Utility Platform

For strengthening partnerships
of municipal utilities worldwide

Outcome Report 4 – Water Operator Partnership

Zambian Water Operator Lukanga Water Supply and Sanitation Company Limited and German Operators Gelsenwasser, Emschergenossenschaft and Lippeverband

IMPRINT

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Partners jointly working at the plant of Lukanga Water in Kabwe at the fact-finding mission | 11/2021 | Photo: GIZ

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EGLV
Emschergenossenschaft
Lippeverband

LUKANGA WATER SUPPLY AND SANITATION COMPANY LIMITED

GELSENWASSER

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On behalf of Federal Ministry for Economic Cooperation and Development

In cooperation with German Water Partnership

VKU VERBAND KOMMUNALER UNTERNEHMEN e.V.

About "Utility Platform for Strengthening Partnerships of Municipal Utilities Worldwide"

Context
In many German partner countries, municipal utilities providing public goods and services such as water and waste disposal are in poor economic shape. As a result, their service provision is only unreliable or does not reach the entire population. Due to the war, utilities in Ukraine are finding it particularly difficult to maintain operations, restore destroyed technology and bring new plants up to European Union standards. In the face of climate change, growing cities and digitalisation, utility companies in Germany and its partner countries are facing similar challenges in order to continue providing their services.

Objective
Municipal utilities in cooperating countries have better access to up-to-date, tried-and-tested knowledge and the technical and institutional expertise of German municipal utilities.

Approach
The Utility Platform promotes and supports 28 partnerships between German municipal utilities and operators in Zambia, Tanzania, South Africa, Jordan, Moldova, Ukraine and Albania in the water and waste sector. The platform promotes close exchange on corporate management and on operating and maintaining plants. Technical advice, mutual visits, job shadowing, virtual meetings and the procurement of technology, particularly for Ukraine, form the core of the cooperation between the companies.

The project has also established a logistics hub that dispatches donations and procurements from German utility companies to their Ukrainian counterparts. Appeals for donations by the Association of Local Utilities (VKU) make it possible to deliver needed technical equipment to Ukraine. In addition to the donations, the logistics partner Go Local also transports the goods that are procured for Ukrainian utilities as part of the 16 solidarity operator partnerships.

About the author: Maria Pascual-Sanz

Maria Pascual-Sanz is a development professional with over 20 years of experience in the fields of water services and urban sustainability. The last 16 years of her career have been dedicated to Water Operators' Partnerships (WOPs), through diverse roles in several organisations. From direct implementation of WOPs as part of VEI (The Netherlands), to research and lecturing as part of Rotterdam School of Management and UNESCO-IHE (in Delft), to global WOPs programme design, coordination and implementation as part of UN-HABITAT GWOPA. She is currently an independent consultant based in Barcelona engaged in organisational support on areas such as monitoring, evaluation and learning; research, knowledge management and product development; partnership facilitation; strategic planning; WOP programme design and resources mobilisation and advocacy.

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ACRONYMS

BMZ	German Ministry for Economic Cooperation and Development
DMA	District Meter Areas
EGLV	Emschergenossenschaft and Lippeverband
ERP	Enterprise resource planning
GIS	Geographical Information System
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH
GSM	Global System for Mobile Communication
GW	Gelsenwasser
GWOPA	Global Water Operators' Partnerships Alliance
LgWSC	Lukanga Water Supply and Sanitation Company Limited
NRW	Non-Revenue Water
PS	Pumping Station
WOP	Water Operator Partnership
ZEMA	Zambia Environmental Management Agency

EXECUTIVE SUMMARY

The Water Operator Partnership (WOP) between Lukanga Water Supply and Sanitation Company Limited (LgWSC) in Zambia, Gelsenwasser (GW) and Emschergenossenschaft and Lippeverband (EGLV) is part of the pilot phase of the 'Utility Platform for strengthening partnerships of municipal utilities worldwide', funded by the German Ministry for Economic Cooperation and Development (BMZ).

The project was formalised in January 2021 through the contract between GIZ and Gelsenwasser. The project termination date was initially set to be May 2023, but two extensions took place until June 2024. The main working packages addressed by partners were: 1) water supply, 2) wastewater and asset management, 3) preventive maintenance and energy management and 4) public relationships.

The project timeline includes a total of nine missions, four job shadowing visits and one networking event in Germany.

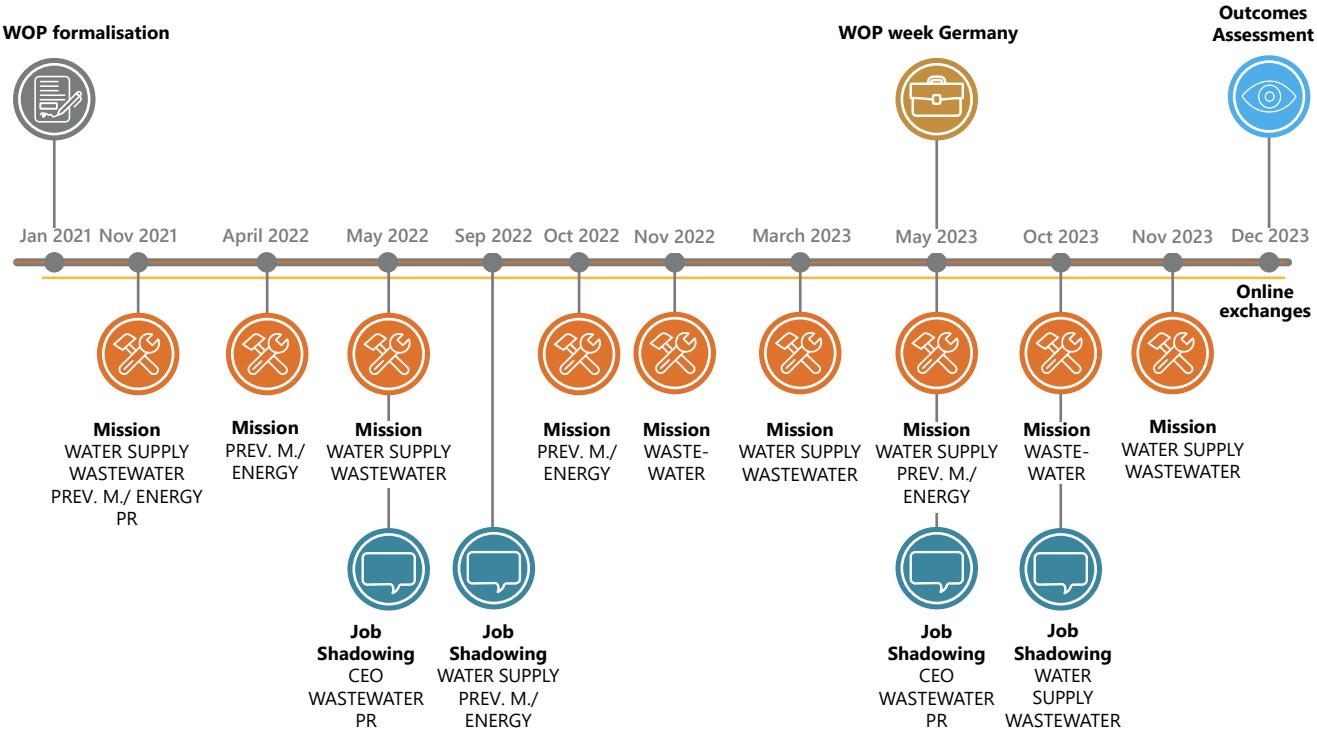


Figure 1: WOP Timeline

WOP Outcomes (Chapter 3)

The WOP resulted in capacity outcomes at individual, operational and strategic level. The table below provides a visual summary of the key outcomes achieved throughout the WOP for each of the work packages. Details on the achieved capacity outcomes can be found in Chapter 3 "Progress towards results by work area" under 3.1, 3.2, 3.3 and 3.4.

Organisational level		Capacity outcome	Work Package 1: Water Supply	Work Package 2: Wastewater and Asset Management	Work Package 3: Management and Preventive Maintenance	Work Package 4: Public Relations
INDIVIDUAL		Enhanced knowledge and skills	40 people, see p. 18	9 people, see p. 21	69 people, see p. 23	1 person, see p. 23
		Increased motivation	See p. 19	See p. 21		
		Applied new knowledge and skills	13 people, see p. 19	9 people, see p. 21	See p. 23	1 person, see p. 23
OPERATIONAL		Improved data and information	See p. 19	See p. 21		
		Better systems	See p. 19	See p. 21	See p. 23	
		Improved organisational structure	See p. 19			
		Better equipment/ infrastructure	See p. 19	See p. 21		
		Improved management practices				
		Improved working routines		See p. 21		
STRATEGIC		Improved vision, mission, strategy	See p. 19	See p. 21		
		Additional resources	See p. 19	See p. 21		
		Improved external relations				
		More supportive organisational culture				
		Better leadership				
OTHER		Any other Outcomes				

Figure 2: Capacity Outcomes on organisational level of the four Work Packages

Key Outcomes Achieved

- **Enhanced knowledge and skills (WP 3):** 36 operational staff were reported to have gained knowledge in preventive maintenance tasks, 16 staff on general plant maintenance and 17 staff gained knowledge on planned maintenance of electrical systems.
- **Applied knowledge and skills (WP 1):** 13 staff are applying the new knowledge in their day-to-day work.
- **Better systems (WP 2):** Several new systems/procedures are in place: Investment Master Plan and related procedures, wastewater sampling and testing procedure, asset remote monitoring system, an excel-based pilot Enterprise resource planning (ERP) system for resource monitoring, analysis and decision making and a process for asset condition assessment.
- **Better systems (WP 1):** District Meter Area (DMA) created for the pilot area Pollen, improved GIS Webapp QGIS was developed – GIS data is now available for all staff with a smartphone.
- **Additional Resources (WP 1):** The reduction from 41% to 19% of NRW in the pilot area entails an operational saving that has not been quantified yet.
- **Better equipment/infrastructure (WP 2):** Among others, 12 pump sealings, a water tank in Chibombo, a pump, and a car for the NRW team were purchased from the grant within the utility partnership.
- **Improved vision, mission, strategy (WP 2):** LgWSC shared that a lot of the gained knowledge through the WOP is currently used to develop the mid-term review process of the Strategy 2021-2026.

Partnership strength (Chapter 4)

When asked about the quality of their collaboration, partners agreed that the WOP (Water Operators' Partnership) had matured. The partnership design was considered clear from the outset, with a positive emphasis on the project's flexibility. Partners reported that roles and responsibilities were well defined from the beginning, with the initial exception of the GIZ development advisor's role. However, by the time of reporting, that role had been clearly understood and the support was highly appreciated. LgWSC particularly valued the day-to-day, on-the-job support provided by the German partners. Partners also expressed a strong interest in longer and more frequent working visits. However, at the time of reporting, the German partners lacked the capacity to accommodate this. Procurement processes were noted by partners to be overly lengthy. Despite this, Zambian partners shared that following the implementation of the WOP, employee enthusiasm and willingness to engage had grown significantly. All partners agreed that building trust took time, but they now feel able to engage with one another transparently.

Partners jointly at IFAT 2022 | 06/2022

Photo: Gelsenwasser

1. INTRODUCTION

The German Federal Ministry for Economic Cooperation and Development has set up the 'Utility Platform for strengthening partnerships of municipal utilities worldwide', as a pilot project running from 2019 until 2024. Another project phase will be starting in July 2024, running until June 2027. The initiative supports partnerships between municipal utilities in Germany and its partner countries to support the implementation of the Sustainable Development Goals (SDGs) and the New Urban Agenda. The partnerships of the pilot project follow principles of peer-support with the aim to build capacity on a not-for-profit basis to enable better service delivery. These principles were derived from the Global Water Operators' Partnerships Alliance (GWOPA), which was founded in 2009.

This WOP project is one of nine international WOPs, three solid waste operator partnerships and 16 solidarity partnerships with Ukraine supported under the current pilot project. This report summarises the design and implementation of the project and identifies the main outcomes derived from the partnership in each work package. It should be noted that the WOP described in this paper has only been in place since 2021 and is still in their early stages.

The current report describes key project characteristics, progress made and outcomes in each of the working packages and evolution of the partnership strength. Multiple methods were used to collect the relevant data. These are:

- documentary review, including project proposal and annual reports, budgets, mission reports and operational plans,
- semi-structured interviews with key informants from the projects mainly coordinators,
- online surveys directed to both partners requesting their perception about outcomes achieved, and
- online dedicated focus group discussions (workshops) per work package with participants from all partners engaged in each work package.

The methodology applied to assess the capacity outcomes (Chapter 3) and partnership strength (Chapter 4) was inspired by the WOP-tailored methodology design by GWOPA and embedded in the web-based Partnership Management Platform (PMP).

The PMP methodology for capacity outcome assessment is an adapted version of the 'Performance and Change Model' by Burke and Litwin (1992).

Capacity is unpacked into individual, operational and strategic capacity outcomes:

Organisational level		Capacity outcome	Description
INDIVIDUAL		**Enhanced knowledge and skills**	Availability of human resources and the extent to which they have the required skills and knowledge to accomplish the work they have been assigned to.
		Increased motivation	Proactive tendencies to move towards goals, take needed action and persist until satisfaction is attained.
		Applied new knowledge and skills	Active use of the newly acquired knowledge and skills in daily practices.
OPERATIONAL		**Improved data and information**	Updated information on the conditions of any part of the water utility system, be it related to physical infrastructure (e. g. pipes), management processes, (e. g. customer database) or otherwise.
		Better systems	Standardised policies, procedures, management and operational information systems and mechanisms that facilitate work.
		Improved organisational structure	Arrangement of functions and people into specific areas and levels of responsibility, decision making authority, communication and relationships to assure effective implementation of the organisation's mission and strategy.
		Better equipment/ infrastructure	Tools and equipment necessary for utility operations and basic infrastructure for the business processes (e. g. water production and distribution).
		Improved management practices	Practices that managers use to mobilise the human and material resources at their disposal and advance the strategy, including managerial behaviour, work etiquette, professionalism, planning, communication and control.
		Improved working routines	The way the tasks are executed daily in consolidated routines.
STRATEGIC		**Improved vision, mission, strategy**	The vision outlines the company's goal for the future and the values that define it. A mission states how the company will achieve its vision. Strategies are the ways in which the mission and vision will be reached.
		Additional resources	Additional (financial) resources via new acquisition or operational costs savings.
		Improved external relations	Improved communications with external stakeholders and customers. This includes stakeholder relations that the operator has forged and how such networks support the achievement of its strategy.
		More supportive organisational culture	Collection of rules, values and principles that are enduring and guide organisational behaviour.
		Better leadership	Managerial staff providing overall organisational direction and serving as behavioural role models for all employees.
OTHER		**Any other Outcomes**	

Figure 3: Overview of methodology assessing the Capacity outcome of WOPs

The **Partnership Strength** of the project is analysed in Chapter 4 by looking into several aspects such as partnership design, clarity of roles and responsibilities, meeting processes and representation, working processes, resources, trust, transparency and teamwork and flexibility/adaptability of the project. The partnership's strength methodology follows 'Partnership Health Check' tool categories developed by Prescott and Stibbe (2017).

At the fact-finding mission partners inspect the facilities of LgWSC | 11/2021

Photo: GIZ

2. THE WATER OPERATOR PARTNERSHIP (WOP)

This WOP includes Lukanga Water Supply and Sanitation Company Limited (LgWSC), supported by two German water operators Gelsenwasser (GW) and Emschergenossenschaft and Lippeverband (EGLV). The project started with one more German partner WABAU from Baruth (Mark) but they left one year after the beginning of the project.

Gelsenwasser undertakes the overall technical, administrative and financial coordination of the WOP-project. Each Work Package (WP) has a focal point from a German water operator and a focal point from the local partner. Besides, LgWSC is supported by an international development advisor from GIZ since early 2023. The development advisor provides local coordination and technical support i.e. supporting LgWSC in the development of proposals or supporting in the development of the Investment Master Plan. More details on how the project implementation coordination takes place are included in Chapter 4 *Partnership Strength*.

2.1 WOP Partners

Lukanga Water Supply and Sanitation Company Limited (LgWSC)**,** is one of the 11 commercial utilities in Zambia formed as part of the Government supported water sub-sector reforms to improve and commercialise water and sanitation service delivery in Zambia. LgWSC was incorporated as a private company in 2006 and is fully owned by 11 local authorities in the central province of Zambia. LgWSC currently serves a population of about 444,000 people and has 29,493 water and 12,101 sewerage connections. It has a staff base of 261 employees and a revenue of € 2.4 million (annual account 2019).

GELSENWASSER (GW) is one of the largest operating companies in the water sector in Germany with more than 5,500 employees in the group and a revenue of € 1,938.8 million (annual account 2019). In addition to drinking water and wastewater, the group is also active in the energy sector (electricity, natural gas) and in various individual services. With a large majority held by the municipalities of Dortmund and Bochum and based in Gelsenkirchen (North Rhine-Westphalia), the company has various international experiences, including water-related ones, in Poland, the Czech Republic, France, Algeria and in direct cooperation with development aid in Kazakhstan and Kosovo (beneficiary).

Jointly, **EMSCHERGENOSSENSCHAFT and LIPPEVERBAND** (EGLV) are the largest publicly owned and non-profit wastewater companies in Germany. EGLV operates more than 800 sites and plants for water management in the catchment areas of the rivers Emscher and Lippe, including 59 wastewater treatment plants with a capacity of up to 2.4 million Population Equivalent (PE) and more than 300 pumping stations with flow rates of up to 42 m^3/s. The main tasks are wastewater discharge and treatment, flood protection, groundwater management, settlement of claims caused by hard coal mining, river restoration and protection of ecosystems.

EGLV

Emschergenossenschaft
Lippeverband

Partners jointly drive to a puddle where a water leakage is assumed to add it into the GIS-map on their mobile devices | 2023

Photo: Gelsenwasser

2.2 Timeline of the partnership

The project was formalised in January 2021 through the contract between GIZ and Gelsenwasser. The total resource envelop for the WOP is € 815,740.

The project timeline includes a total of nine missions, four job shadowing visits and one networking event in Germany.

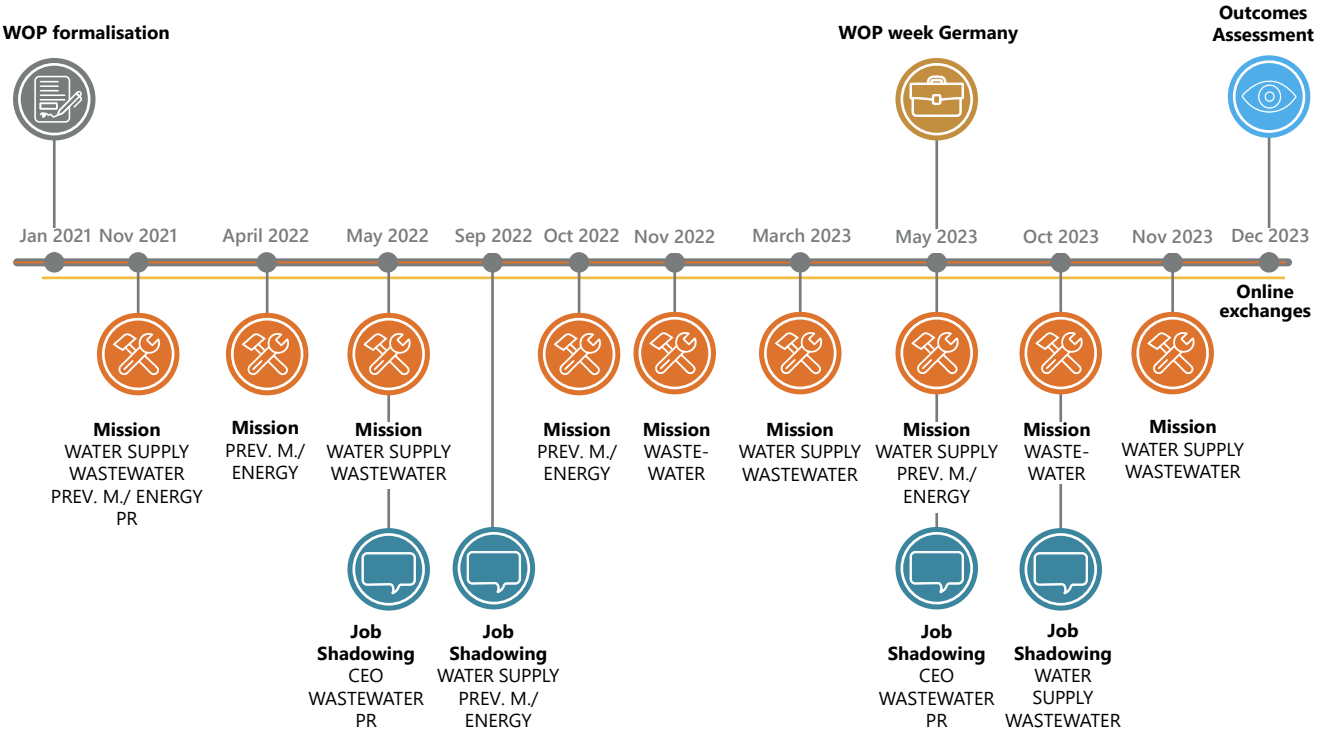


Figure 1: WOP Timeline

More details on the duration of each event are included in this list:

- Contract between GIZ and Gelsenwasser: January 2021
- Fact Finding Mission: 16 - 25 November 2021
- Mission on preventive maintenance and energy management: 23 April - 11 May 2022
- Mission on water supply and wastewater: 7 May - 1 June 2022
- Job shadowing with CEO on wastewater, PR: 28 May - 4 June 2022
- Job shadowing on Water Supply, Wastewater, Preventive maintenance and energy management: 18 - 28 September 2022
- Mission on preventive maintenance and energy management: 06 - 23 October 2022
- Mission Wastewater: 19 - 26 November 2022 (on-site: 21 - 24 November)
- Mission Water supply and Wastewater: 11 - 18 March 2023
- Job shadowing visit on topics of CEO, Wastewater and PR: 20 - 28 May 2023
- Mission Water supply: 30 April 30 - 8 May 2023
- Mission Preventive maintenance and energy management: 27 April - 13 May 2023
- Mission Wastewater: 2 - 8 October 2023
- Job shadowing visit Water supply and Wastewater: 21 - 29 October 2023
- Mission Water supply and Wastewater: 4 - 13 November 2023

3. PROGRESS TOWARDS RESULTS BY WORK AREA

In this Chapter, the four work packages are being looked at regarding the implementation of activities and the outcomes achieved:

Work Package 1: Water supply, supported by GW,
Work Package 2: Wastewater and Asset Management, supported by EGLV,
Work Package 3: Energy Management and Preventive Maintenance, supported by GW,
Work Package 4: Public Relationships, initially supported by WABAU, later supported by GW.

3.1 Work Package 1: Water supply

Implementation of activities

Development of an initial assessment and proposals for NRW reduction

The drinking water group developed a concept to reduce the amount of water lost in the Kabwe region. Physical losses can be avoided in a targeted manner by carrying out repairs promptly. Also, this would contribute to LgWSC's goal of ensuring the water supply for at least 20 hours a day. Many leaks are open and visible to everyone – the damage ranges from moderate to severe. In particular, the rubber seals between the asbestos pipes are a weak point. A first approach is to replace them and repair the connections. There are also visible leaks in drinking water tanks. Usually, these are only repaired when the extent of the leak increases and the supply is severely impaired. The drinking water working group has also carried out pressure

measurements in the distribution network. The pressure level there is below 2 bar. A further reduction in pressure using pressure management equipment to avoid losses is therefore hardly possible (current LgWSC strategy). It is also noticeable that the workforce for maintenance and repair of the network faces enormous challenges. There is a lack of vehicles for transporting personnel, materials and tools. Furthermore, there is no personal protective equipment. The lack of equipment and materials is a major problem in LgWSC. Suitable tools and equipment, such as shovels and spanners as well as pumps and mini excavators, are either non-existent or inadequate. There are also hardly any spare parts such as clamps, pipework, etc. in stock to enable rapid repair of damage. The already difficult conditions are exacerbated by large areas that have never been recorded in the GIS as well as inaccurate and outdated GIS data. This makes planning and carrying out repairs significantly more complicated. The problems described above mean that the operating units are not able to ensure the supply performance by reacting to faults and repairing them promptly. There is no forward-looking planning and maintenance of the supply systems.

Design, implementation and supervision of the NRW pilot to reduce water losses in Pollen

The concept was integrated into LgWSC's NRW action plan and is to be rolled out to other zones. The main objective of the work in this WP is to reduce the NRW in LgWSC. Partners selected the area of Pollen to conduct a pilot project. They created a District Meter Area (DMA) at Pollen, in which several activities were implemented to map and reduce physical losses in the network. A network audit was conducted. Technical reports and map updating is ongoing. Four bulk metres were installed. Visible leaks are being mapped, repaired and recorded in the GIS system together with an indication of what caused the rupture. GW brought pressure loggers from Germany to conduct pressure measurements in the network. Suitable pressure points were identified, and pressure measured. The pressure measured is within an acceptable range with less than 2 bar. Two new positions have been assigned for NRW reduction: one NRW coordinator and a GIS engineer. 30,000 Euros of the project budget were assigned to buy equipment and materials such as metres at an early stage of the project. A lot of metres need to be replaced.

Partners find broken sealings at the fact-finding mission at LgWSC | 11/2021

Photo: GIZ

10% of the metres were tested within the pilot area and 50% of those are giving errors of either under registering or over registering. **An initial estimation of NRW before and after the measures was taken in the pilot area. It went from 41% to 19%**, but partners agreed that new measures need to be taken to ensure that the estimates are accurate. Partners identified the lack of basic equipment and slow procurement process as obstacles for progress in the NRW reduction.

GIS improvement

Support with the digitisation of old paper plans is being provided and the GIS system is being updated. A rezoning has taken place to match physical and commercial zones and integrate all the relevant information in the GIS system. Four staff members were trained on data management and data quality in the webapp QGIS and the first data backup of LgWSC GIS data was carried out. Webapp QGIS was developed – GIS data is now available for all staff with a smartphone.

Using the GIS WebMap on a mobile device | 2023

NRW reduction Strategy development

LgWSC highlighted the value of the knowledge and skills gained through the NRW approach adopted and shared that the lessons learned are being incorporated in the development of a NRW Strategy for the whole water utility.

Other activities implemented as part of the Water supply Working Package

- Support in the development of a proposal plan for Kabwe central hospital for wastewater and drinking water connection to LgWSC network (4000 costumers)
- Support in the development of a proposal of expansion of the network in Kapiri Mposhi submitted for Swed fund
- Development and discussion of a concept for chlorination at the Bwatcha tank
- Training on safety at work, working with asbestos, and surveying has been done with 15 participants
- Drawing up a concept for repairing the damage to the Mukubeko transmission pipeline
- Procurement of 12 pump sealings, paid by the WOP grant, preventing fluid leaks and keeping contaminants out of the system. A total of six staff members were trained to install them
- Procurement of equipment such as sealings, GMS control units, tanks, cars, test kits, among others.

Equipment procured

A water tank in Chibombo, a pump, and a car for the NRW team was purchased from the grant within the utility partnership. The installation is scheduled for January 2024.

Outcomes achieved

Individual level

- **Enhanced knowledge and skills:** LgWSC reported that 15 staff members had improved their knowledge and skills on NRW reduction. Some of the topics are NRW reduction measures, safety, working with asbestos, surveying (trained 15 staff), pump sealing installation (six trained staff), data management and data quality in the webapp QGIS and the first data backup of LgWSC GIS data was carried out (four staff).

- **Increased motivation:** They also shared that the motivation has increased considerably, and that they value being considered for exposure visits to the partner utilities in Germany very positively.
- **Applied new knowledge and skills:** 13 staff members are applying the new knowledge in their day-to-day work.

Operational level

- **Improved data and information:** Most of the work conducted in the WP Water supply focussed on getting more accurate data of the water distribution network.
- **Better systems:** District Meter Area (DMA) created for the pilot area Pollen, improved GIS Webapp QGIS was developed.
- **Improved organisational structure:** Zoning of the system to align distribution and commercial areas is ongoing and two new positions have been assigned for NRW reduction: one NRW coordinator and one GIS engineer.
- **Better equipment/infrastructure:** Among others, 12 pump sealings, a water tank in Chibombo, a pump, and a car for the NRW team was purchased from the grant within the utility partnership.

Strategic level level

- **Improved vision, mission, strategy:** LgWSC shared how all the lessons learned through the peer-to-peer work are being incorporated in the development of a NRW Strategy for the whole water utility.
- **Additional resources:** The reduction from 41% to 19% of NRW in the pilot area entails an operational saving that has not been quantified yet.

3.2 Work Package 2: Wastewater and asset management

Implementation of activities

Wastewater treatment plant Kapiri Mposhi

The Wastewater treatment plant Tazara at Kapiri Mposhi was out of use for over 10 years. Partners jointly identified areas that required improvements. LgWSC has improved to the point that the plant is now operational, serving 5,600 people. To further improve the operation of this plant, some required investments have been included in the ongoing development of the Investment Master Plan of LgWSC. LgWSC has started to develop an overall Master Investment Plan for the utility with the development advisor including an update of the asset register, risk management, renewal strategies and renewal plans.

Pumping station management

LgWSC has improved data management thanks to more accurately quantifying the produced sewage volume through an estimate based on energy consumption metering. Cleaning and maintenance routines are well accepted and established in pumping station 1.

Wastewater quality testing

Wastewater flows have started to be tested and monitored. Two people were trained on wastewater sampling in the laboratories. This activity has started with a few parameters but others are to be added to comply with the Zambia Environmental Management Agency (ZEMA) regulations. A wastewater sampling procedure that includes how to collect and analyse the samples among others is being developed to fulfil the regulations from ZEMA.

Asset management and investment planning in both drinking water and wastewater

All managers received training on asset management. A process for asset condition assessment is being implemented. A form has been proposed and it is being used to record asset conditions. Additionally, an asset policy for the utility is under development. A training on master investment planning was conducted with eight participants. The information on investment planning for the first district, Kapiri Mposhi, which is LgWSC´s second largest, is planned to be finished in Q1 2024. During 2024, the seven other branches will be included in the plan. Only the most developed utility out of the 11 utilities in Zambia, Lusaka Water, has a Master Investment Plan so far. LgWSC greatly values the skills and knowledge to conduct this relevant activity, avoiding the dependency of consultants. This has meant a shift in proactiveness and planning horizons regarding the assets. Using the asset condition assessment approach, LgWSC is currently planning for asset replacement two years in advance, with the goal of extending this planning horizon to 15 to 20 years. As part of this, they are applying a mini-assets replacement approach, mostly for pipes, based on key criteria such as age, condition, and material.

Asset remote monitoring system

The first remote monitoring system has been installed through Global System for Mobile Communication (GSM) control units and three people have been trained on its installation and operation. The system has been installed at the three pumping stations and this helps keeping better records on how the pumps are working. The system has also been installed in boreholes, which allows an early warning of down-time of boreholes (power off). Before, LgWSC would only notice a borehole was not working at night when the water levels were not rising.

Maintenance management process

An Enterprise resource planning (ERP) staff feedback solution was recently implemented in a simple excel file as part of a three month long maintenance monitoring pilot that is ending in January 2024. The pilot includes the information of one branch, and it is in an iterative stage of improvement with feedback from main users. This system records a lot of information about the maintenance tasks such as staff allocation, time needed, transport time, etc. The analysis of this information will help to optimise operations which is expected to generate operational savings in the long run. Once the pilot ends, the usefulness of this tool will be assessed, and the decision will be made whether to continue using it and extend its use to other branches of the organisation.

At the fact-finding mission partners inspect a pumping station of LgWSC | 11/2021

Repairs taken place

Some repairs that have taken place as part of the WOP include the Kasanda Police elevated storage water tank, impacting 1,600 people living in this area, to reduce water losses.

New equipment

Some of the equipment procured through the WOP is a new operational van. The reparation of the drinking water tank in Chisamba improved the living conditions of 3,500 people in an area struck by a cholera hotspot the year before. The procurement of a pump at the pumping station at Mulungushi Dam in Kapiri Town improved the living conditions for 65,000 people.

Strategic planning

The Strategic Plan 2021-2026 is currently undergoing a mid-point review and development. The new knowledge and skills acquired through the peer-to-peer work is strongly influencing this review.

Outcomes achieved

Individual level

- **Enhanced knowledge and skills:** Nine LgWSC´s staff members reported to have gained extensive new knowledge and skills, mainly on the diagnosis and action planning for the non-operational WWTP at Kapiri Mposhi, pumping stations maintenance, wastewater quality testing in the lab, asset management at management level and asset remote monitoring systems development of asset registers, asset condition assessment and investment master planning.
- **Increased motivation:** Staff reported that the direct applicability of the knowledge and skills gained is really motivating employees in their day-to-day job.

Operational level

- **Improved data and information:** Information about the LgWSC system has been greatly improved. Some examples are the detailed information on the assets, real time information available about the pumps and boreholes operation and data on wastewater quality.
- **Better systems:** Several new systems/ procedures are in place: The Investment Master Plan and related procedures, wastewater sampling and testing procedure, an asset remote monitoring system, an excel-based pilot Enterprise resource planning (ERP) system for resource monitoring, analysis and decision making and a process for asset condition assessment.
- **Better equipment/infrastructure:** Tools and safety clothing for the Tazara treatment plant in Kapiri were acquired: Global System for Mobile Communication (GSM) control units, a new operational van, reparation of a drinking water tank and the procurement of a pump for an important station.
- **Improved working routines:** Improved working routines were consolidated for cleaning and maintenance of the pumping station PS1, among others: wastewater sampling and testing, asset remote control, asset condition assessment and asset maintenance management process (pilot).

Strategic level

- **Improved vision, mission and strategy:** LgWSC shared that a lot of the gained knowledge through the WOP is currently used to develop the mid-term review process of the Strategy 2021-2026.
- **Additional resources:** The application of the asset management monitoring system through the pilot programme and its potential roll out throughout the organisation are expected to be leading to operational efficiencies and related cost savings despite estimates have not been calculated at this early stage.

Inspection of the Mulungushi Dam during the fact-finding mission | 11/2021

Photo: GIZ

3.3 Work Package 3: Energy Management and preventive maintenance

Implementation of activities

The great limitations in terms of equipment made it very difficult to focus on energy management. Therefore, the decision was made to redirect the support of this WP towards preventive maintenance instead. A lot of the operational staff members do not have access to computers and at times cannot read or write, which lead to on-the-job training being the key supporting activity in this WP. Some of the tasks addressed via on-the-job training were cleaning of pipes, generators, low voltage equipment, protection of equipment in the pumping house via equipping it with doors and windows. Approximately 36 people benefited from the on-the-job training. A workshop on planned maintenance also took place with 10 participants from LgWSC. A preventive maintenance checklist was designed for daily, weekly and monthly maintenance tasks which included tasks to be implemented in pumping stations and workshops. The checklist was printed and protected with a plastic for easy access and use.

A total of 17 plant operators (six women) have been trained to train other employees with the focus on planned maintenance of electrical systems ("Train the Trainer').

Outcomes achieved

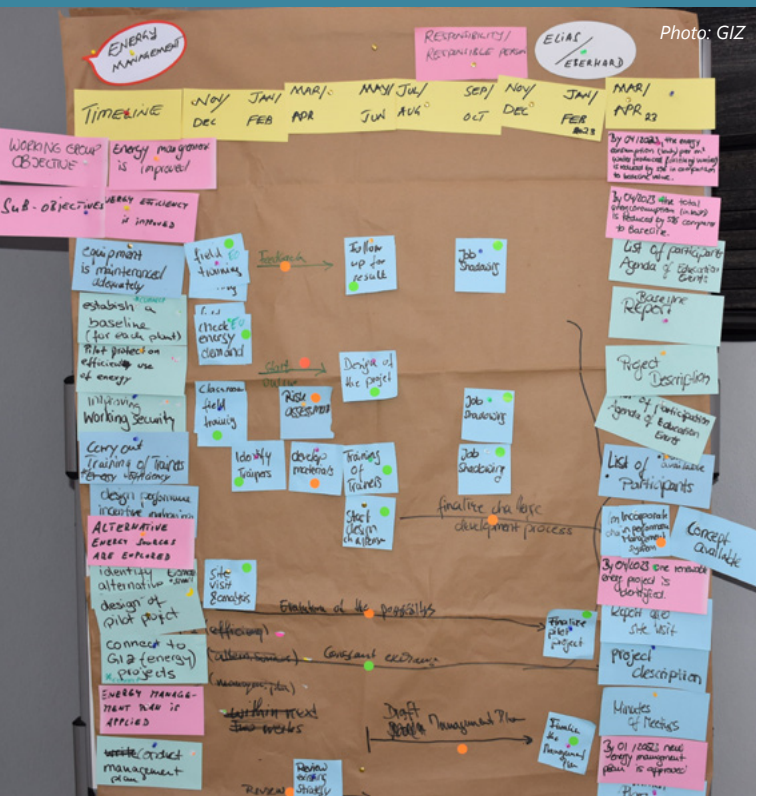
Individual level

- **Enhanced knowledge and skills:** 36 operational staff members were reported to have gained knowledge in preventive maintenance tasks, 16 staff members on general plant maintenance and 17 staff members gained knowledge on planned maintenance of electrical systems.
- **Applied new knowledge and skills:** Most of the new knowledge and skills gained are hands on and were reported to be applied.

Operational level

- **Better systems:** A preventive maintenance check list was designed for daily, weekly and monthly maintenance tasks regarding pumping stations and workshops.

Joint workshop during work trip to Zambia | 11/2021



3.4 Work Package 4: Public Relations

Implementation of activities

The main activities reported in this WP is the support to the water clubs in one school. The focus lay on sensitisation of children on handwashing and hygiene practices and donation of handwashing materials and other simple materials for children like crayons. Additionally, the WP worked on support with social media (LinkedIn), support with company image related branding, the visibility of rehabilitation and repair works (e.g. pump station rehabilitation, repairs and painting), and a public campaign to encourage clients to pay their bills on time. As part of the communication efforts, the WOP project was presented in the Zambia Water Forum and Exhibition (ZAWAFE). It was agreed that partners in this working group need to meet to jointly identify main objectives for this work package.

Outcomes achieved

Individual level

- **Enhanced knowledge and skills:** One staff member gained knowledge and motivation on social media.
- **Applied new knowledge and skills:** One staff member is integrating the newly acquired knowledge and skills into their working routine.

4. PARTNERSHIP STRENGTH AND LESSONS LEARNED

Partners shared that time helped them to get to know each other and to optimise the efficiency of the collaboration. They all reported to have strong partnerships at the point of the assessment.

Partnership design

Partners stated that the partnership design was clear from the start of the project. An initial broad definition of the project activities allowed partners to jointly define priorities along the way. This feature was very positively valued by partners. It allowed partners to make plans together based on priorities jointly identified through peer-to-peer interaction.

A disagreement between what the GIZ programme could accept to cover as per diem for people travelling abroad and the internal rules of LgWSC for people travelling to Germany was reported to hinder the number of exposure visits of staff from LgWSC to Germany. The recommendation was given to reach an agreement between partners upfront as part of the partnership creation processes on these types of aspects.

LgWSC shared that support is being received in several relevant areas for Lukanga. However, the different working environments in Germany and Zambia do not allow for the German partners to support in other areas such as service provision in rural areas, which is a new mandate of LgWSC. A possibility to assist in getting support for this area could be to identify other water utilities in the South that have gone through the process of enlarging their mandate to rural areas and try to establish exchanges with them. This would require sufficient flexibility at programme level to allow for additional partners to be part of the WOP along implementation if considered sufficiently relevant.

Roles and responsibilities

Even though the nature of this project was new for LgWSC, the concept and roles of each partner were reported to be clear from the beginning. A GIZ development advisor was placed at LgWSC in 2023. She is an engineer with a strong background in asset management and LgWSC staff member were confused that she was not taking over certain LgWSC tasks. It took some communication efforts to build clarity that in a WOP, the emphasis is not on taking over certain tasks but rather on supporting with the tasks so that the capacity to do it resides in the supported water utility. Partners have clarity

on her role and reported high appreciation on the added value that she brings to the project both on coordination and technical support. In the WP Public Relations, LgWSC was initially receiving support from a German partner that left the project. That, together with an understaffed PR team in LgWSC, has limited progress in this work package.

Meeting processes

LgWSC shared that the day-to-day on-the-job support from the German partners is extremely valuable. They claimed that they would like to receive more frequent visits from German peers and that their stays should be longer. German partners shared that even if they would like to go to the project site more often and for longer periods, they must attend their workload back in Germany. The team from EGLV supporting the wastewater work package shared that they have recently engaged a new staff member from EGLV to increase the inputs and presence in the project site.

Work processes

It took time for partners to understand the difference in working culture and communication styles. Partners reported that it took them approximately a year to fully trust each other and work efficiently as a strong team. A member of LgWSC shared that engaging with the peer German water utility in WOP activities usually entails additional work for staff members. While initially not all staff members were inclined to engage in WOP activities, nowadays many are asking how they can engage in the WOP. Staff members value the new knowledge and skills gained through the WOP.

Procurement procedures

Partners stated that the procurement processes were lengthy and complex. This has caused delays in the intended procurement of equipment. In 2023, only 50% of the initially planned procurement materialised due to time running out. In terms of lessons learned for other projects, the recommendation was given to conduct a thorough assessment on procurement rules for both partners and design the best approach to procure with clear steps and roles for each partner at the beginning of the project.

Trust and transparency

Partners shared how time was needed for them to get to know each other and to get to know the WOP model of support. They shared that trust and transparency between partners has positively evolved over time.

Adaptability and flexibility

Partners positively valued the great flexibility built in the project.

Inspection of the supply facilities at LgWSC during the fact-finding mission | 11/2021

Photo: GIZ

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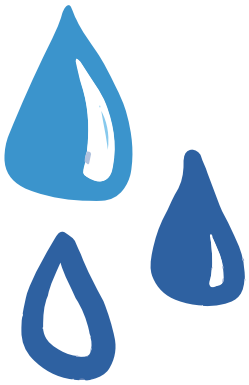

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