Leveraging the data revolution

Informed decision-making for better water and sanitation management

June 25th to 29th 2018, Spiez, Switzerland

About AGUASAN

AGUASAN (www.aguasan.ch) is an interdisciplinary Swiss Community of Practice (CoP) that brings together a broad range of specialists to promote wider and deeper understanding of key water and sanitation management issues in developing and transitioning countries. It builds on committed sector professionals from various specialised institutions involved in Swiss development cooperation, humanitarian aid and research. Since 1984, the CoP has provided an exemplary, vibrant and most pertinent exchange platform and think-tank serving the water sector and constitutes an essential link in the innovation and knowledge management strategy of the Swiss Agency for Development and Cooperation (SDC).

Besides convening quarterly knowledge sharing events, every year members of the CoP organise an international **AGUASAN Workshop** in Switzerland. During these events water and sanitation specialists as well as other development practitioners from all over the world gather for five days to collectively reflect on a cutting-edge topic of the water sector. The workshops provide a joint learning experience and utilise the broad knowledge gathered by the participants to elaborate strategies and conceptual tools of practical use for development work, highly relevant for sector interventions at the local, national and global level. They are the annual highlight of AGUASAN and provide a unique forum for in-depth exchange and cognition by exploring new issues, whilst consolidating relevant experiences.

➢ The **focus of this year's AGUASAN Workshop** will be on improving evidenced-based decision-making for more priority-driven and targeted water and sanitation management. We will determine which data, processes and tools are needed and available to inform investment and operation & maintenance (O&M) decisions and how stakeholders should manage this evidence-based decision-making process. While exploring the technical and social innovations that have arisen with the data revolution, we will also look at steering measures to close gaps in data literacy and access to information and to address issues such as data sharing and privacy – amongst other challenges.

Topic

What is not measured cannot be managed

Data is the **lifeblood of decision-making** and the raw material for ensuring accountability. Without adequate data providing the right information on the right things at the right place and time, evidence-based decision-making for better Water, Sanitation and Hygiene services (WASH) or Water Resources Management (WRM) is impossible.

The city of Cape Town (South Africa) has witnessed three consecutive winter droughts which has led to a historic and severe water shortage. Despite water saving measures, dam levels are predicted to decline to critically low levels, and "Day Zero" is expected in May 2018, when municipal water supply will largely be shut off.

The challenges of drought and urbanisation that Cape Town is facing are also the main drivers for the creation of **tools to support evidence-based decision-making**. Cape Town has produced high-quality and up-to-date information on water demand and supply (like the Theewaterskloof Dam imagery showing a drop in water levels over the last 7 years; current capacity of the city's water infrastructure is at only 26%) as well as future development scenarios by using climate forecasts and population growth projections. Despite long-term water augmentation plans the city is thrown into disarray because the probability of a severe drought was underestimated, and water augmentation was only accelerated last year – too late to hold

off a water crisis. Now that the water crisis has hit, the city has explored various options to increase water supply and has been able to prioritize them by studying socio-economic data such as the population's ability to pay for water and decided that raising the water tariffs for the costly method of desalination is not an option. They have concluded from exploration drilling in three major aquifers, that relying on groundwater is the best option to meet water demands in the short-run.

This example shows that in practice – despite the availability of tools – there are limitations to evidence-based decision-making because forecasts are never 100% accurate and demand for conservative interpretation. And while authorities in South Africa are resourceful, many other countries are still lagging behind in terms of technology and capacities, and a massive asymmetry of information exists between countries as well as stakeholders like authorities, end users and service providers. Miscommunication between data producers and decision-makers, misinterpretation of statistics (like trivializing the likelihood of disasters), a lack of political will or financial means can equally lead to inadequate or tardy decisions as the example of Cape Town partly shows.

Turning data into actionable, strategic decisions

To influence actionable and strategic decisions, managing of the data flow is important. Data are numbers, points and qualitative answers that need to first be processed and interpreted to sufficiently inform decision-making. Tools and know-how are needed to turn this data into useful information that decision-makers can consult to advance strategic objectives related to WASH and WRM. The 'knowledge value chain' (see below) depicts how this flow from data to wisdom – so the 'evidence-based decision-making process' – works.
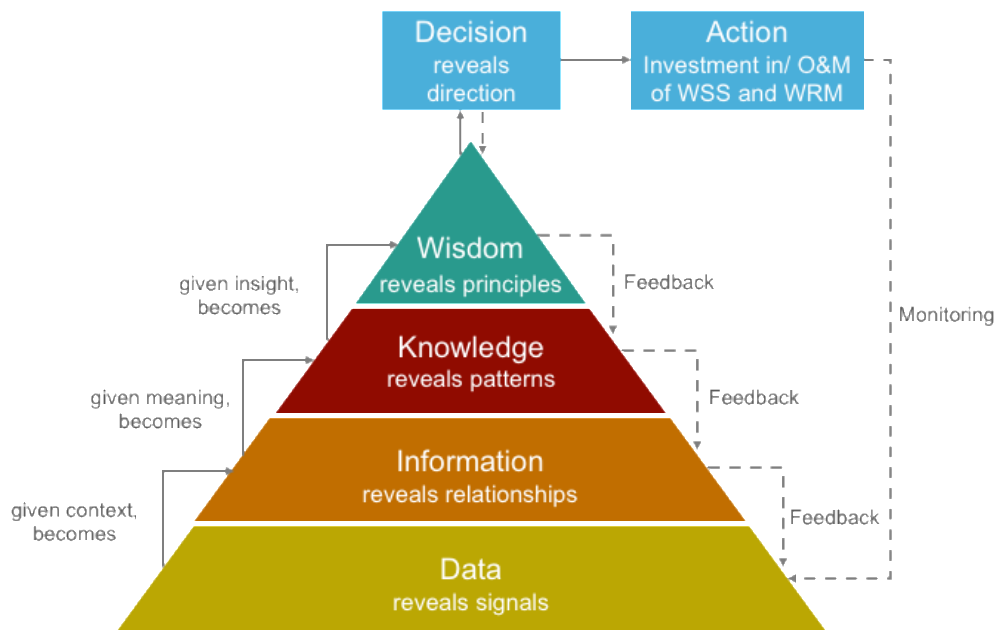

Image: The 'knowledge value chain' (or 'evidence-based decision-making process')

In the case of Cape Town **data** was collected on rainfall, water level of rivers and dams, population size and their water use – amongst others. When looking at the variations in water levels and water demand *over time*, the data is given *context* and becomes **information**. Looking at the *relationships* of the information – so the water levels of the dams dropping despite the occurrence of rainfall in the Cape region and the stable water demand – data gains *meaning* and becomes **knowledge**. We now see a *pattern* where the watershed and the dams are not replenishing in the winter months while the water demand of the population is remaining stable. Based on *insights* from climate change research, these climate patterns of the Cape region are used to create forecasts of water availability. Insights from urban development research are used to create water demand forecasts. At the same time, the city has a budget to fulfil its political mandate of supplying Cape Town's residents, business and industry with clean, safe drinking water. These and other *insights* are consulted when assessing the viability of alternative sources

to augment water supply (desalination, aquifers and recycling of wastewater) and the effectiveness of various means to depress water demand (awareness raising, reducing pressure, increasing tariffs, rationing). At this point, the knowledge has turned into **wisdom**, revealing *principles* and showing the priority areas for intervention to secure water access to all in light of the impending water crisis.

If this wisdom is used to take adequate **decisions** on time, depends on a variety of factors like political will, decision-makers trusting in science and correctly interpreting the statistics, financial means and others. Once an investment decision and **action** have been taken to build WASH or WRM infrastructure (e.g. groundwater pumping stations in the case of Cape Town), the evidence-based decision-making process continues; this time with adapted *monitoring* indicators and data being collected to inform O&M decisions for managing the infrastructure. Similarly *feedback* loops exist between the individual steps of the pyramid to ensure that the processing of data is always in line with the decision to be taken.

Understanding decision-making first, collecting data later

The **intention of monitoring should not be to produce unlimited quantities of data for the sake of data collection alone**. Data should be collected and processed to inform decision-making – in line with the development objectives a country or organisation has set itself (such as the UN Sustainable Development Goal on Water and the Human Right to Water). If an NGO conducts household surveys to inform national budget planning, and they focus on indicators like 'number of toilets', then no knowledge can be established on the 'functionality' or 'use' of the toilets. Also, the level of data disaggregation (i.e. 'household' vs. 'female inhabitant') would not serve a programme that focusses on the needs of girls and women. Data collection is thus only one step towards priority-focused and targeted decision-making for better WASH and WRM. Therefore, we need to target data collection, processing and analysis **based on which decisions must be taken**.

Investment decisions are typically made by governments, service providers, development partners and ideally water committees. For evidence-based decision-making, these stakeholders need information from socio-economic data, data on population density, location and state of water resources, state of infrastructure and available technologies – amongst others. For example, by mapping water sources, households and the distance between them, strategic decisions can be made on priority areas for infrastructure upgrades.

Operators need information to take informed **O&M decisions** regarding water treatment, water allocation and the repair of broken parts. Proper O&M is crucial in assuring the efficiency, effectiveness and sustainability of water and sanitation provision. Failure of accurate and timely reporting of data on pipe leaks for example can result in even greater infrastructure deterioration, high costs and reduced service provision. In Tanzania, the company MSABI developed a subscription-based system for water point maintenance. The pumps digitally track all water point interventions allowing to analyse which factors influence cost-efficiency and sustainability of water services. This enabled communities and governments to keep installed water points in operation adding to the effectiveness and efficiency of initial investments.

➢ **In the workshop we will focus on** which data, processes and tools are needed and available to inform investment and O&M decisions and how stakeholders should manage the evidence-based decision-making process.

Data revolution for all?

The **data revolution** was sparked from the spread of mobile and digital technology and has caused an exponential increase in the amount and variety of data and data sources, such as qualitative data and citizen-generated or opportunistic sensor data. The rapidity with which data is generated and dispersed and the number of producers – be it by actively collecting the data or by passively leaving 'digital footprints' from sensor-enabled devices or inferred via algorithms ('big data') – have correspondingly exploded in recent decades.

This mobile technology has also supported developing countries in **leapfrogging development** and has provided a unique opportunity to bridge the gap between the lack of data and information on existing water and sanitation infrastructure and its O&M. With smartphones citizens can now

gather water data like water levels and wastewater discharge and play an important role in monitoring at the local level and holding their governments accountable for the provision of adequate WASH and WRM.

Despite large increases in mobile coverage (83% of Africans now have access to mobile coverage, compared to 11% a decade ago) and the exponential growth of data volume, **huge gaps remain** between the data haves and have-nots and the data-literate and data-illiterate. High-income countries typically profit more from the opportunities that arise with the data revolution than low- or medium-income countries that are lagging behind when it comes to investing, training and experimenting with data. As a consequence, many citizens and their livelihoods are still unaccounted for and essential environmental parameters are not monitored. There are also huge disparities in accessing and using the data due to a lack of resources, technology and capacities. Data literacy training is mostly absent, and tools are missing to transform data into understandable information for decisions. As a result, decision-makers are left with high rates of errors or guessing, resulting in ineffective investments or poor O&M. This becomes all the more significant as many countries are decentralizing and WASH-/WRM-related decisions are shifted to the local level. Women for example – that traditionally take important decisions on the allocation of resources in smallholder farms and water committees – are typically data-illiterate and deprived from access to mobile technology.

Leveraging an inclusive data revolution

The opportunities of the data revolution can only be exploited to serve the greater goal of improved WASH and WRM if these gaps are closed and inclusive decision-making processes are developed. Steering measures and an enabling environment are needed along the decision-making process to ensure this.

➢ While exploring the technical and social innovations that have arisen with the data revolution, **we will also focus in the workshop on** how gaps in data literacy and access to information can be closed or issues in data sharing and privacy can be addressed by taking steering measures. The below measures will be built on in the workshop to leverage an inclusive data revolution:

▪ *Transparent coordination of governments, private sector, NGOs, media and academic researchers.* Particularly the establishment of feedback loops between the users and producers of knowledge; the better integration and use of all the innovative data sources (crowd-sourcing, opportunistic sensing etc.) that have emerged with the data revolution as well as the reconciling of local/ project-based with national monitoring, for example through Joint Sector Reviews.

▪ *Institutional strengthening to increase the performance* of both knowledge users and producers to ensure that the timing of data collection, processing and analysis matches the timing of decision-making (i.e. reporting and budgeting calendars). For investment and O&M decisions in WASH and WRM, the inclusion of local – currently often marginalized – groups in data collection will be key (crowd-sourcing).

▪ *Investments in technology and innovation.* This includes access to internet, mobile devices as well as analytical and communication tools, particularly in schools and for decision-makers (e.g. women in water committees). The cooperation with the private sector will be crucial to help innovate and leapfrog to new technologies and get access to data (e.g. mobile phone generated data).

▪ *Capacity development to harness the benefits of these innovations.* This entails training at all steps of the evidence-based decision-making process, particularly to avoid the overload of data without meaning ('data graveyards'). For data collection: showing citizens how to feed which water point data into a mobile application or training engineers to digitally track leaks to perform maintenance tasks. For transforming data into knowledge: being able to understand data ('data literacy'), translate this data into knowledge (by using adequate analytical tools) and influence decision-makers to feed it into investment and O&M decision-making (by using adequate communication and visualization tools).

- *Principles and standards[1] to enable cooperation and ensure service standards.* Household surveys that use different indicators are not comparable; neither is geospatial data that uses different geographical definitions. The appropriate level of disaggregation of data allows for distinguishing the particular needs of certain groups (like women) and for them to be reflected in investment and O&M decisions. In disaster response the timeliness of data is more important than other data standards. In light of the massive amounts of data being passively generated ('digital footprint'), the issue of data privacy and the protection from data-related discrimination is pivotal. At the same time certain data – particularly on public spending and resources – has to be free and open by default so that all stakeholders can take decisions and citizens can hold governments accountable for their decisions.

Target audience

The AGUASAN Workshop 2018 is open to NGO field and desk staff, service providers, consultants, researchers, policy makers, multilateral organisations, donor agencies, entrepreneurs and other specialists of WASH and WRM in the development and humanitarian context, particularly those with expertise and interest in evidence-based decision-making. We particularly invite young water professionals that have just started their career in the sector to apply for sponsored participation (see below "Application").

Workshop features

- A **steering committee** carefully prepares the workshop. To support a dynamic workshop, it only defines the programme of the workshop, but does not anticipate its outcomes.
- **Resource persons** bring in key inputs and practical insights of participants make the topic tangible for different contexts.
- A team of **facilitators** and interactive formats support the participants to share their experiences and leave the event with concrete learnings as well as strengthened professional ties.
- Alternate working in **plenary and small groups**, whilst proceeding in a stimulating and participatory manner by using a variety of visual aids and innovative working methods.
- A mid-week **field trip** (half-day) for illustrating the workshop topic in the Swiss context.
- An afternoon session with **free time** – for catching up on office work or going for a hike in the area.
- A **market place** where the participants present their specific experiences or challenges in a market or storytelling setting.
- A **networking event** with Swiss water and sanitation experts from SDC, the private sector, academia and NGOs.
- A venue (www.abzspiez.ch) ideal for a workshop and sufficient time for informal exchanges in a beautiful **mountain setting**.

Application

- A full application must be submitted by **March 20th, 2018** by filling in this [application form](). Late applications cannot be considered.
- Workshop participation does not involve any registration fee, but you must count on **costs of approx. 1'060 CHF** (approx. 910 EUR or 1'140 USD) for food, lodging, facilities and field trip (excluding transport to and from the venue, visa, insurance, drinks and all personal expenses) to be settled by you on the spot or by your sponsoring organisation. The workshop convenor does not provide any financial support to regular participants.
- **Five young water professionals will be sponsored to participate in the AGUASAN Workshop**. The sponsoring includes transport to and from the venue, full board, lodging, facilities and field trip (excluding visa, insurance, drinks and any personal expenses). For the application requirements, please consult the [application form]().

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[1] legal, technical, privacy, geospatial and statistical standards

- To optimise the working environment the number of participants is limited to 50. A **well-balanced mix** regarding the participants' expertise and gender as well as their thematic, organisational and geographic background is aimed at. English is the workshop language – working groups may exchange in a language understood by all group members, but inputs and feedbacks in plenary are always in English.
- The **participants constitute the main knowledge resource** for the event by bringing in topic-related questions and expertise. Participants that bring in highly relevant and specific key questions and/ or are willing to prepare and present a relevant practical insight, poster or similar are given priority in the selection process (see also application form).