Dalit community leader Soniya Devi Saday washing her hands before domestic work.

WaterAid/ Manoj Banaita

The Beacon Project's 'Legacy that Grows' shared learning workshop on Water Utility Management in Nepal

30 November 2023
Hotel Himalaya, Kathmandu, Nepal
Summary report

WaterAid

INTRODUCTION

The Beacon Project in Lahan, launched in 2017, is a unique multi-partnership initiative of the Ministry of Water Supply, Lahan Municipality, Nepal Water Supply Corporation, Anglian Water Alliances and WaterAid, committed to achieve sustainable and equitable municipality-wide water, sanitation and hygiene (WASH) services. The project seeks to strengthen capacity and accountability, deliver sustainable solutions through effective partnerships, and empower the most marginalised communities to access safe WASH services. The project aligns with Sustainable Development Goal 6 (SDG 6), aiming to contribute to increased access to water and sanitation for all by 2030.

The key co-creation strategy outcomes of the project are:

- water-security
- safe clean water
- sanitation with dignity
- sustainable faecal sludge management
- a legacy that grows

To build upon the 'legacy that grows' outcome of The Beacon Project, a half day workshop on 'Water Utility Management in Nepal' was organised on 30 November 2023, at Hotel Himalaya, Kathmandu, in collaboration with Ministry of Water Supply. The objective of the workshop was to disseminate best practices, learnings and knowledge about water utility management as part of the safe clean water outcome of The Beacon Project. There were 44 participants in the workshop including representatives from Ministry of Water Supply (MoWS), Department of Water Supply and Sewerage Management (DWSSM), Nepal Water Supply Corporation (NWSC), development partners and sector experts. This document provides the summary and key points presented in the workshop.

Sushil Kumar Dhimal installs water taps using a wrench in Gudigaun, Lahan-5, Nepal. April 2023.

OPENING REMARKS AND CONTEXT SETTING

Country Director, Tripti Rai, WaterAid Nepal

Ms. Tripti Rai, Country Director, WaterAid Nepal

WaterAid Nepal's Country Director, Ms. Tripti Rai delivered the opening remarks, contextualising The Beacon Project and sharing the workshops objectives, which align with the 'legacy that grows' outcome. The aim behind this overarching outcome is to create a ripple effect, fostering a legacy that continues to evolve and expand, where learnings, progress, challenges and failures are actively shared among stakeholders, partners, and collaborators, helping to accelerate progress towards SGD 6.

The simultaneous adoption of the SDGs and Nepal's constitutional guarantee of water and sanitation rights provided impetus for this initiative. Despite the impact of the Covid-19 pandemic, the efforts continued and in the next seven years, The Beacon Project is dedicated to maximising its efforts in Lahan Municipality, incorporating a business plan for NWSC Lahan, the Municipality's WASH plan with a robust WASH strategy aimed at ensuring universal access. All these endeavours are rooted in a systems approach guided by human rights principles, affirming everyone's entitlement to WASH services from both duty bearers and service providers.

Five key presentations were made during the workshop and a summary of each is provided below.

PRESENTATION 1

LEARNING FROM THE BEACON PROJECT'S PARTNERSHIP MODALITY

Er. Kabindra Pudasaini, Beacon Lead, WaterAid Nepal

While sharing the learning of the sustainable partnership modality adopted by The Beacon Project, Er. Kabindra Pudasaini, showcased how a successful collaborative approach and co-creation strategy can ensure greater accountability and good governance. With each partner delivering on their strategic strength in the project, the project is resilient and partners are committed to their responsibilities, and it is clear that joint efforts have made a difference to the people of Lahan.

There is a project technical team, a project steering committee and a project board, each guided by an agreement of collaboration, with defined roles and responsibilities. He emphasised commitment to a long-term vision, ensuring accountability and system strengthening. There is also a collaborative funding approach from all the partners, developed as one plan and budget, laying the ground for sustained initiatives. Transparency and honesty are key to The Beacon Project's success - sharing of ideas among partners are encouraged and embraced, propelling each other towards achieving our common goal.

He highlighted how The Beacon Project has funded four boreholes for water security and resilience in the Lahan water supply system, another four boreholes were funded by NWSC, and two new boreholes are under construction with Beacon funding currently. Three in-line chlorine dosing stations were established, water quality sampling is conducted regularly, and electromagnetic flowmeters are installed. Drone surveys for GIS mapping have helped improve water resource management, with prioritisation of monitoring and quality control systems.

WaterAid partners for The Beacon Project engaging in a technical session led by Anglian Water, Lahan, Nepal, October 2023.

PRESENTATION 2

IMPROVING WATER UTILITY PERFORMANCE IN LAHAN (NWSC BRANCH)

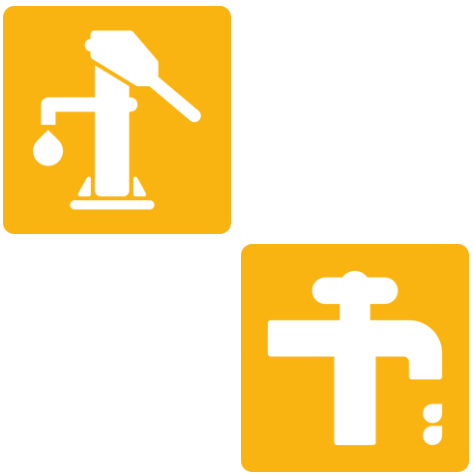
Er. Shirish Rajbhandari, Branch Manager, NWSC Lahan
Mr. Andy Smith, Head of Smart Water, Anglian Water
Er. Dharma Ratna Chitrakar, Beacon Technical Manager, WaterAid Nepal

Several noteworthy results from The Beacon Project were highlighted, including the fact that the percentage of Non-Revenue Water (NRW) has dropped from 45% in 2016 to 36% in 2023, with the opportunity to reach for a further 20% reduction objective by replacing defunct meters. From 2016 to 2023, the number of hours available for water delivery has increased, from five hours of uncertain supply to ten hours of reliable supply hours per day. This was made possible through collaborative working of The Beacon Project with the NWSC team. Interventions were focused on source to tap improvement measures to cope with issues that were creating problems in the NWSC supply system, which included improving understanding of how the system was functioning through regular monitoring of data and allocating different workstreams to address different aspects of the safe clean water outcome.

Lahan has made the switch to digital record-keeping, which has improved quality measures and allowed monitoring of Key Performance Indicators (KPIs) remotely including water supply parameters, customer satisfaction, meters, billing etc,. This visibility of data enables decision makers to focus on specific areas for improvement. Inequality in distribution of water is slowly diminishing and quality of water from tap has improved. The NWSC Lahan system now has proper hydraulic modelling, which enables improved network performance with appropriate pressure management in the pipelines.

In addition, NWSC Lahan has initiated a systematic complaints mechanism which is digitally recorded and can be seen anywhere globally. The Beacon Project also sponsors academic research in partnership with universities in the UK and Nepal to increase understanding.

Ultimately, The Beacon Project is about the people of Lahan, and the partners are united around the common purpose of delivery of safe clean water to these consumers.



PRESENTATION 3

BUSINESS PLANNING IN WATER UTILITIES - EXPERIENCE SHARING FROM NEPAL

Dr. Rajit Ojha, NWASH Chief, DWSSM

Dr. Rajit passionately outlined the comprehensive vision of the Ministry of Water Supply to enhance the operational and management efficiency of water utilities in Nepal, which requires a strategic and long-term business planning approach. Emphasising the key outputs or key performance indicators for these utilities, he underscored the importance of geographical coverage, sufficiency, quality, accessibility, and reliability. The essential processes to bolster these areas must be condensed within five pivotal components of technical operation wing, financial management, commercial operation, user satisfaction and organisational management. Further, he presented the envisioned utility career path approach for the water utilities in Nepal outlining three distinct layers of functionality, performance and efficiency based on set of KPIs. He provided a comprehensive list of examples, shedding light on potential pathways for water utilities in Nepal.

Dr. Rajit Ojha during the interaction session

PRESENTATION 4

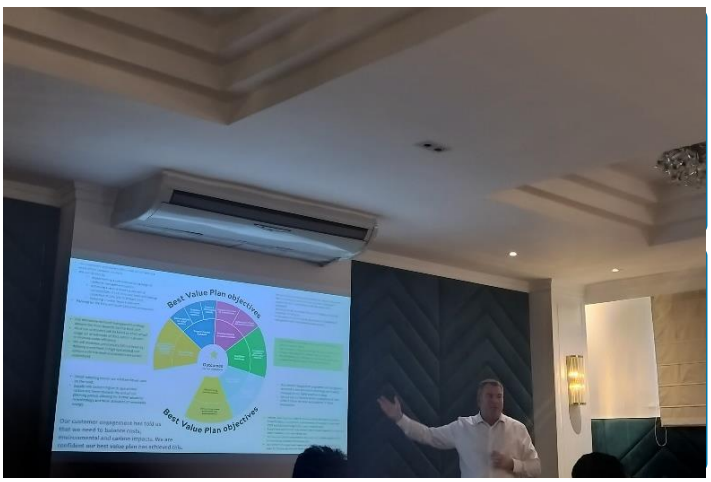
BUSINESS PLANNING IN WATER UTILITIES - EXPERIENCE SHARING FROM THE UK

Mr. Dave Ward, Beacon Board Chairperson and Head of Treated Water Distribution, Anglian Water

Dave highlighted the key aspects of Anglian Water's operations within the UK's strongly regulated water industry. He highlighted regulatory frameworks that monitor performance across various aspects, including quality of water supply (e.g. nutrient levels and metal concentrations) and non-revenue water management.

He emphasised the importance of minimising losses in the distribution system for efficiency and sustainability. He also outlined the company's customer-centric strategy and strong, visionary leadership, considering environmental challenges and adaptable planning approaches. He reiterated the importance of considering capital assets, people and finances when developing long term business plans for adequate investments and sustainable management of assets.

He noted that the above principles are critical for The Beacon Project's success beyond 2023 - ensuring sustainability in Lahan and serving as a blueprint for the wider WASH sector. The business plan for a water supply organisation must be a long-term strategic plan, based on the needs of consumers, stakeholders and the environment, and consider long-term challenges such as the impacts of climate change and large capital investment plans. The business plan must also be affordable and sustainable to both the utilities and consumers in terms of tariff setting. It is imperative to balance the need of the community versus their expectations, and to adopt a sustainable mindset. Long-term objectives must align with challenges posed by climate change along with costs, human resources, and visionary leadership to steer the utility towards sustainable outcomes.



Dave Ward, Anglian Water

CLOSING REMARKS

Dr. Ishwar Prasad, General Manager, NWSC

Dr. Ishwar Prasad extended appreciation to WaterAid Nepal for organising the workshop and emphasised its importance as a forum to enable the invaluable exchange of ideas, experiences and best practices. The Beacon Project has set a unique benchmark, showcasing the power of partnership and cooperative strategies in fostering a resilient approach towards water security, safely managed drinking water and sanitation through sustainable faecal sludge management.

The project has focused on a result-oriented approach, with production now surpassing demand. He stressed that embracing innovative technologies like the electromagnetic flowmeters for water balance calculation, rigorous testing of water quality in laboratories, and checking for water leakages, along with a commitment to capacity building of staff, including training on CCTV camera surveys and water pump designs to the NWSC Branch Managers, reflects the holistic approach of The Beacon Project initiative. These learnings can be leveraged to enhance efforts to serve communities with the vital resource of clean water.

The Beacon Project workshop participants from WaterAid Nepal, NWSC and Anglian Water, pictured in NWSC Head Office, Kathmandu.

FIND OUT MORE

Visit The Beacon Project webpage **washmatters.wateraid.org/the-beacon-project**

Read The Beacon Project learning documents **washmatters.wateraid.org/publications/beacon-project-lessons-partnership-sustainable-wash-Nepal**

Read news coverage on the workshop **aawaajnews.com/social-development-news/the-beacon-project-transforming-water-access-in-lahan**

APPENDIX

Opening remarks

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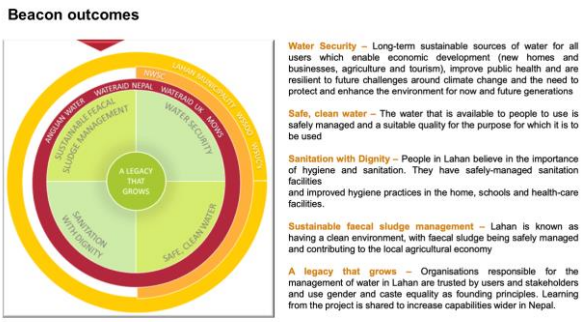

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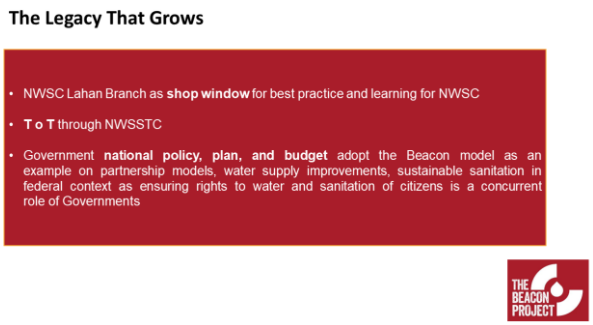

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Presentation 1

1

The Beacon Project

- The Beacon Project is a long-term partnership between the UK water company Anglian Water and its Alliances (AWA), WaterAid Nepal, the Nepal Water Supply Corporation (NWSC), and the Ministry of Water Supply (MoWS) and Lahan municipality.
- The Beacon Project aims to develop and demonstrate holistic solutions that work across communities, local governments and utilities, and ultimately contributes to Nepal's journey towards achieving the Sustainable Development Goals (SDGs).

- Timeframe: 2018 – 2030
- Partners:
  - Ministry of Water Supply
  - Lahan Municipality
  - Nepal Water Supply Corporation (NWSC)
  - Anglian Water & Alliance partners
  - WaterAid
- Location – Lahan Municipality (population ~ 102,031)
- NWSC supplies water in 23 towns in Nepal to a total of 1.34 million customers

2

Partnership modality & Governance

- **Declaration of Intent** between MoWS, AWA, and WaterAid that forms an advisory board to work together
- **Agreement** *(Project Execution)* between **NWSC, LM, and WA** to guide this unique collaboration, roles and responsibilities in this partnership through **Project Steering Committee (PSC)**
- **Project Board** to provide strategic direction for the Beacon Project and approve its Plan and budget and ensure fund flows as agreed.
- **Project Steering Committee (PSC)** to recommend project plans for Board's approval with agreed timescales/milestones; coordinate with S/Hs for execution of Beacon Plan.
- **Project technical team** with a combination of the experts/professionals from AW, WA to provide required support to realize ONE PLAN of Beacon Project

3

Roles & Responsibilities

Ministry of Water Supply (MoWS)	NWSC	Lahan Municipality	WaterAid	Anglian Water and its Alliance Partners	Dalit Jana Kalyan Yuva Club (DJKYC
• Provides strategic input and enables financial support • Joint Secretary of MoWS sits on the Board of NWSC	• Currently delivering and managing water supply in 24 towns, including Lahan • Primary delivery agency for water supply within the Beacon Project, & potential to create a replication effect in other towns serviced by NWSC.	• Leads the Beacon Project Steering Committee (PSC) as its Chair • Delivery of sanitation services • Provide and ensure the necessary approvals at local and provincial levels, and helps to identify and extend services to unserved communities	• Overall project management to ensure delivery of the project plan, as approved by the Beacon Board • Secretarial support to the Project Steering Committee and Board and facilitates the necessary technical support	• Technical resources for Lahan from its alliance partners, including capacity-building through various means such as on-site coaching, designing water and sanitation sector capacity training. • Anglian Water Alliance has been providing strategic leadership	• Works to support Dalit communities and runs drinking water and sanitation programmes in Dalit communities and local schools under the Beacon Project

4

Learnings

- Developing **project governance** that established a **joint long-term vision** and **accountabilities** to deliver an effective project
- **Systems Strengthening** approach for **sustainable WASH** services
- **One Plan** and local/national-international team
- **"Quick wins"** to maintain commitment and engagement by all stakeholders
- Open and transparent Beacon **work culture** helped maintain trust between partners " organization Collaboration "

5

Water Security

- Development of Standard Technical specification on borehole construction and Management with NWSC Board approval and circulated to NWSC branches for implementation
- Constructed **Eight** new boreholes in Lahan (Four Beacon funded ,Two NWSC funded and Two Joint contribution) with hydrological supervision support
- Rehabilitated 6 boreholes; 4 succeeded and 2 boreholes decommissioned.
- Still planning to drill 2 additional new boreholes in 2022/23, using the new specification

Safe, Clean Water

Water quality and treatment

- Installed 3 inline chlorine dosing stations in Lahan.
- Water quality sampling now carried out by an NWSC chemist, and for detail analysis samples sent to certified laboratory of Kathmandu
- Electromagnetic Flowmeters installed to create Distribution Zones

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Inline Chlorine dosing unit

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Presentation 2

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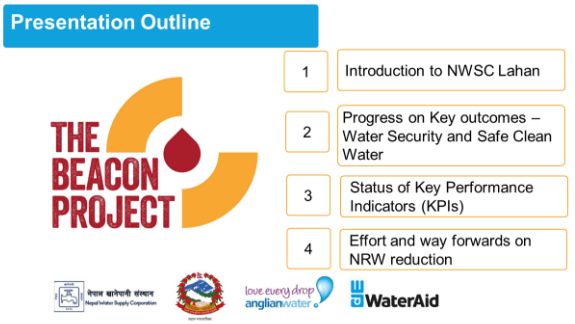

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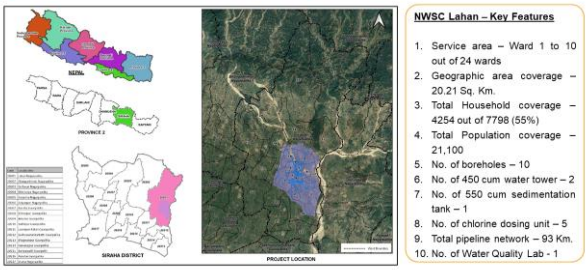

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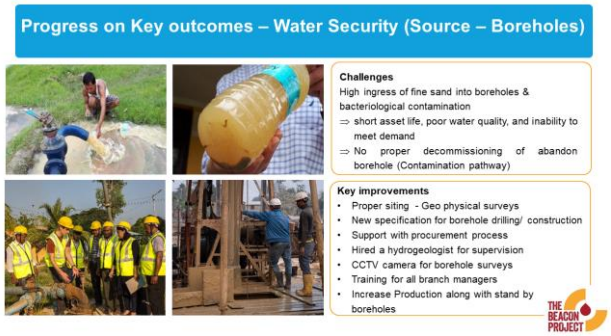

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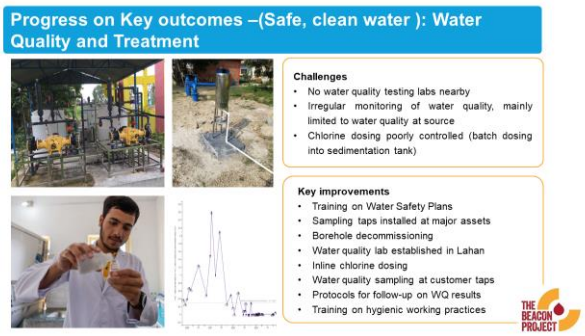

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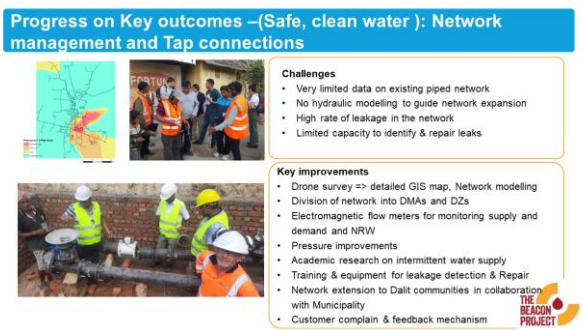

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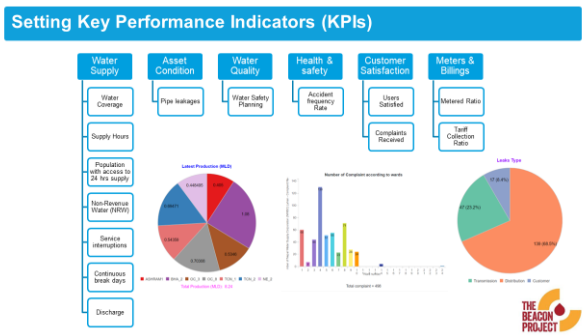

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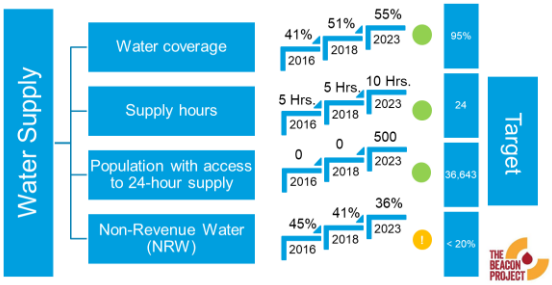
Status of Key Performance Indicators (KPIs)



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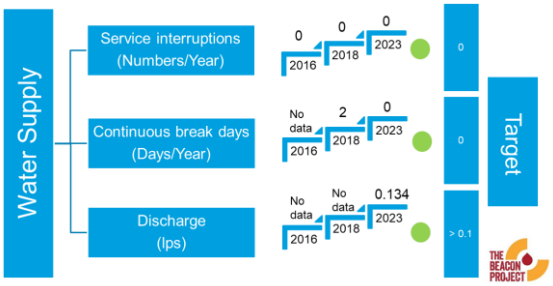
Status of Key Performance Indicators (KPIs)



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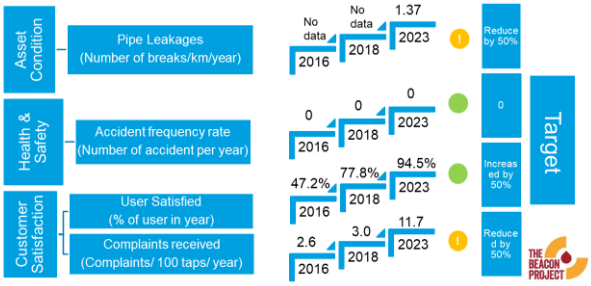
Status of Key Performance Indicators (KPIs)



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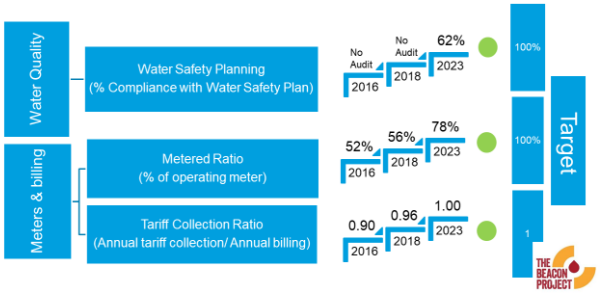
Status of Key Performance Indicators (KPIs)



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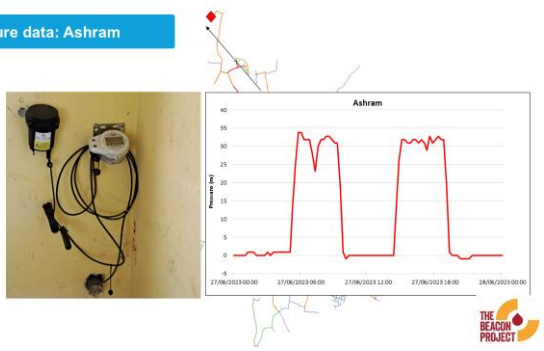
Effort and way forwards on NRW reduction

- 4 BHs developed this year
- 2 BHs planned for 2023/24
- 4.9km of mains laid in 2023
- Sedimentation bypass and WT bypass constructed
- Sedimentation tank cleaned
- 12 pressure logger locations tapped
- Chlorine dosing on each input

14

Pressure data: Ashram



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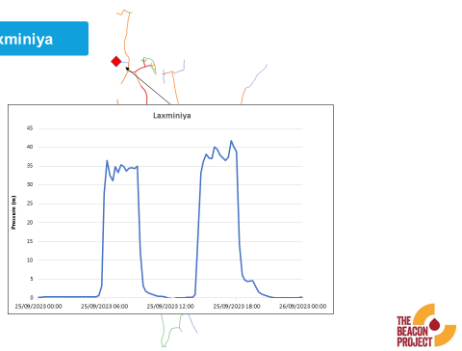
Pressure data: Laxminiya



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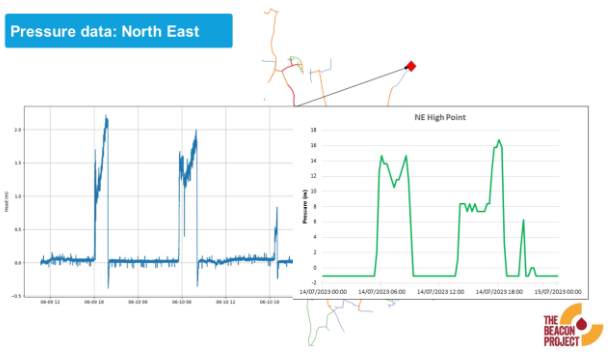
Pressure data: North East



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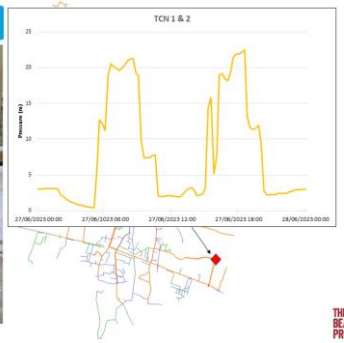
Pressure data: TCN



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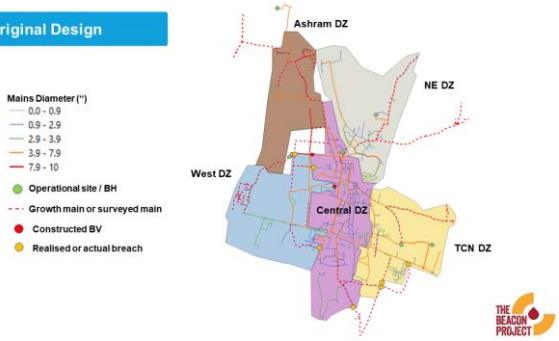
DZ Original Design



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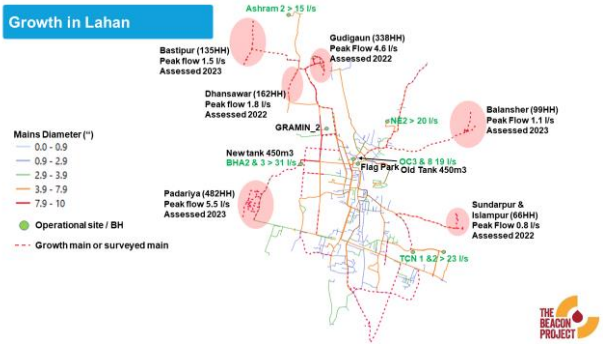
Growth in Lahan



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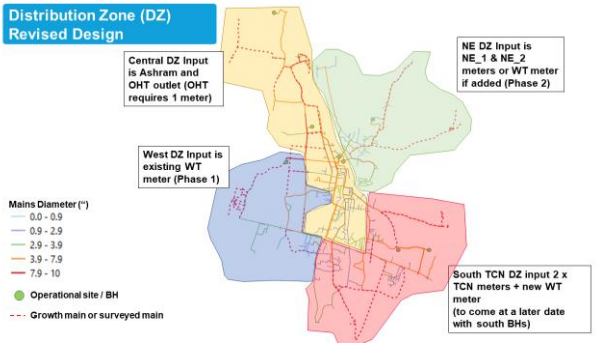
Distribution Zone (DZ) Revised Design



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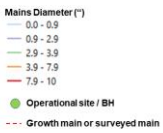
DZ Phase 1

- Create west DZ first
- Requires Gramin_2 in service
- Requires cross connection and 3 x valves
- Accommodates growth in Padariya
- Smaller area to resolve leakage and meter anomalies – demonstrate the value of low UFW upon revenue



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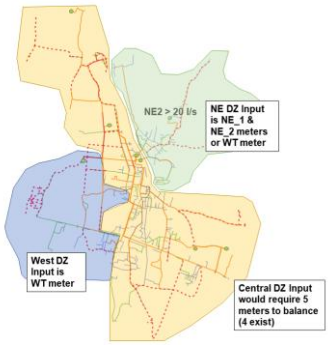
DZ Phase 2

- Create NE DZ second
- Requires method of BH control or additional small WT
- Requires 2 x valves on bridge
- Enables improved understanding of UFW level in 3 x smaller areas



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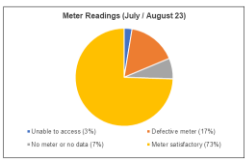
Water Balance Calculations

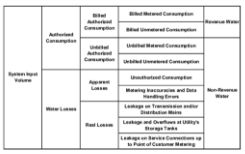
Uncertainty with the calculated NRW level ~ between 36% and 66% depending on data used and assumptions made (see next slide – 4 versions of balance)

Issues with groups of customer meters;:
- 17% of customer meters offline or defective
- 3% of customers could not be read
- 7% of customers had no meter or no data on current meter

4 Versions of balance are:
- 1a > Input estimated from operators and unadjusted meter readings
- 1b > Input estimated from operators and adjusted meter readings
- 2a > Input from EMF totaliser values and unadjusted meter readings
- 2b > Input from EMF totaliser values and adjusted meter readings

To undertake version 1b. and 2b. Balance, estimated 27% of customer usage based on average consumption of 73%





IWA water balance components

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Water Balance Wards 1-10

Version	System Input type	System Input (MLD)	Data Source: Consumption	Consumption (MLD)	NRW (Input – Consumption) (%)
1a	Borehole flowrate and duration estimations from operators	5.29	Unadjusted meter readings	1.81	3.37 MLD **66%**
1b	Borehole flowrate and duration estimations from operators	5.29	Adjusted meter readings*	2.33	2.95 MLD **56%**
2a	Electro-Magnetic Flowmeter totalisers**	3.62	Unadjusted meter readings	1.81	1.81 MLD **50%**
2b	Electro-Magnetic Flowmeter totalisers**	3.62	Adjusted meter readings*	2.33	1.29 MLD **36%**

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Adjusted Consumer Usage: Revenue Implications

The meter readings investigation results in:

- 1,014 customers underpaying (27% of all customers)
- The tariff for consuming '0 m^3' = 110 NPR
- The tariff for consuming 19.87 m^3 = 360 NPR
- The change in revenue if charged correctly:
  = 1,014 x (360-110)
  = 253,500 NPR/month (£1,550 /month)

This is equivalent to a 20.5% increase in revenue.

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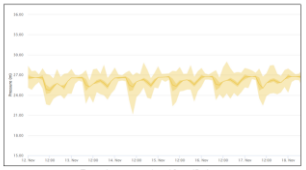
Focus Areas - Networks

- Developing West DZ in 2024
- Flow and Pressure data being housed on the i20 portal – more visibility of data
- Fix / replace defective customer meters
- Improving water balance with more consistent flow data (inputs and outputs)
- Determine how we can extend supply hours and Integrate new BHs
- Planning network growth in parallel with DZ development
- Planning network development in Wards 13, 14 and 24
- Longer term planning for network to support 5-year investment horizon

New BH south of the Highway being drilled



Example pressure trend from i2o logger

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Presentation 3

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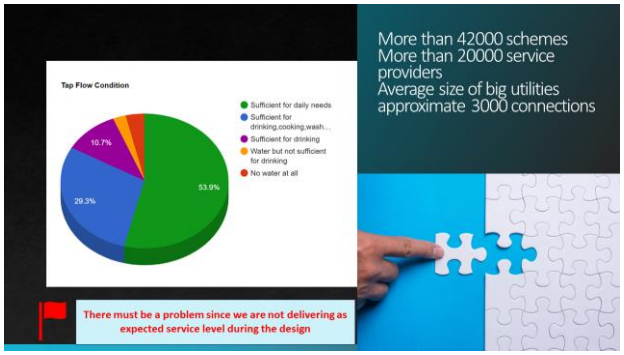

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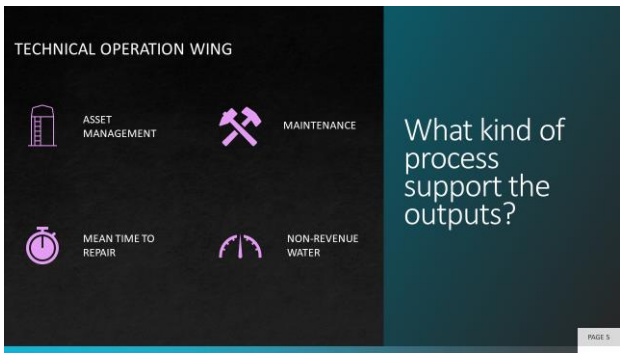

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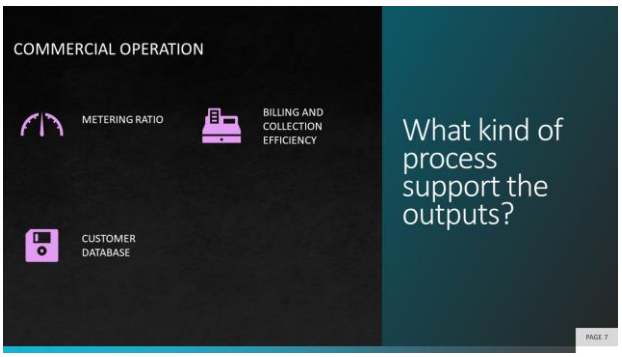

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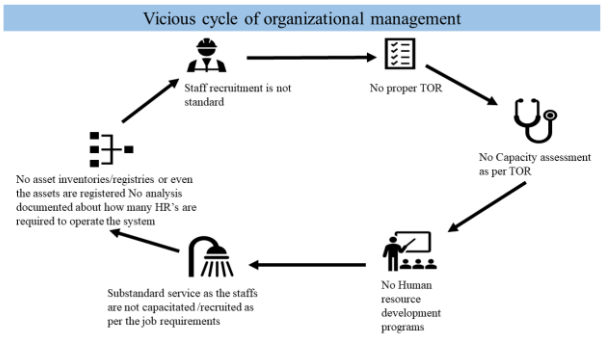

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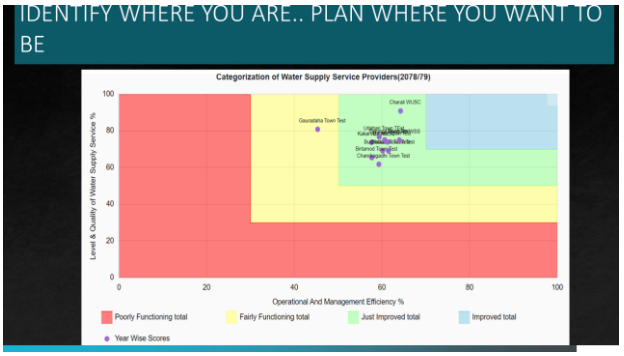

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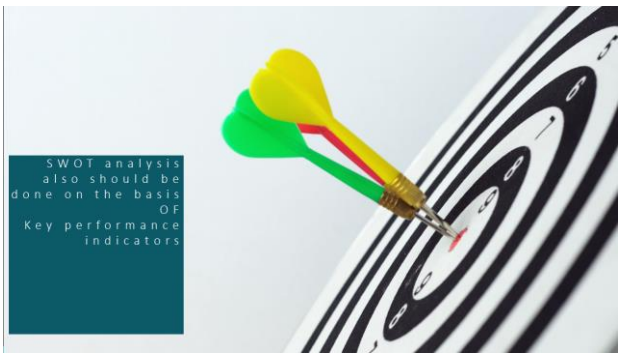

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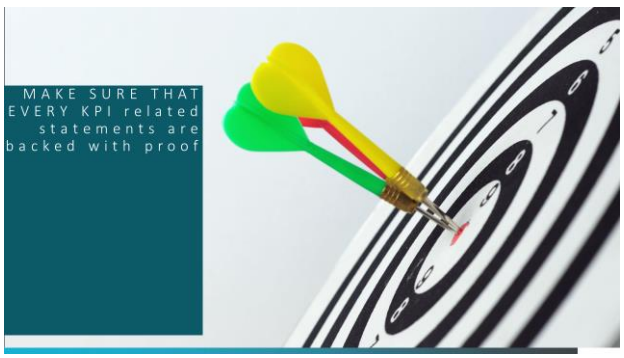

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EXAMPLE (ACTIVITIES THAT MINIMIZE THE THREAT: Sub standard meter)

Identify whether your used meters are certified or not : ISO /NS or some others
From which money you are planning to identify?:
Grant
Tariff?

Calibration mechanism/ Risk identification ?
How ? Data validation with accounts for revenue anomaly?
Resource : Grant
Tariff?

Replacement plan
From which source you are planning to replace: your saved money?
Tariff?

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OPTIMIZING THE PROCESS

MEAN TIME TO REPAIR

FROM NO LOG-BOOK TO LOG- BOOK MANUAL DATA ENTRY

DIGITIZED /APP BASED

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OPTIMIZING THE PROCESS

WATER QUALITY

LAB/LOGBOOK RECORDS

DIGITIZED /APP BASED

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FINANCING

GRANT

LOAN

CONTRIBUTIONS FROM SAVING/COMMUNITY

SHOULD BE REFLECTED IN TARIFF

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FINALLY FOLLOW THE PDCA CYCLE

SOURCE: https://asq.org/quality-resources/pdca-cycle

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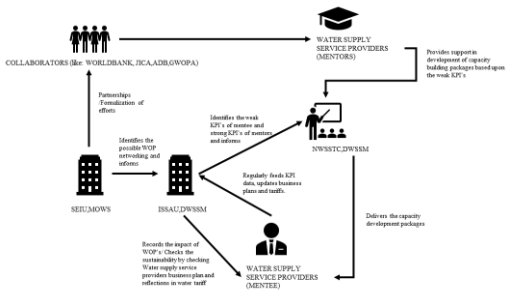

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Presentation 4

1

Regulators and long-term business planning context

Dave Ward
Anglian Water, Head of Treated Water Distribution

2

What are we regulated on?

Performance

- Maximum concentrations of things like nutrients and metals
- Duration of outages when supply is unavailable
- Non-revenue water, and quantities abstracted from the environment

Projects & People

Requirement for investment to achieve the levels of service

Financing

Requirement for revenue from tariffs to fund the agreed activity

3

Our regulators

- **defra** – Government department responsible for water and wastewater issues including the environment
- **CCWater** – Independent org representing customers' interests
- **Environment Agency** – Secures, protects and improves the environment in England & Wales by influencing policy making, flood protection, protection of the environment and advice to business/agricultural bodies. Issues 'abstraction licences' and monitors contaminant levels put into rivers, outflow pipes and the sea
- **dwi** – guardians of drinking water quality, DRINKING WATER INSPECTORATE – Regulates public water supplies in England and Wales by assessing the quality of drinking water including cyber security.
- **OFWAT** – Economic regulators of the water industry. Responsible for ensuring companies carry out their functions, able to finance their operations, comply with licences, protect consumers, promote competition.
- **NATURAL ENGLAND** – Ensures land, flora, fauna, freshwater and marine environments, geology and soils are protected and improved
- **ENGLISH HERITAGE** – Statutory advisor to the government on the historic environment

4

Regulators hold Anglian Water to account but...

Visionary Leadership and being a purpose led organisation with commitment to our customers and environment is key.

- **OFWAT** – Publishes annual performance report to hold us to account
- **dwi** – guardians of drinking water quality, DRINKING WATER INSPECTORATE – Publishes annual Chief Inspector's report

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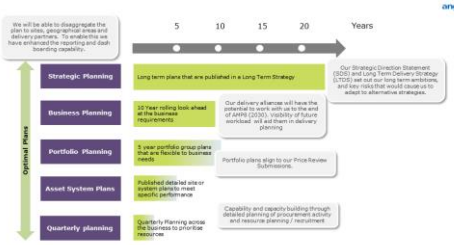
Business Planning Cycles



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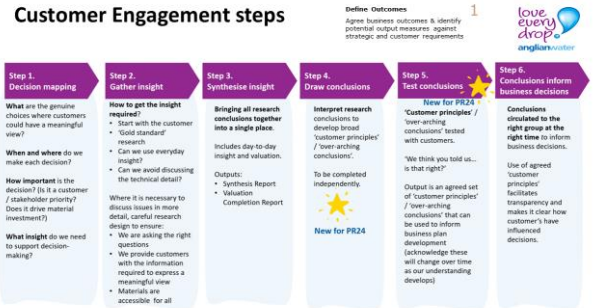
Customer Engagement steps



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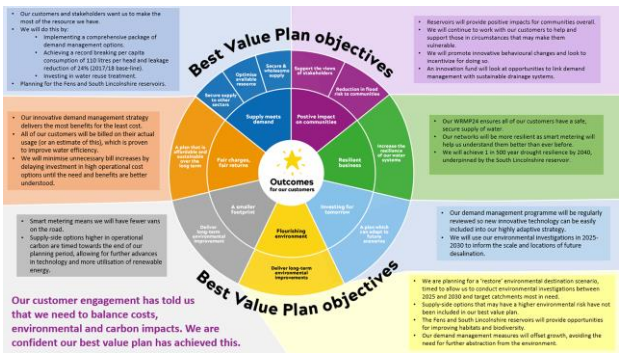

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Our approach

We are planning to make expenditure planning more dynamic