

# The Water Flow Diagram -

## A tool for more inclusive and integrated urban water management

### The objective: To visualise urban water flows

With the Water Flow Diagram (WFD) we want to:

- I. Make the urban water flows visible and easy-to-understand to a broad audience (water users, industries, politicians and planners).
- II. Enable a dialogue among different water users, service providers and governing bodies.
- III. To empower municipalities to work towards reducing inequity and increasing resilience in urban water management.

### The diagram

The Water Flow Diagram (WFD) is a visual tool that shows in one picture all the water resources and flows and identifies the challenges and opportunities related to SDG6 and the HRWS. It connects information related to both Water Sanitation and Hygiene (WASH) and Integrated Water Resources Management (IWRM) and assists in the creation of a joint vision to prioritise action.

### Methods

With Sankey Diagrams, yearly water balances can be illustrated in an intuitive manner. The width of a certain flow is proportional to its quantity. The relevant components and processes along the water use chain are represented: Source, drinking water treatment, use (domestic, public, industrial and agricultural), wastewater treatment, discharge and losses, recharge and reuse. A standardised diagram is shown in Figure 1. A colour code adds a judgement to the urban water management practices. The judgement is based on the water quality and quantity of a flow and its use or destination. For example, if wastewater is not or only marginally treated and infiltrates to the groundwater, it is coloured red as this is problematic. If the practices are appropriate, the flow is coloured green. If the water quality is unknown and a judgement cannot be made, the flow is grey.

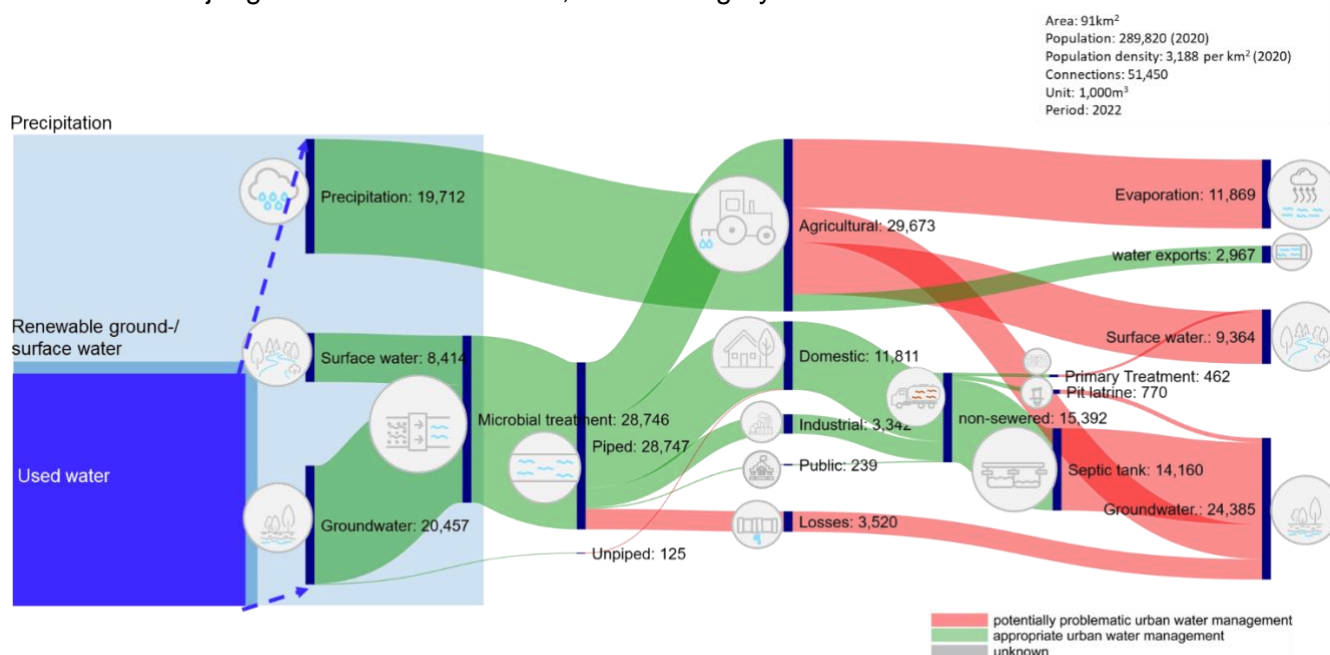


Figure 1: Example of a WFD (green = good management practices, red = bad practices, grey = unknown)

The boxes on the left side of the WFD (Figure 1) describe the water reserves available within the system boundaries. The size of the boxes represent the amount of precipitation, renewable groundwater and surface water. They can be compared to the box “used water” to judge whether more water is used than sustainably available within the system boundaries.

The system boundary of a WFD are usually the municipal boundaries, where water agencies and utilities are active. Various data sources exist to gather the data needed to generate a WFD. Often, government services/water agencies and (waste) water utilities have useful data. If resources are available, a data collection campaign can provide high accuracy data. Alternatively, comparable contexts can be considered where the data is available to estimate some of the required volumes and water qualities. As a last option, default values or expert judgements can be used.

## Thinking beyond

The WFD provides an overview on available resources and all their uses providing information on the resiliences in terms of water. The WFD can also be **linked to the Sustainable Development Goals (SDG) 6 indicators**: Access to safe water (6.1) and sanitation (6.2), proportion of wastewater treated (6.3.1) and state of water bodies (6.3.2), level of water stress (6.4.2) and efficiency (6.4.1), as well as the degree of integrated water resource management (6.5.1). Additionally, making a WFD increases stakeholder participation (6.b.1). It can also be related to the outcome indicators on availability and quality for the Human Right to Water and Sanitation (HRWS). An example is shown in Figure 5. In the future, we want to judge the **resilience of a city against climate hazards** using the WFD. One idea is to use an approach based on exposure, sensitivity and the adaptive capacity of processes and flows in the WFD.

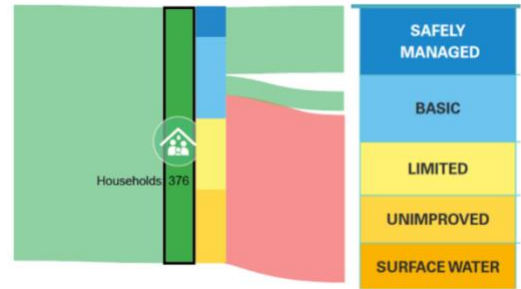


Figure 2: Example of how the WFD can be linked to the indicators for SDG6.

## Join this initiative!

The WFD has been applied in different contexts in the Philippines, Switzerland, Senegal, Brazil, and Uganda. A standardised methodology has been developed by Eawag, the Swiss Federal Institute of Aquatic Science and Technology and partners and is available on [www.sandec.ch/wfd](http://www.sandec.ch/wfd). The WFD has been presented at the World Water Forum in Dakar 2022 and the UN water conference in New York in 2023, where different actors support the application of the WFD in a [commitment to the UN Water Action Agenda](#).

**Organisations around the globe are invited to apply the methodology and make water management practices visible in their city!**

Watch two case study videos:



Rio Pardo de Minas



Bern

The participatory process in Rio Pardo de Minas:




More information, user manual and templates: [www.sandec.ch/wfd](http://www.sandec.ch/wfd)

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Eawag, WFD abstract, 12.06.2023

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aquatic research

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