++</b> | <b>Willingness to pay for present and future risk reductions</b> | The water challenge is fully comprehended by decision-makers. There is political and public support to allocate substantial financial resources. Also expenditure for non-economic benefits is perceived as important. There is clear agreement on the use of financial principles, such as polluter-pays- and user-pays- or solidarity principle  |
| <b>+</b>  | <b>Willingness to pay for provisional adaptation</b>             | Due to growing worries about the water challenge, there are windows of opportunity to increase funding. However, the perception of risk does not necessarily coincide with actual risk. Financial principles, such as polluter-pays principle, may be introduced. Due to inexperience, implementation is often flawed. Focus groups decide on priority aspects regarding the water challenge, but there is confusion regarding the extent and magnitude of the water challenge |
| <b>0</b>  | <b>Willingness to pay for business as usual</b>                  | There is support for the allocation of resources for conventional tasks. There is limited awareness or worries regarding the water challenge. Most actors are unwilling to financially support novel policies beyond the status quo. Generally, there is sufficient trust in local authorities   |
| <b>-</b>  | <b>Fragmented willingness to pay</b>                             | Willingness to pay for measures addressing the water challenges are fragmented and insufficient. The importance and risks are perceived differently by each stakeholder. Generally, their estimates of the cost are substantially lower than the actual costs  |
| <b>--</b> | <b>Mistrust and resistance to financial decisions</b>            | There is a high level of mistrust in decision making of resource allocation. At this level financial decisions are based on prestige projects, projects that benefit small groups or specific interests. As expenditures often do not address the actual water challenges, there is a high degree of resistance regarding resource allocation  |

### Five most consulted sources

Casey JF, Kahn JR and Rivas A (2006) Willingness to pay for improved water service in Manaus, Amazonas, Brazil. *Ecol Econ* 58:365-372

Hensher D, Shore N and Train K (2005) Households' willingness to pay for water service attributes. *Environ Resour Econ* 32:509-531

Marshall GR (2013) Transaction costs, collective action and adaptation in managing complex social-ecological systems. *Ecol Econ* 88:185-194

OECD (2014) Organization for Economic Cooperation and Development: Water Governance in the Netherlands. Fit for the future? OECD Studies on Water, OECD publishing

Whittington D, Briscoe J, Xinming MU and Barron W (1990) Estimating the willingness to pay for water services in developing countries: a case study of the use of contingent valuation surveys in southern Haiti. *Econ Dev Cult Change* 38:293-311

### Indicator 8.3: Financial continuation

**Predefined question:** To what extent do financial arrangements secure long-term, robust policy implementation, continuation, and risk reduction?

|           |   |   |
|-----------|---|---|
| <b>++</b> | <b>Long-term financial continuation</b>                     | There is secured continuous financial support for long-term policy, measures and research regarding the water challenge. These costs are included into baseline funding. Generally, both economic and non-economic benefits are considered and explicitly mentioned   |
| <b>+</b>  | <b>Abundant financial support with limited continuation</b> | Abundant financial resources are made available for project based endeavours that are often exploring new solutions but lack long-term resource allocation or institutionalized financial continuation. Hence, long-term implementation is uncertain  |
| <b>0</b>  | <b>Financial continuation for basic services</b>            | Financial resources are available for singular projects regarding basic services of the water challenge. The allocation of financial resources is based on past trends, current costs of maintenance and incremental path-dependent developments. Costs to deal with future water challenges are often not incorporated. Limited resources are assigned for unforeseen situations or calculated risks |
| <b>-</b>  | <b>Inequitable financial resource allocation</b>            | There are potential resources available to perform basic management tasks regarding the water challenge, but they are difficult to access, are distributed rather randomly and lack continuity. No clear criteria can be found on the resource allocation. Resources allocation is ad hoc and considers only short-time horizons  |
| <b>--</b> | <b>Lack of financial resources</b>                          | There are insufficient financial resources available to perform basic tasks regarding the water challenge. Financing is irregular and unpredictable leading to poor policy continuation   |

#### Five most consulted sources

Adger WN, Arnell NW, and Tompkins EL (2005) Successful adaptation to climate change across scales. *Glob Environ Chang* 15:77-86

Anguelovski I and Carmin J (2011) Something borrowed, everything new: Innovation and institutionalization in urban climate governance. *Curr Opin Environ Sustainability* 3:169-175

Geels FW (2013) The impact of the financial–economic crisis on sustainability transitions: Financial investment, governance and public discourse. *Environ Innov Soc Transit* 6:67-95

Gibbs D, Jonas A and While A (2002) Changing governance structures and the environment: Economy-environment relations at the local and regional scales. *J Environ Policy Plan* 4:123-138

UNEP United Nations Environmental Program (2013) City-level decoupling. Urban resources flows and the governance of infrastructure transition. A report of the working group on cities of the international resource panel

## Condition 9: Implementing capacity

Implementing capacity is about the effectiveness of policy instruments with respect to the water challenge. Part of the effectiveness is also due to the level of compliance to policy and regulation and the familiarity with (calamity) action plans.

### Indicator 9.1: Policy instruments

**Predefined question:** To what extent are policy instruments effectively used (and evaluated), in order to stimulate desired behavior and discourage undesired activities and choices?

|           |  |  |
|-----------|--|--|
| <b>++</b> | <b>Effective instruments enhance sustainable transformations</b> | There is much experience with the use of policy instruments. Monitoring results show that the current use of instruments proves to be effective in achieving sustainable behaviour. Continuous evaluation ensures flexibility, adaptive capacity and fit-for-purpose use of policy instruments   |
| <b>+</b>  | <b>Profound exploration of sustainability instruments</b>        | Instruments to implement principles such as full cost-recovery and polluter-pays principle, serve as an incentive to internalize sustainable behaviour. The use of various instruments is explorative and therefore not yet optimized and efficient. The use of instruments is dynamic. There are a lot of simultaneous or successive changes and insights |
| <b>0</b>  | <b>Fragmented instrumental use</b>                               | Policy fields or sectors often have similar goals, but instruments are not coherent and may even contradict. Overall instrumental effectiveness is low and temporary. There is sufficient monitoring and evaluation leading to knowledge and insights in how instruments work and actors are getting a more open attitude towards improvements             |
| <b>-</b>  | <b>Unknown impacts of policy instruments</b>                     | Instruments are being used without knowing or properly investigating their impacts on forehand. The set of instruments actually leads to imbalanced development and inefficiencies that are hardly addressed   |
| <b>--</b> | <b>Instruments enhance unsustainable behavior</b>                | Policy instruments may enhance unwanted or even damaging behaviour that opposes sustainability principles, e.g., discount for higher water use stimulates spilling and inefficiency. There is hardly any monitoring that can be used to evaluate the counterproductive effects of these policy instruments   |

### Five most consulted sources

Brown RR and Farrelly MA (2009) Delivering sustainable urban water management: a review of the hurdles we face. *Water Sci Technol* 59:839-846

EEA (2016) European Environment Agency. Urban adaptation to climate change in Europe 2016. Transforming cities in a changing climate. ISSN 1977-8449

Klein RJT, Schipper ELF and Dessai S (2005) Integrating mitigation and adaptation into climate and development policy: Three research questions. *Environ Sci Policy* 8:579-588

Mees HLP, Dijk J, Van Soest D, Driessen PPJ, Van Rijswijk MHFMW and Runhaar H (2014) A method for the deliberate and deliberative selection of policy instrument mixes for climate change adaptation. *Ecol Soc* 19

Müller M and Siebenhüner B (2007) Policy instruments for sustainability-oriented organizational learning. *Business Strategy and the Environment*, 16:232-245

## Indicator 9.2: Statutory compliance

**Pre-defined question:** To what extent is legislation and compliance, well-coordinated, clear and transparent and do stakeholders respect agreements, objectives, and legislation?

|           |   |  |
|-----------|---|--|
| <b>++</b> | <b>Good compliance to effective sustainable legislation</b> | Legislation is ambitious and its compliance is effective as there is much experience with developing and implementing sustainable policy. Short-term targets and long-term goals are well integrated. There is a good relationship among local authorities and stakeholders based on dialogues.  |
| <b>+</b>  | <b>Flexible compliance to ambitious explorations</b>        | New ambitious policies, agreements and legislations are being explored in a "learning-by-doing" fashion. Most actors are willing to comply. Some targets may be unrealistic and requires flexibility   |
| <b>0</b>  | <b>Strict compliance to fragmented legislation</b>          | Legal regulations regarding the water challenge are fragmented. However, there is strictly compliance to well-defined fragmented policies, regulations and agreements. Flexibility, innovations and realization of ambitious goals are limited. Activity may be penalized multiple times by different regulations due to poor overall coordination |
| <b>-</b>  | <b>Moderate compliance to incomplete legislation</b>        | The division of responsibilities of executive and controlling tasks is unclear. Legislation is incomplete meaning that certain gaps can be misused. There is little trust in local authorities due to inconsistent enforcement typically signalled by unions or NGO's  |
| <b>--</b> | <b>Poor compliance due to unclear legislation</b>           | Legislation and responsibilities are unclear, incomplete or inaccessible leading to poor legal compliance by most actors. If legislation is present it enjoys poor legitimacy. Actors operate independently in small groups. Fraudulent activities may take place  |

### Five most consulted sources

Bryson JM, Crosby BC and Stone MM (2006) The design and implementation of cross-sector collaborations: Propositions from the literature. *Public admin review* 66:44-55

Fiorina MP (1982) Legislative choice of regulatory forms: Legal process or administrative process? *Public Choice* 39:33-66

Müller M and Siebenhüner B (2007) Policy instruments for sustainability-oriented organizational learning. *Business Strategy and the Environment*, 16:232-245

Roy AH, Wenger SJ, Fletcher TD, Walsh CJ, Ladson AR, Shuster WD, Thurston HW and Brown RR (2008) Impediments and solutions to sustainable, watershed-scale urban stormwater management: Lessons from Australia and the United States. *Environ Manage* 42:344-359

Van Rijswijk M, Edelenbos J, Hellegers P, Kok M and Kuks S (2014) Ten building blocks for sustainable water governance: an integrated method to assess the governance of water. *Water Int* 39:5, 725-742

### Indicator 9.3: Preparedness

**Predefined question:** To what extent is the city prepared (i.e. there is clear allocation of responsibilities, and clear policies and action plans) for both gradual and sudden uncertain changes and events?

|           |  |  |
|-----------|--|--|
| <b>++</b> | <b>Comprehensive preparedness</b>              | Long-term plans and policies are flexible and bundle different risks, impacts and worst case scenarios. They are clearly communicated, co-created and regularly rehearsed by all relevant stakeholders. The required materials and staff are available on short-term notice in order to be able to respond adequately. Evaluations on the rehearsals or reviews on dealing with calamities are available |
| <b>+</b>  | <b>Fragmented preparedness</b>                 | A wide range of threats is considered in action plans and policies. Sometimes over-abundantly as plans are proactive and follow the precautionary principle. Awareness of risks is high, but measures are scattered and non-cohesive. They may be independent or made independently by various actors. Allocation of resources, staff and training may therefore be ambiguous                            |
| <b>0</b>  | <b>Low awareness of preparation strategies</b> | Based on past experiences, there are action plans and policies addressing the water challenge. Actions and policies are clear but actual risks are often underestimated and the division of tasks is unclear. They are not sufficient to deal with all imminent calamities or gradually increasing pressures. Damage is almost always greater than is expected or prepared for                           |
| <b>-</b>  | <b>Limited preparedness</b>                    | Action plans are responsive to recent calamities and ad hoc. Actual probabilities and impacts of risks are not well understood and incorporated into actions or policies. Reports can be found on how the water sector deals with recent calamities  |
| <b>--</b> | <b>Poor preparedness</b>                       | There are hardly any action plans or policies for dealing with (future) calamities, uncertainties and existing risks. The city is highly vulnerable  |

#### Five most consulted sources

Allen KM (2006) Community-based disaster preparedness and climate adaptation: Local capacity-building in the Philippines. *Disasters* 30:81-101

Amundsen H, Berglund F and Westskogh H (2010) Overcoming barriers to climate change adaptation-a question of multilevel governance? *Environment and Planning C: Government and Policy*, 28:276-289

Brody SD (2003) Are we learning to make better plans?: A longitudinal analysis of plan quality associated with natural hazards. *J Plann Educ Res* 23:191-201

Evans B, Joas M, Sundback S and Theobald K (2006) Governing local sustainability. *J Environ Plan Manage* 49:849-867

Raaijmakers R, Krywkow J and Van Der Veen A (2008) Flood risk perceptions and spatial multi-criteria analysis: An exploratory research for hazard mitigation. *Nat Hazards* 46:307-322