Five Star Survey on the Water Networks in Rohingya Camps, Cox's Bazar

June 2024

Table of Contents

Contributor List 4
List of figures 4
List of tables 5
List of acronyms 6
Executive summary 7
Introduction 8
Context 8
Country, camps and response context 8
MSF presence 9
Wash situation in the camps 9
Study background 10
Objective 11
Methodology 12
Indicators 12
Timeline and Preparation 13
Field assessment 13
Findings 15
Number of water networks surveyed in each camp 15
Implementation Partners Managing Water Networks 15
Functionality of Water Networks 16
The Five Indicators 17
Water Production 17
Time Distribution 20
Water Treatment 23
Beneficiary Satisfaction 26
Network Performance (Tap stand Service) 29
Overall Performance 32

Other indicators & Findings 35
Topography 35
Logbook availability 35
Functional Flowmeter 35
Chlorine Stock 36
Chlorine Logbook Availability 36
Training Requested by Operators 36
Frequency of Working Taps Associated with Water Distribution Hours 37
Reactivity to solve issues 38
Human resources 39
Challenges from the operators 40
Concern from the beneficiaries 40
Discussion 41
Challenges and limits of the study 43
Challenges 43
Limitations of the Study 43
Recommendations 44
For Each Implementing Partner 44
For AFA/DPHE 44
For the WASH Sector 44
Way Forward for MSF 44
Conclusion 45
ANNEXES 46

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List of figures

Figure 1: Yearly distribution of water, sanitation and hygiene budget for Cox's Bazar Rohingya camps

Figure 2: All 33 Rohingya refugee camps located in Cox's Bazar, Bangladesh

Figure 3: Representing the 5 stars study methodology diagram

Figure 4: Number of water networks surveyed in each camp

Figure 5: Implementation partner of the water networks across the camps

Figure 6: Functionality of water networks characterized by camps

Figure 7: Weighted amount of water received by an individual per day characterized by the camps

Figure 8: Geographical presentation on water production per capita per day, Rohingya camps, Cox's Bazar

Figure 9: Water supply frequency in the water networks by camp

Figure 10: Water supply duration in the water networks by camp

Figure 11: Geographical presentation on water supply frequency and time distribution, Rohingya camps, Cox's Bazar

Figure 12: Geographical overview on water treatment condition, Rohingya camps, Cox's Bazar

Figure 13: Types of chlorination across the study camps

Figure 14: Geographical overview on beneficiary satisfaction characterized by 5 stars indicators, Rohingya camps, Cox's Bazar

Figure 15: Proportion of tap stands performance characterized by camps

Figure 16: Geographical overview on tap stands functionality characterized by 5 stars indicators, Rohingya camps, Cox's Bazar

Figure 17: Overall camp performance presented by the 5 stars indicators, Rohingya camps, Cox's Bazar

Figure 18: Most common types of training requested by the operators

Figure 19: Proportion of tap stands reactivation by time duration

List of tables

Table 1: Beneficiary satisfaction level in 95% CI

Table 2: Frequency and percentage of types of topography

Table 3: Logbook availability analysis in 95% CI

Table 4: Functional flowmeter status with percentage and 95% CI

Table 5: Descriptive table for chlorine stock

Table 6: Analysis table for chlorine logbook availability

Table 7: frequency of working taps associated with water distribution in hours

Table 8: Association between number of tap stands and staff deployment

Table 9: Challenges are faced by the operators

Table 10: Proportionate calculation of beneficiary concern

List of acronyms

AFA – Area Focal Agency

BH - Borehole

CBTM - Community-Based Team Members

CiC - Camp-in-Charge

CXB – Cox's Bazar

DPHE - Department of Public Health Engineering

FRC - Free Residual Chlorine

FSM - Fecal Sludge Management

IWM - Institute of Water Modelling

I/NGO - International Non-Governmental Organization

JRP - Joint Response Plan

LQAS - Lot Quality Assurance Sampling

MSF - Médecins Sans Frontières

OCA - Operational Centre Amsterdam (MSF)

OCP - Operational Centre Paris (MSF)

RRRC - Refugee Relief and Repatriation Commissioner

TS - Tap Stand

UN - United Nations

WASH - Water, Sanitation, and Hygiene

Executive summary

The Five Star Assessment, led by Médecins Sans Frontières (MSF), evaluates the performance, sustainability, and challenges of water networks across 33 Rohingya refugee camps in Cox's Bazar, Bangladesh. Seven years after emergency WASH infrastructure was established, providing consistent and safe water supply has become increasingly challenging, exacerbated by funding reductions and limited resources. Following a similar assessment conducted last year by the Institute of Water Modelling (IWM), 2024's study offers an updated, comprehensive look into the operational state of the water networks, employing robust quantitative and qualitative methodologies to highlight current gaps and opportunities for improvement.

The assessment, which evaluated the water networks across five key indicators—flow capacity, distribution timing, network functionality, water treatment, and beneficiary satisfaction—reveals several major findings. First, while efforts have been made to meet the emergency standard of 20 liters per person per day, distribution levels remain inadequate in several camps. Water quantity disparities persist, with some camps delivering significantly less than the required standard, which affects equitable access. Additionally, chlorination practices vary widely, often falling below safety standards, which raises concerns about the reliability of water quality across networks.

Functional gaps in infrastructure also emerged as a critical issue, with many networks lacking operational flow meters, which limits the ability to monitor and manage water distribution effectively. Tap stand functionality, essential for water access, is inconsistent across camps, with high operational rates in some areas contrasted by low functionality in others. Beneficiary feedback reflects considerable dissatisfaction, with common concerns including water availability, long wait times, and inequitable distribution, particularly impacting high-demand areas and vulnerable households.

In response to these findings, the assessment emphasizes the need for reinforced coordination and systematic improvements by all WASH actors. Key recommendations include extending distribution times, increase in production should be planned for the longer term to ensure sustained coverage, standardizing chlorination practices with automated systems, maintaining tap stands with adequate stocks of spare parts for timely repairs, and installing functional flow meters to enhance monitoring and accountability.

To improve service satisfaction, regular beneficiary feedback should guide ongoing adjustments in water distribution and accessibility. For MSF, specific actions include providing technical support, upgrading essential equipment, focusing on operator training, and advocating for sustained WASH funding to ensure reliable, safe water access.

Introduction

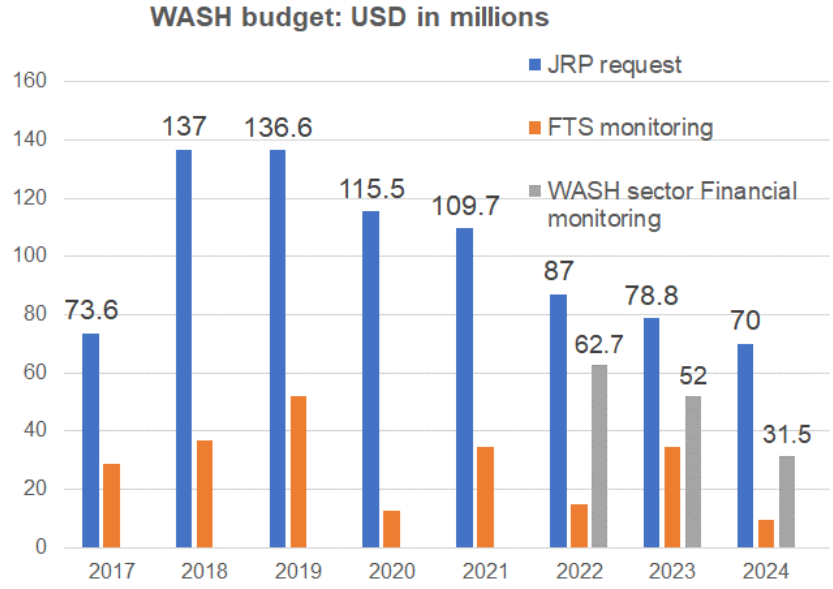
Context

Country, camps and response context

Following the mass violence in Myanmar in 2017, over 700,000 Rohingya refugees fled to Cox's Bazar, Bangladesh, where emergency water and sanitation infrastructure was quickly established to support health and dignity in the camps. Seven years later, the camps now host nearly a million refugees, supported by local authorities, public agencies, and UN agencies alongside over 30 WASH partners.

However, sustaining these essential services has grown increasingly challenging, particularly due to the COVID-19 pandemic and ongoing funding cuts. In July 2024, WASH funding through the Joint Response Plan (JRP) met only 45% of its requested support, well below the JRP average of 61%. This marked a 34% drop from 2023, decreasing from $47.5 million to $31.5 million within a year. WASH was already under severe budget strain as the 2023 allocations saw significant cuts with the JRP request decreasing by 51% compared to the 2018-2019 emergency years. This new funding gap underscores the continued challenges in maintaining and improving vital WASH services as the sector faces lower prioritization in funding allocations.

Figure 1: Yearly distribution of water, sanitation and hygiene JRP budget for Cox's Bazar Rohingya camps



MSF presence

Since 2017, in response to the Rohingya crisis in Cox's Bazar, MSF has established vital WASH infrastructure, including over 400 tube wells, 300 latrines and showers, 16 water networks with reservoirs of 70-90m³ capacity, and two fecal sludge management units treating 70m³ daily. Over time, MSF has handed much of this infrastructure to other WASH actors in the camps.

Currently, MSF focuses on maintaining essential WASH services by identifying critical gaps & public health risks ,offering technical support and training, and advocating for minimum standards. Amid decreasing funding and changing priorities, MSF remains committed to sustaining these essential services.

Wash situation in the camps

In the early years of the Rohingya crisis, WASH actors implemented extensive infrastructure to meet the population's needs. This included comprehensive water networks with boreholes, solar pumping systems backup by generators, tank sites, tap stands, and large reservoirs in Teknaf, along with dedicated water treatment plants. Additionally, tube wells with hand pumps were installed to supply water directly to households. For sanitation, thousands of latrines were constructed with pits and sewage networks, organized desludging and collection systems, and treatment plants. Waste management was also systematically organized, incorporating segregation, collection, recycling, and treatment.

Through the coordinated efforts of international and local NGOs, authorities, DPHE, and UN agencies, service coverage has been impressive, especially considering the scale of the population and operational

constraints. However, significant gaps persist, and the public health situation remains critical for many. Key challenges related to water access include:

Quantity: The distributed water quantity per person often falls short of the 20L/day emergency standard, leaving some households under-resourced.

Inequity in Distribution: Disparities in water access are prevalent across different camps and networks, impacting fair distribution.

Quality and Safety: Inadequate chlorination and treatment raise the risk of pathogens in the water supply, creating serious health risks.

Access Issues: Barriers such as long distances to water sources, limited distribution times, and safety concerns affect reliable access.

Maintenance and Accountability: Insufficient infrastructure maintenance and a lack of clear accountability contribute to service interruptions and inconsistencies.

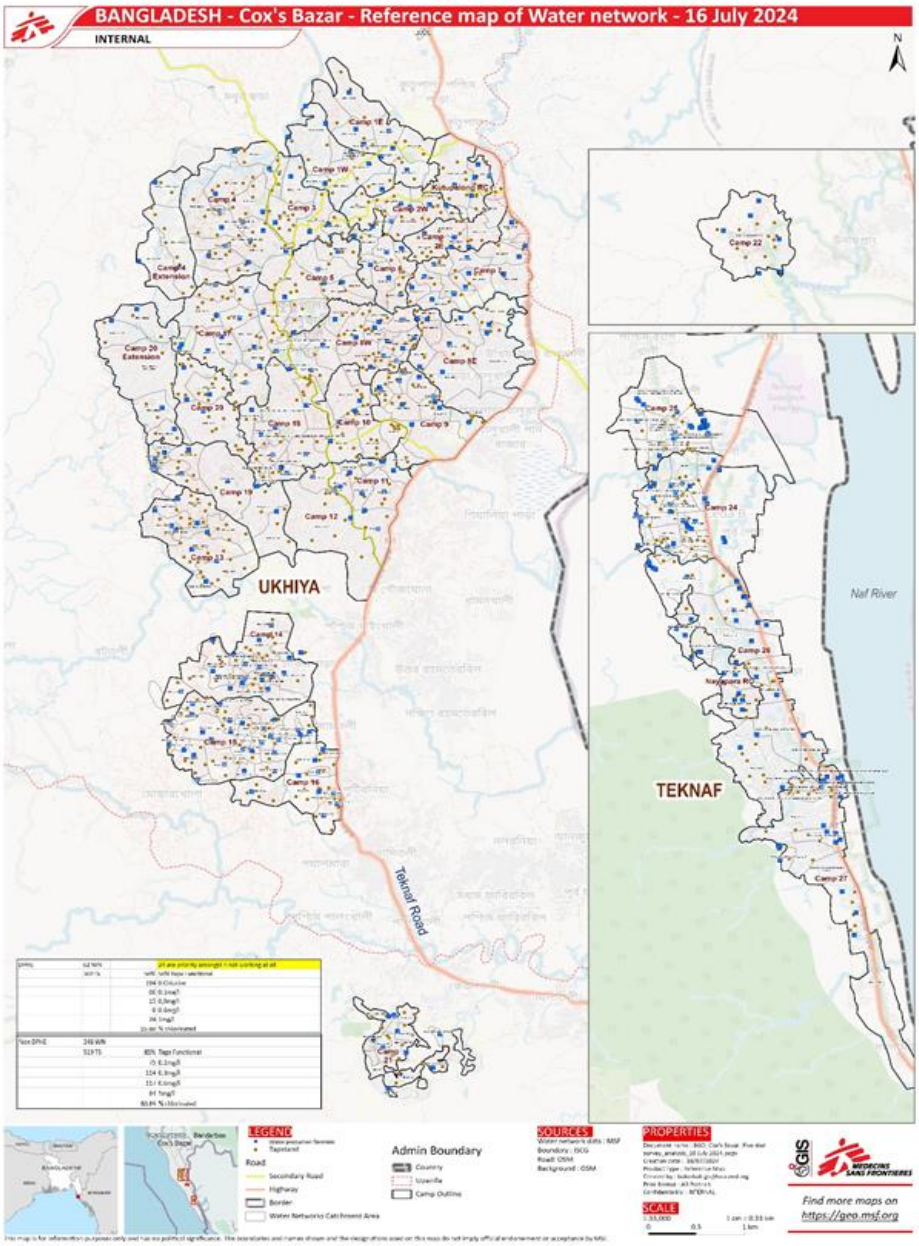
Study background

To gain a clearer understanding of the challenges, develop effective solutions, and implement them in the field, the WASH sector enlisted the Institute of Water Modelling (IWM) to conduct a 5-star survey in 2023. This survey, designed to be quantitative and structural, assessed the water networks across all 33 camps. Details on its methodology and any adaptations are covered in subsequent sections.

In addition, MSF OCP performed a structural survey in their designated catchment area, covering eight camps in the south-western part of the mega camp. This survey also included assessments of tube wells and latrines.

Numerous qualitative and quantitative studies have been conducted to understand conditions at the household and water facility levels, focusing on beneficiaries' perceptions and needs. Among these are several MSNA studies led by the WASH sector, including this year. MSF has also conducted LQAS studies in 2018, 2022, and 2023, with plans to repeat the survey in 2024.

Figure 2: All 33 Rohingya refugee camps located in Cox’s Bazar, Bangladesh



Objective

General Objective

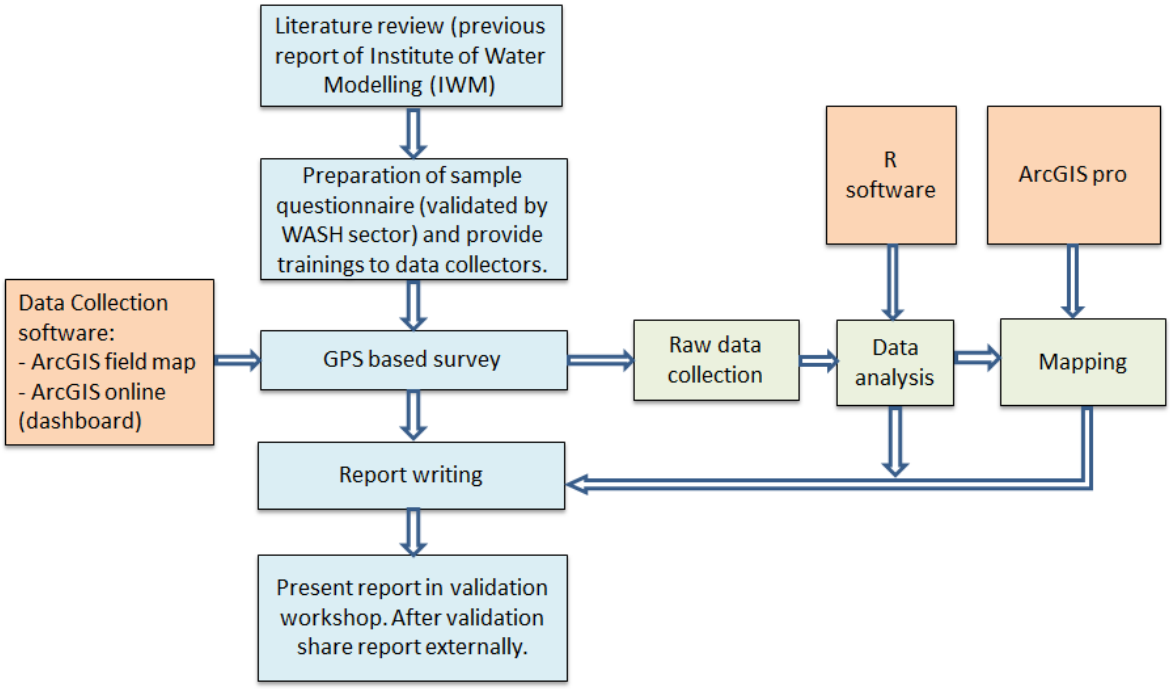
Conduct comprehensive infrastructure assessments of all water networks within the 33 Rohingya refugee camps in Cox's Bazar.

Specific Objectives

- Assess the current status of water networks across the camps.
- Identify gaps, challenges, and explore potential solutions.
- Link identified gaps to potential public health risks.
- Use findings to inform a strong advocacy strategy with donors, authorities, UN agencies, sectors, and implementing partners.
- Prioritize MSF's interventions and training initiatives based on identified needs.

Methodology

Figure 3: Representing the 5 stars study methodology diagram



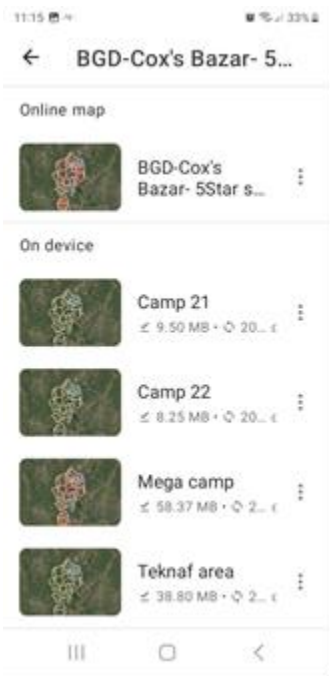
Indicators

The Five Star Survey was done across all 33 Rohingya camps. This survey assessed the water network system using five key indicators: flow capacity, time distribution, network performance,

water treatment, and user satisfaction. Two distinct questionnaires were used in the survey—one for beneficiaries at tap stands and another for water distribution pump operators.

Timeline and Preparation

To collect data, ArcGIS Field Map was selected for its dynamic features. As MSF plans to conduct the Five Star Survey twice a year (pre monsoon and post monsoon), Field Map suits the purposes well.



Field assessment

24 surveyors were recruited from the Rohingya community, alongside regular MSF-OCA WASH staff, and provided training at the MSF-OCA Balukhali clinic and BKL-Rubber Garden from May 15 to May 23, 2024. A pilot assessment was conducted in Camp 9. For data collection, 13 devices were used for offline data gathering. Field assessments across the mega camp began on May 22, 2024, and concluded on June 12, spanning a total of 13 working days. In Teknaf, assessments started on June 26 and were completed by July 8, total six working days. A monitoring dashboard has also been developed to monitor the progress of the survey. It will help managers to monitor daily survey updates and write reports.

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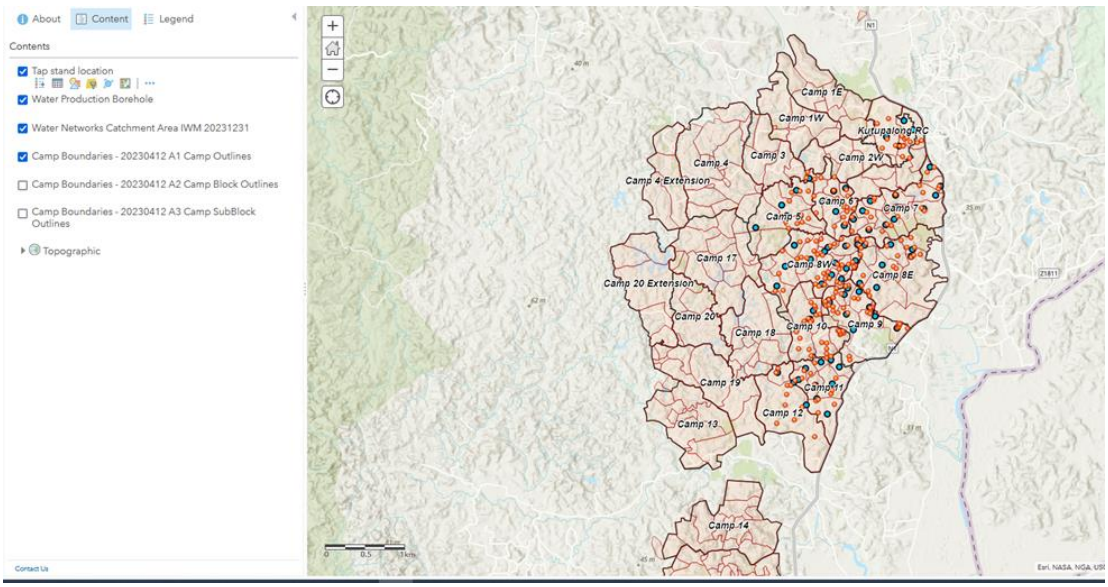
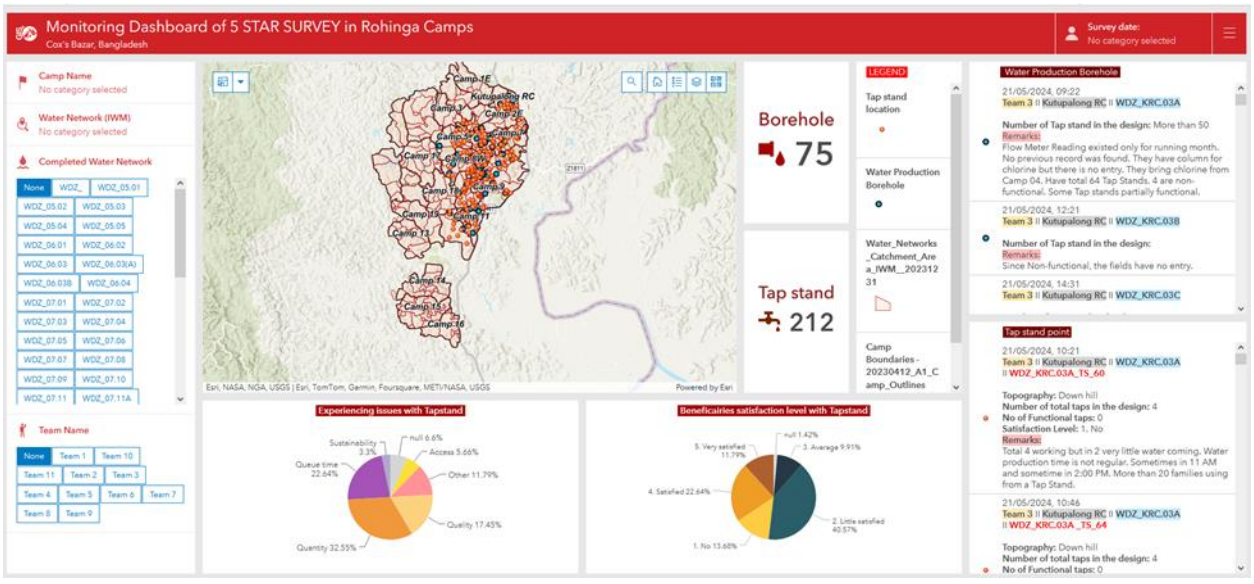




Findings

Number of water networks surveyed in each camp

Figure 4: Number of water networks surveyed in each camp

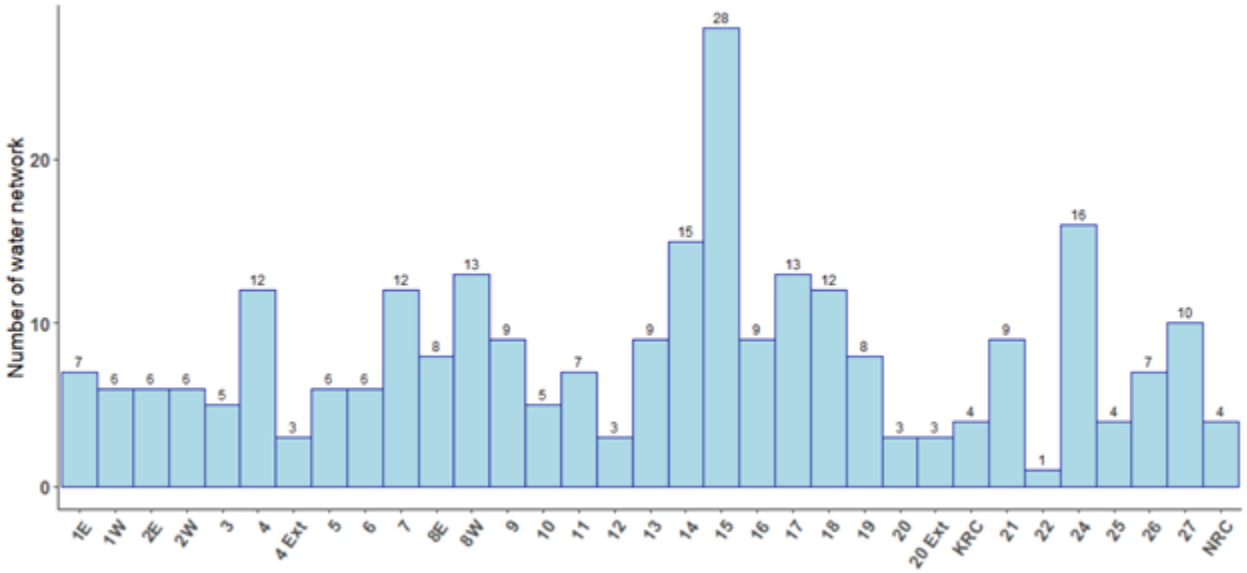
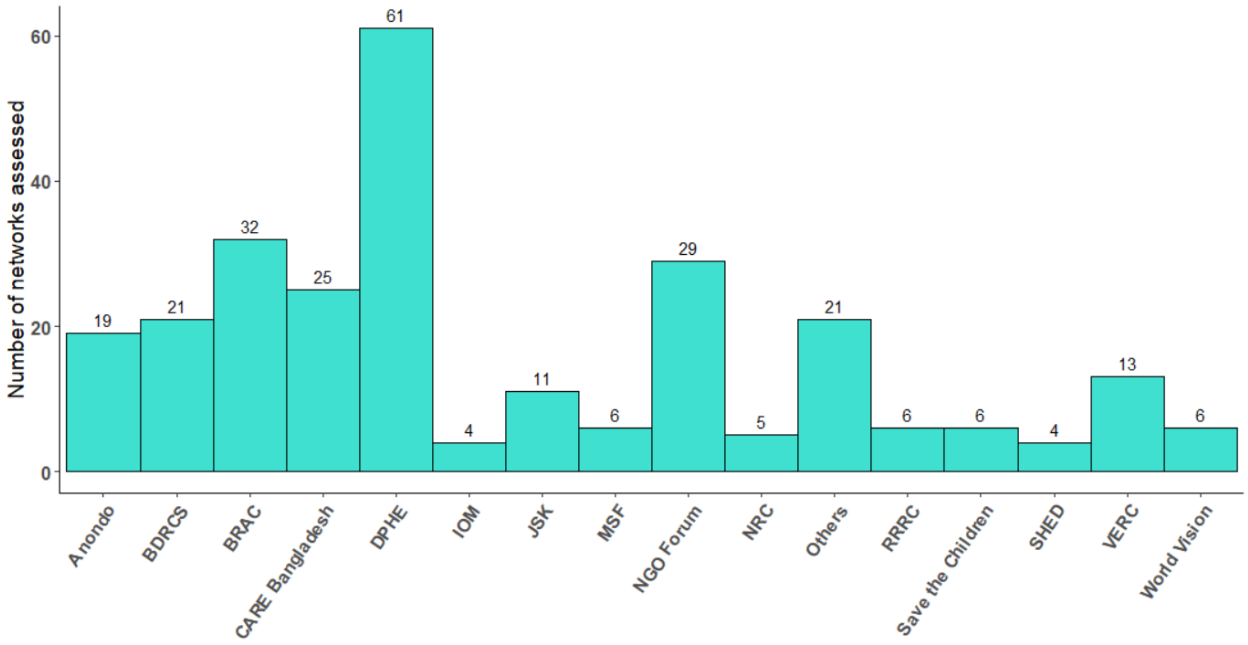


Figure 4 shows Camp 15 standing out with the highest number of water networks (28), indicating significant water infrastructure in this location, followed by Camps like 24 (16 networks) and 14 (15 networks) compared to others. Camps 4 Ext, 12, 20, 20 Ext and 22 have a relatively low number of water networks, with some camps having as few as 3-4 networks.

Implementation Partners Managing Water Networks

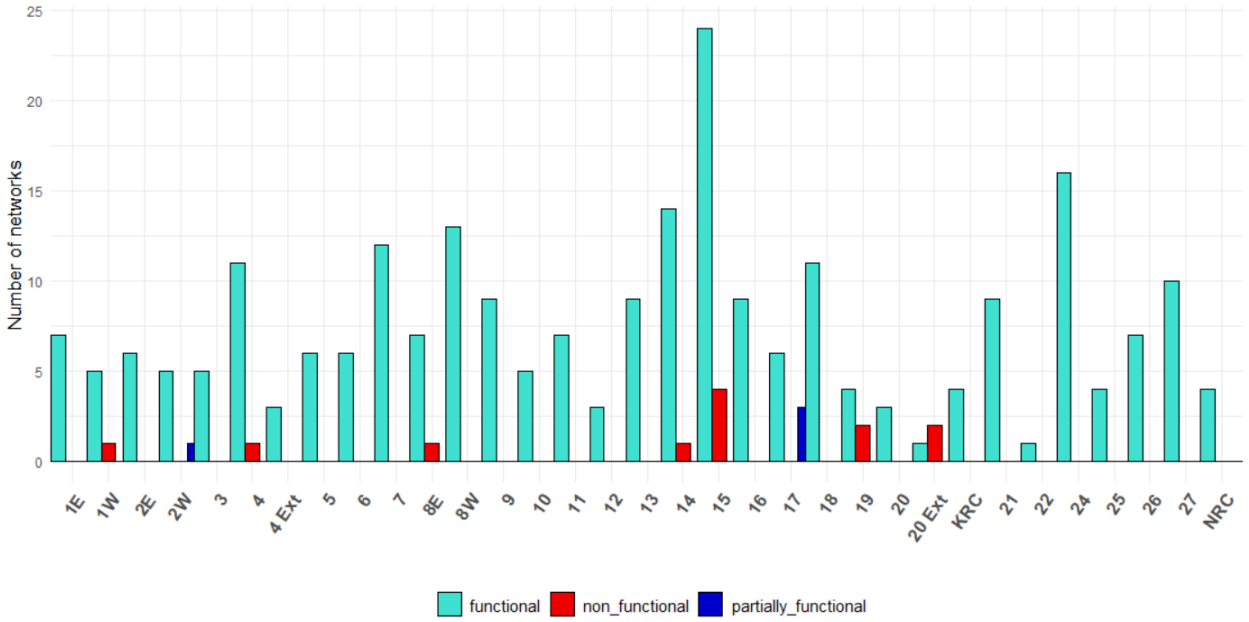
Figure 5: Implementation partner of the water networks across the camps



The Department of Public Health Engineering (DPHE) is overseeing the operation of the largest water networks (N= 61), while other organizations such as BRAC, NGO Forum, and Anondo also play a crucial role in the provision and distribution of water across the camps.

Functionality of Water Networks

Figure 6: Functionality of water networks characterized by camps



During data analysis, 12 non-functional water networks have been reported particularly in Camps 1W, 4, 8E, 14, 15, 19 and 20 extension. In contrast, only three water networks in Camps 3 and 18 were reported as partially functional.

The Five Indicators

Water Production

Figure 7: Weighted amount of water received by an individual per day characterized by the camps

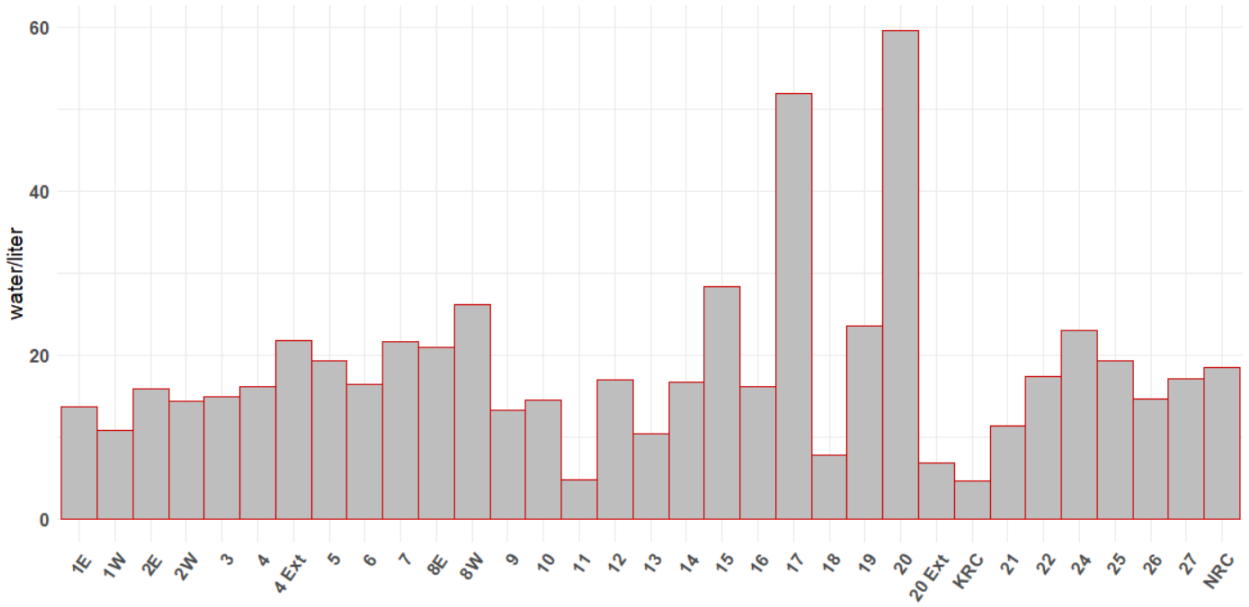


Figure 7 illustrates the water distribution across camps, revealing that 29 camps (88%) provide at least 10 liters of water per person per day. However, camps 11, KRC, 20 Ext, and 18 report daily water access levels below this 10-liter benchmark. A total of 9 camps (27%) deliver over 20 liters per capita daily, including camps 4 Ext, 7, 8E, 8W, 15, 17, 19, 20, 21, 22, and 24. Notably, camps 17 and 20 achieve the highest per capita water access, with more than 50 liters provided daily.

Figure 8: Geographical presentation on water production per capita per day, Rohingya camps, Cox's Bazar

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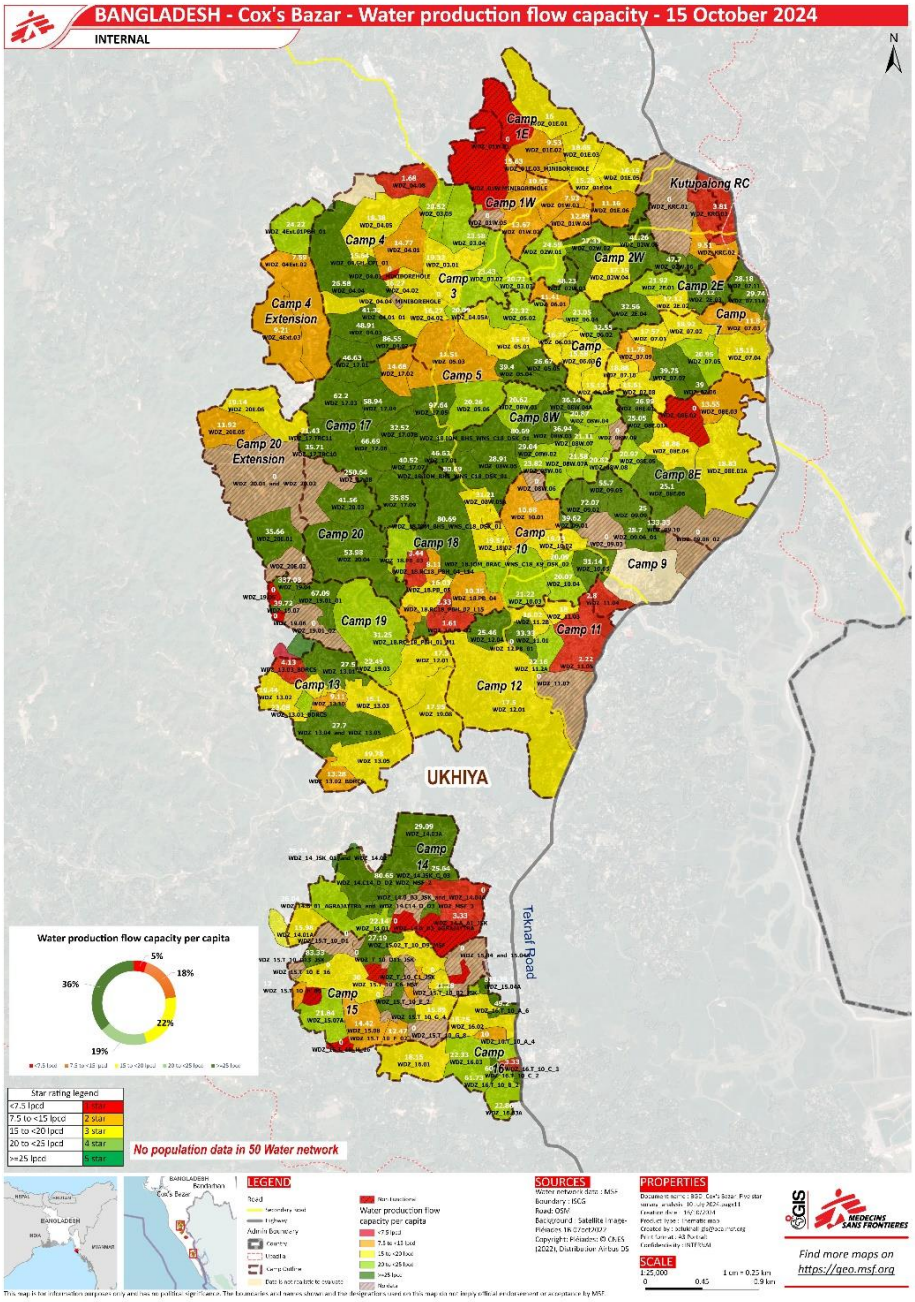
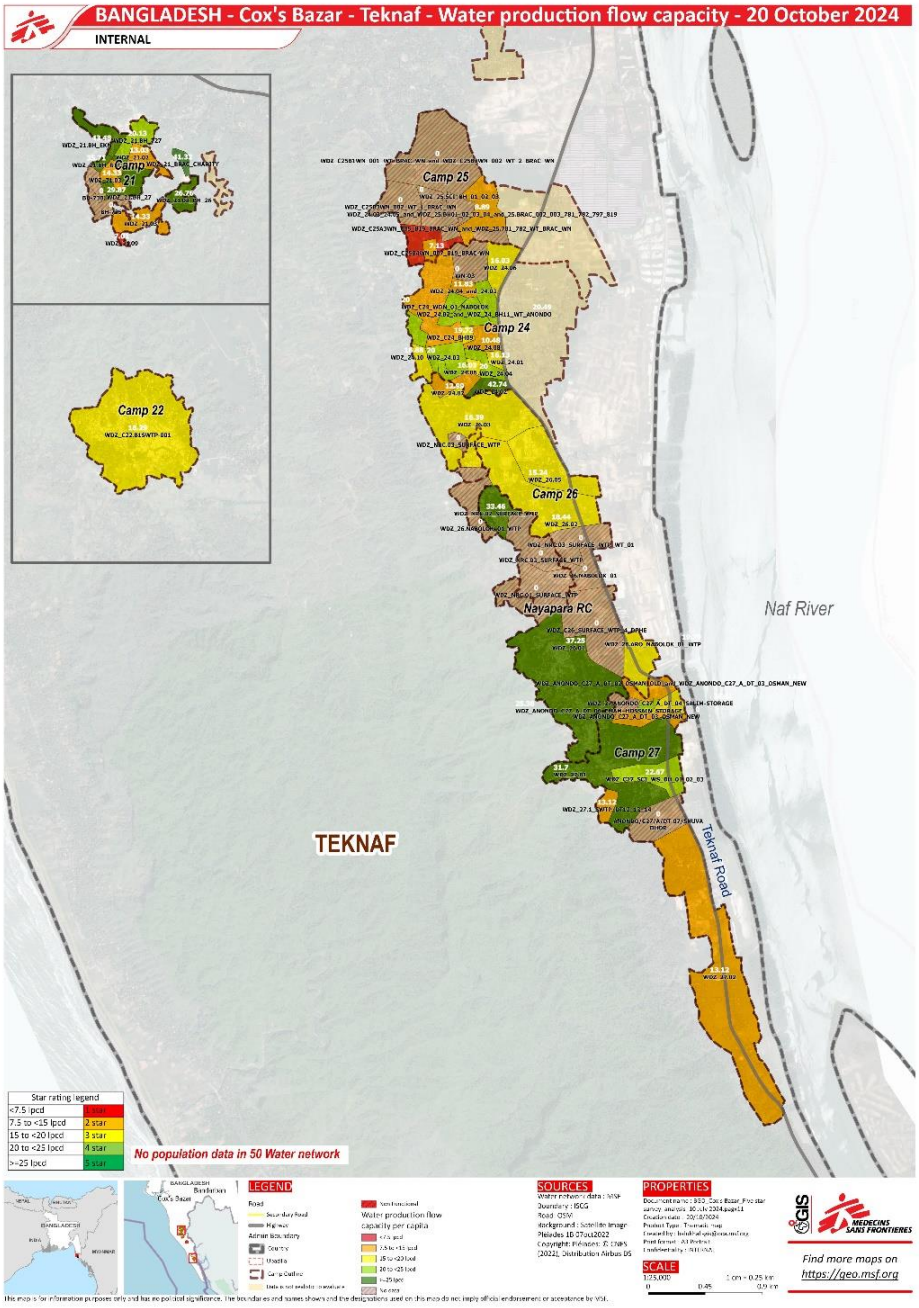




Time Distribution

Figure 9: Water supply frequency in the water networks by camp per day

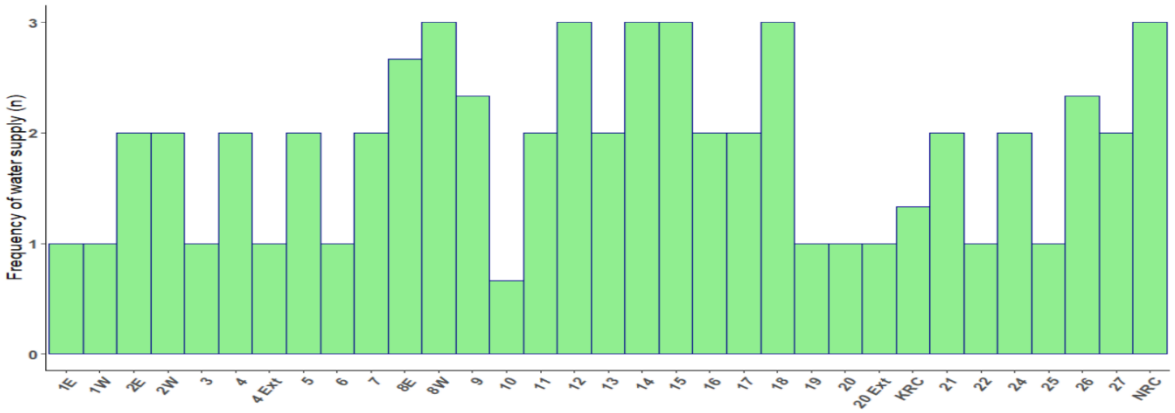
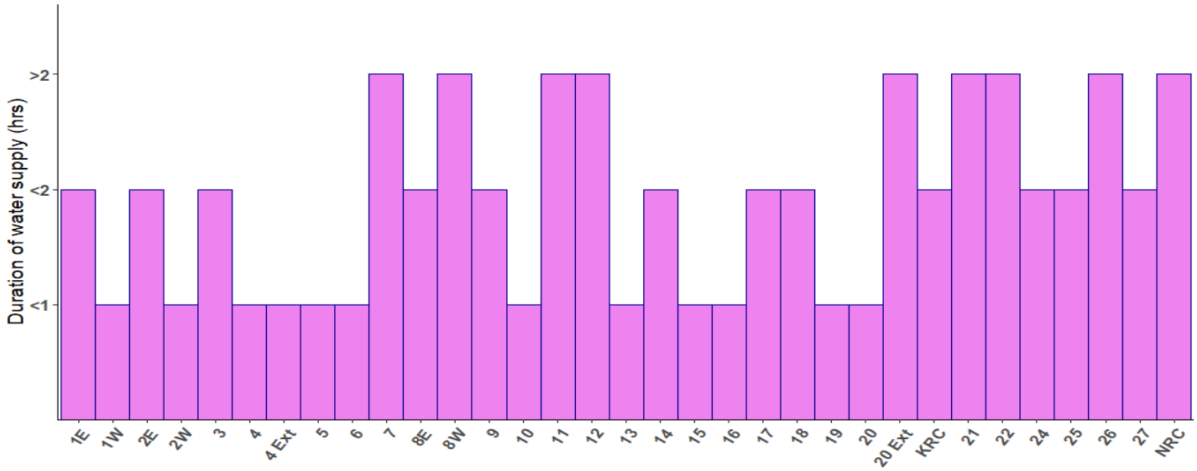


Figure 10: Water supply duration in the water networks by camp



Figures 9 and 10 present the distribution patterns of water supply across camps, categorized by survey catchment areas. Water supply metrics were assessed based on two main indicators: frequency of distribution and hours of supply. Overall, camps 8W, 9, 12, 26, and NRC were identified as having optimal water supply conditions. Conversely, Camp 10 was reported to fall below the standard supply threshold. The remaining FDMN camps generally receive water at least once daily, though the supply duration is often under one hour.

Figure 11: Geographical presentation on water supply frequency and time distribution, Rohingya camps, Cox's Bazar

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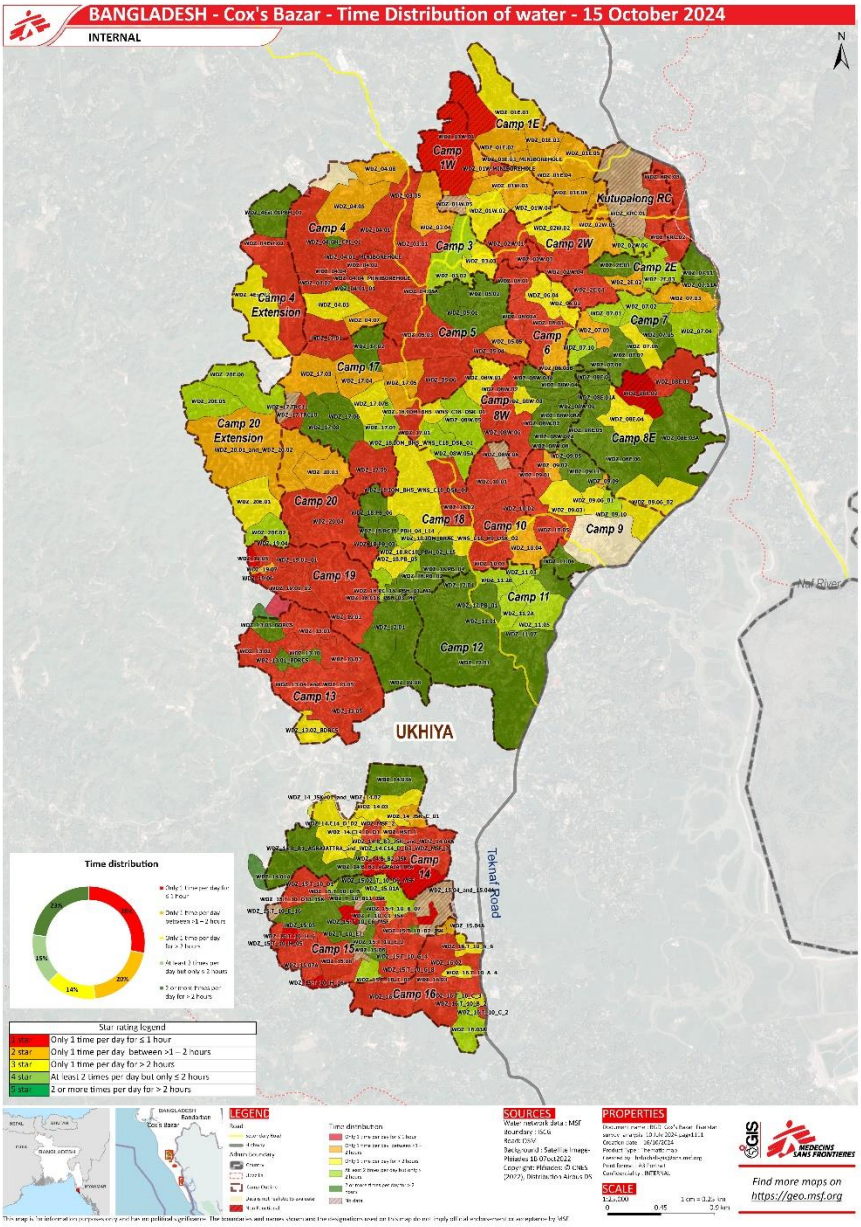

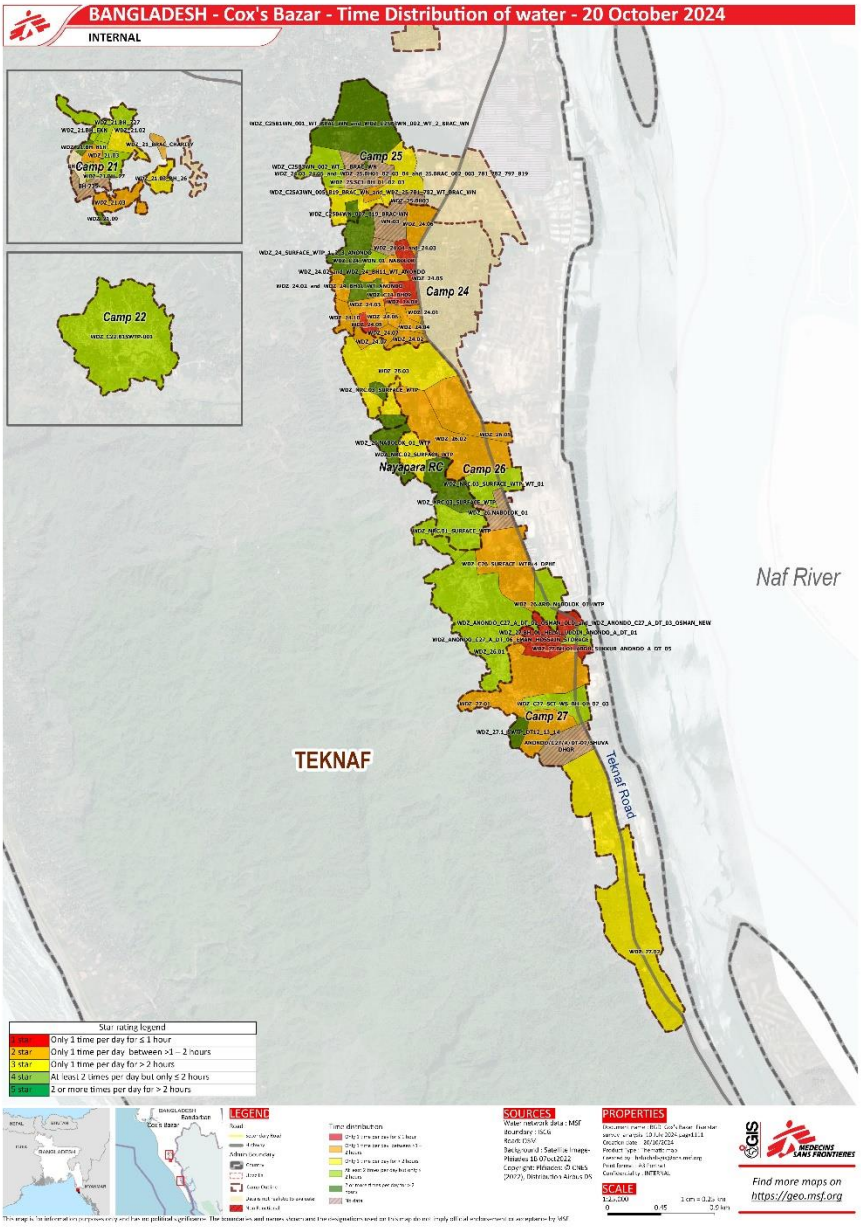

Water Treatment

Figure 12: Geographical overview on water treatment condition, Rohingya camps, Cox's Bazar

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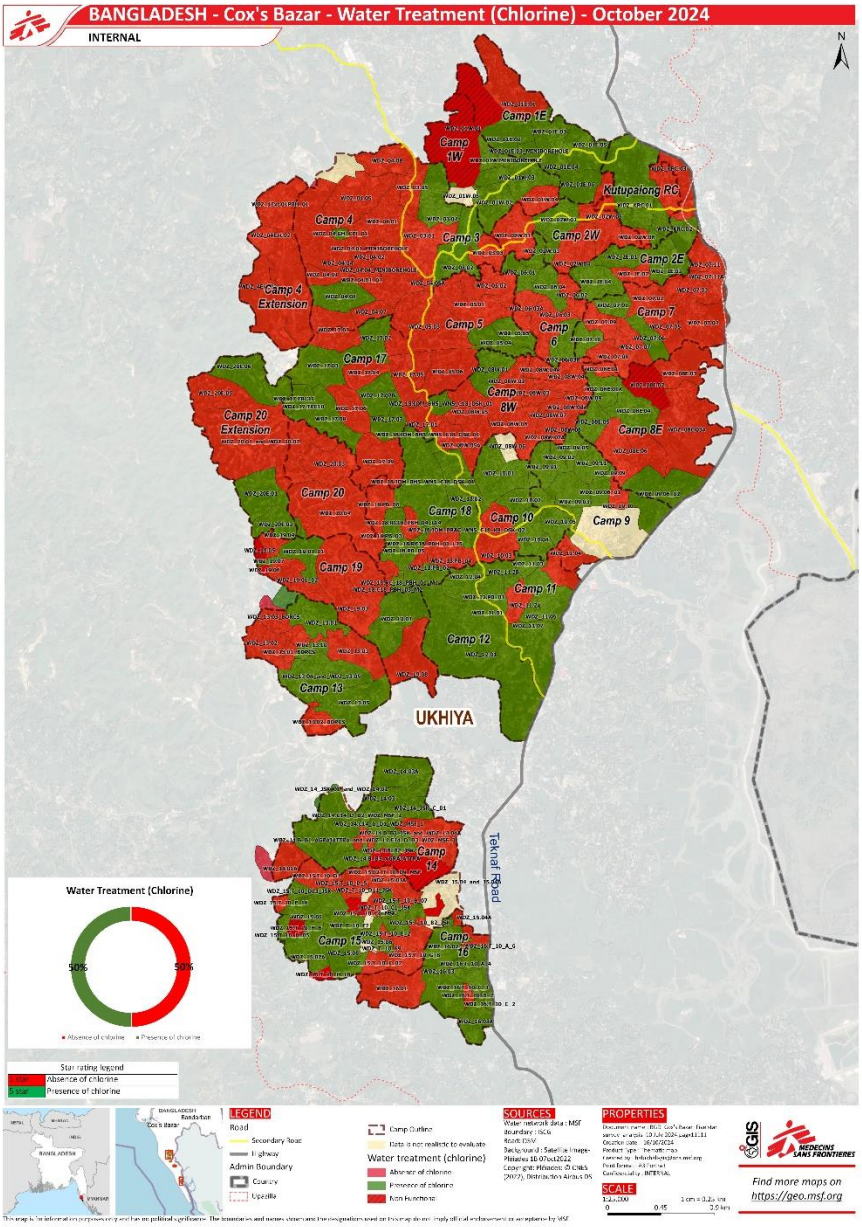
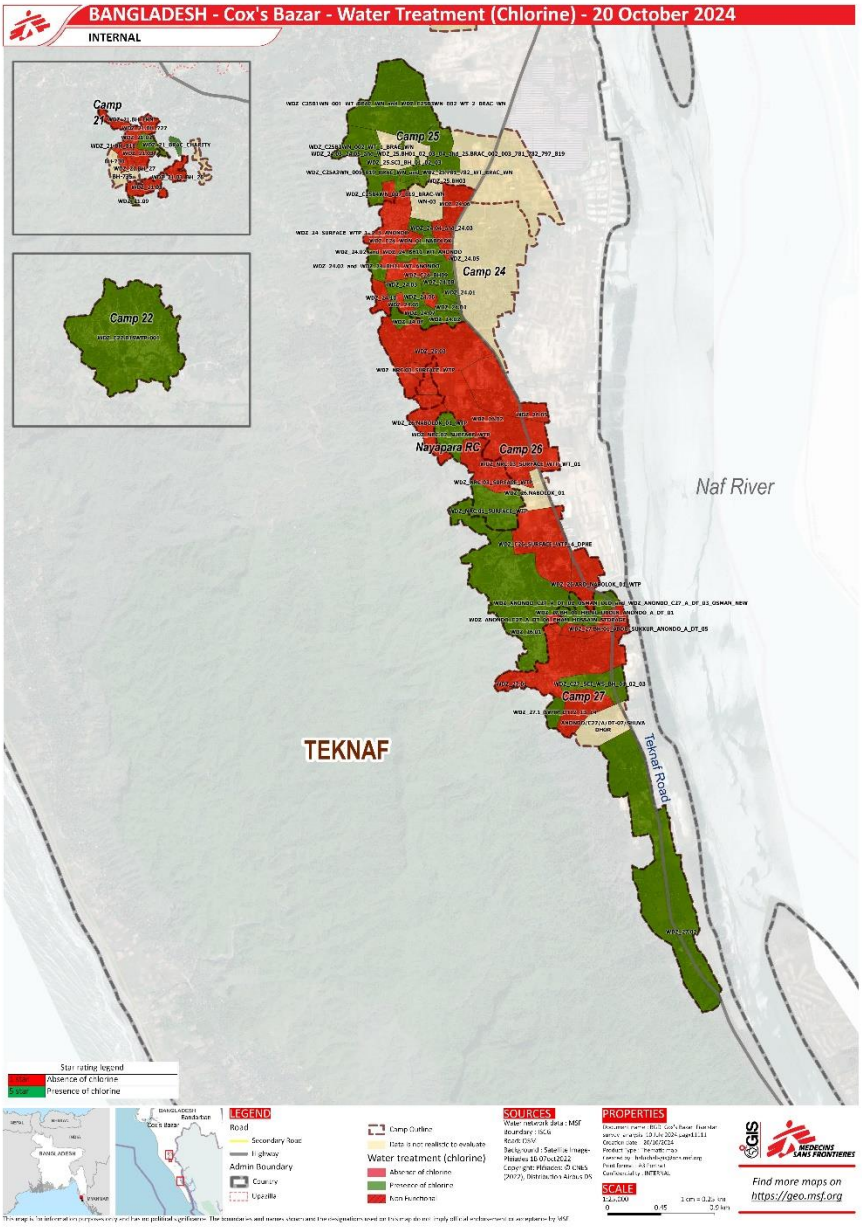
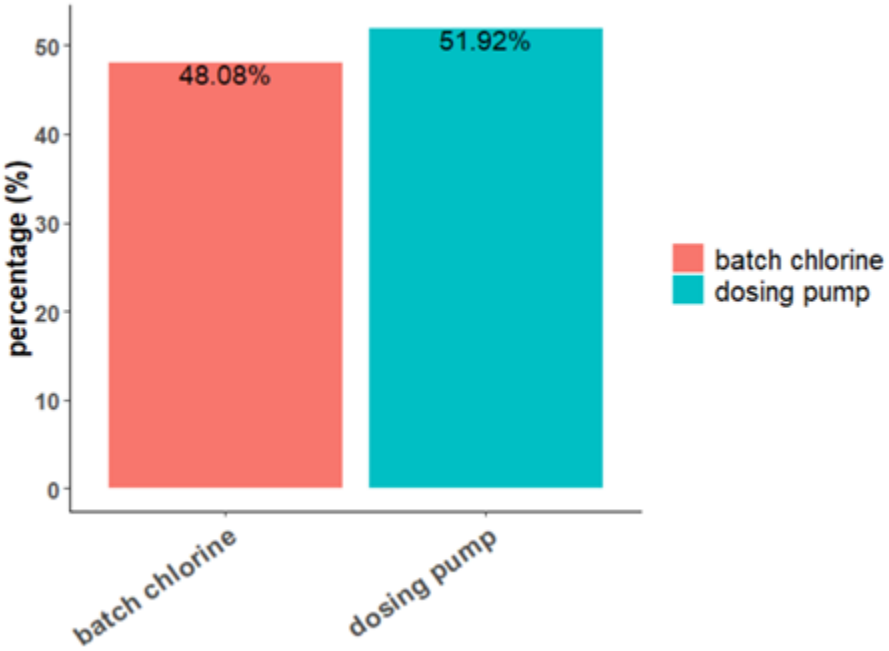




The maps illustrate that 50% of the camps lack adequate chlorination, falling below essential water safety standards. Notably, camps in Teknaf, such as Camps 26, 27, and Nayapara, as well as central and northern camps in Ukhiya, including Camps 1E, 1W, 2W, 4, 4Ext., 5, 7, 8E, 8W, 14, 20 and 20 Ext., exhibit extensive red zones, indicating insufficient chlorine levels.

Field testing confirms that many of these camps maintain Free Residual Chlorine (FRC) levels below the recommended 0.3 mg/L, with several falling under 0.1 mg/L in distribution tanks.

Figure 13: Types of chlorination across the study camps



The two chlorination methods—batch chlorination and dosing pumps are used in nearly equal proportions, with a slight preference for dosing pumps (51.92%). This distribution suggests that water facilities may vary in their resources, operational capacity, and the scale of water treatment operations. The use of dosing pumps reflects a more mechanized and reliable method, whereas batch chlorination remains prevalent, likely due to its ease of implementation in smaller or less complex systems.

Beneficiary Satisfaction

Table 1: Beneficiary satisfaction level in 95% CI

Beneficiary satisfaction	N	% (95% CI)
high	204	24.23% (21.37 - 27.27)
low	354	42.04% (38.68 - 45.46)
not respond	26	3.09% (2.03 - 4.49)
moderate	91	10.81% (8.79 - 13.10)
very high	75	8.91% (7.07 - 11.04)
very low	92	10.93% (8.90 - 13.23)

Table 1 summarizes beneficiary satisfaction levels across six response categories, illustrating variability in satisfaction among the population. Approximately 42% of beneficiaries reported low satisfaction (42.04%, 95% CI: 38.68 - 45.46), marking it as the largest category. In contrast, high satisfaction was noted in 24.23% of respondents (95% CI: 21.37 - 27.27), while very high satisfaction accounted for a smaller portion at 8.91% (95% CI: 7.07 - 11.04). Moderate satisfaction was recorded at 10.81% (95% CI: 8.79 - 13.10) and very low satisfaction closely followed with 10.93% (95% CI: 8.90 - 13.23). Notably, 3.09% of beneficiaries did not respond (95% CI: 2.03 - 4.49), potentially impacting the overall assessment of satisfaction levels in the study. This distribution highlights areas of improvement and indicates a significant segment with low satisfaction that may require targeted interventions to enhance service outcomes.

Figure 14: Geographical overview on beneficiary satisfaction characterized by 5 stars indicators, Rohingya camps, Cox's Bazar

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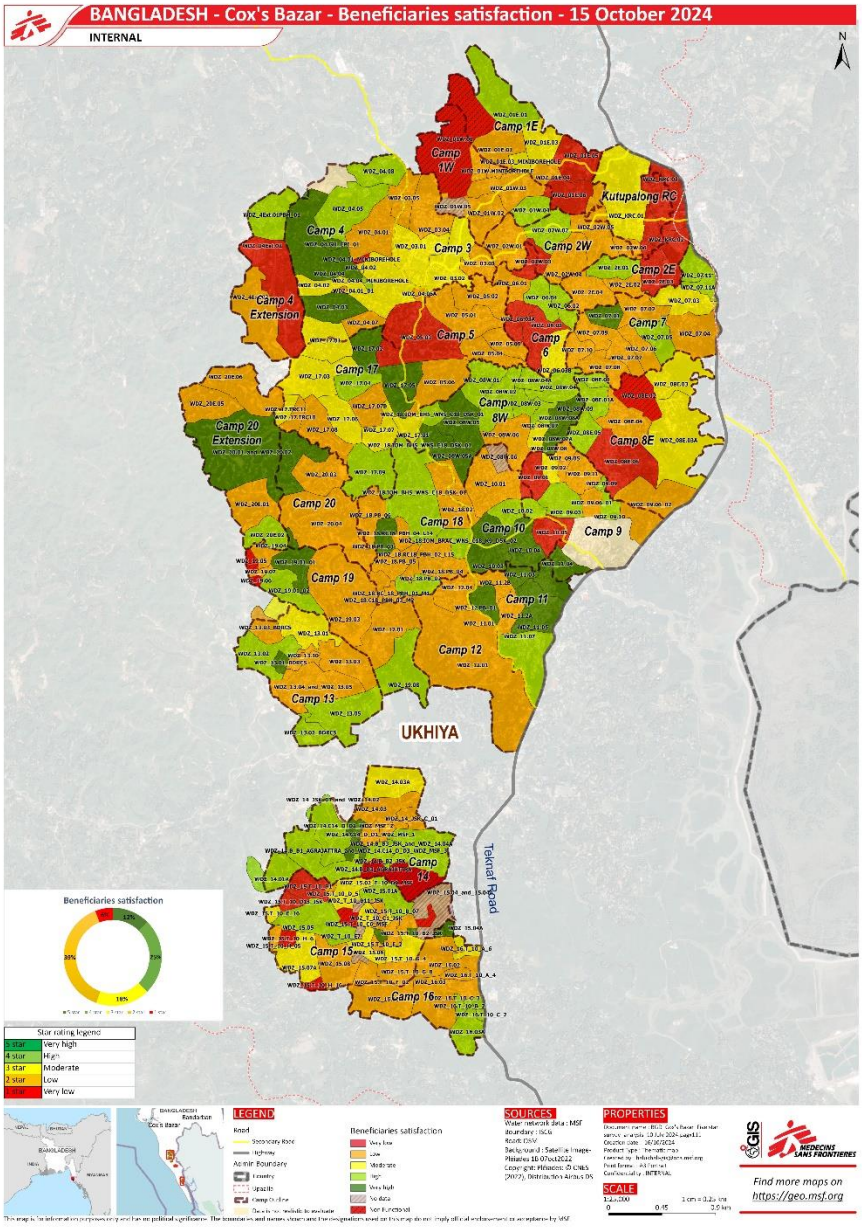
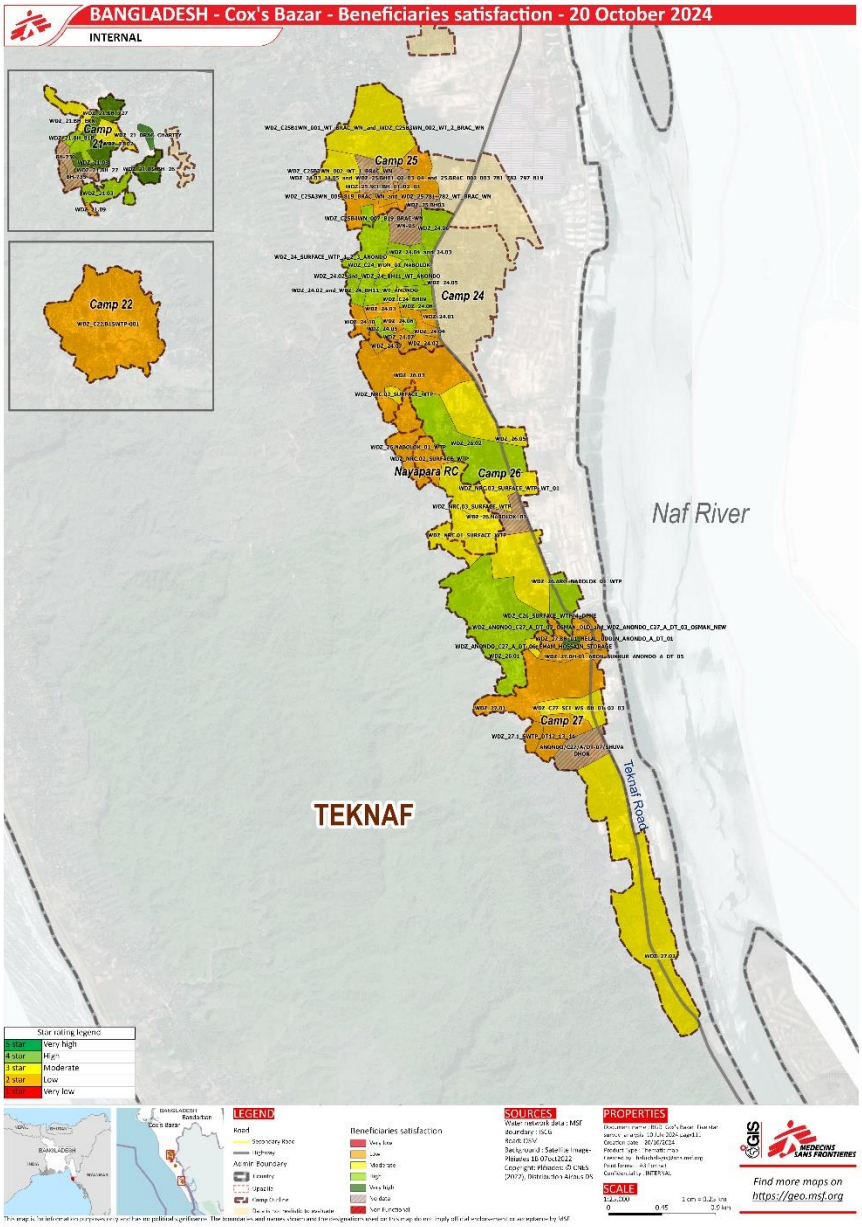
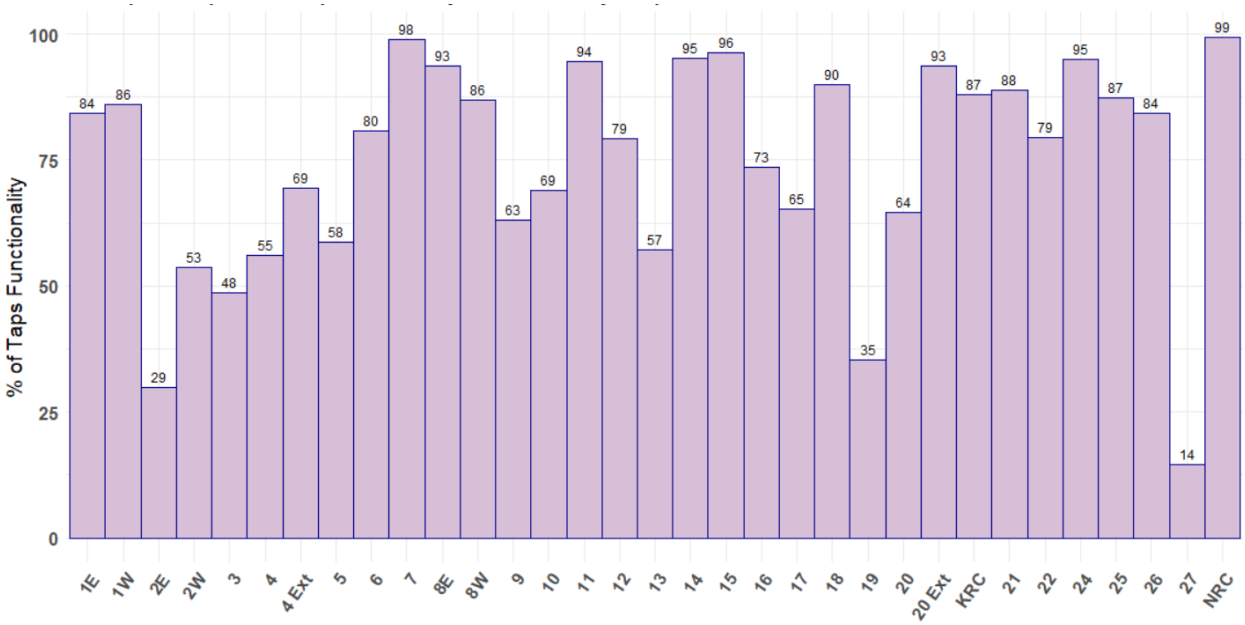




Network Performance (Tap stand Service)

Figure 15: Proportion of tap stands performance characterized by camps



The functionality of tap stands serves as a key indicator in this survey, allowing for assessment of water access across camps. Several camps—specifically Camps 1E, 1W, 6, 7, 8E, 8W, 11, 14, 15, 18, 20 Ext, KRC, 21, 24, 25, 26, and NRC reported high functionality, with over 80% of their tap stands operational. In contrast, Camps 2E and 27 reported notably low functionality, with less than 30% of tap stands in working order. The analysis also revealed that camps in the Teknaf area demonstrated higher levels of tap functionality compared to those in Ukhiya, suggesting potential differences in infrastructure maintenance or service provision across regions.

Figure 16: Geographical overview on tap stands functionality characterized by 5 stars indicators, Rohingya camps, Cox's Bazar

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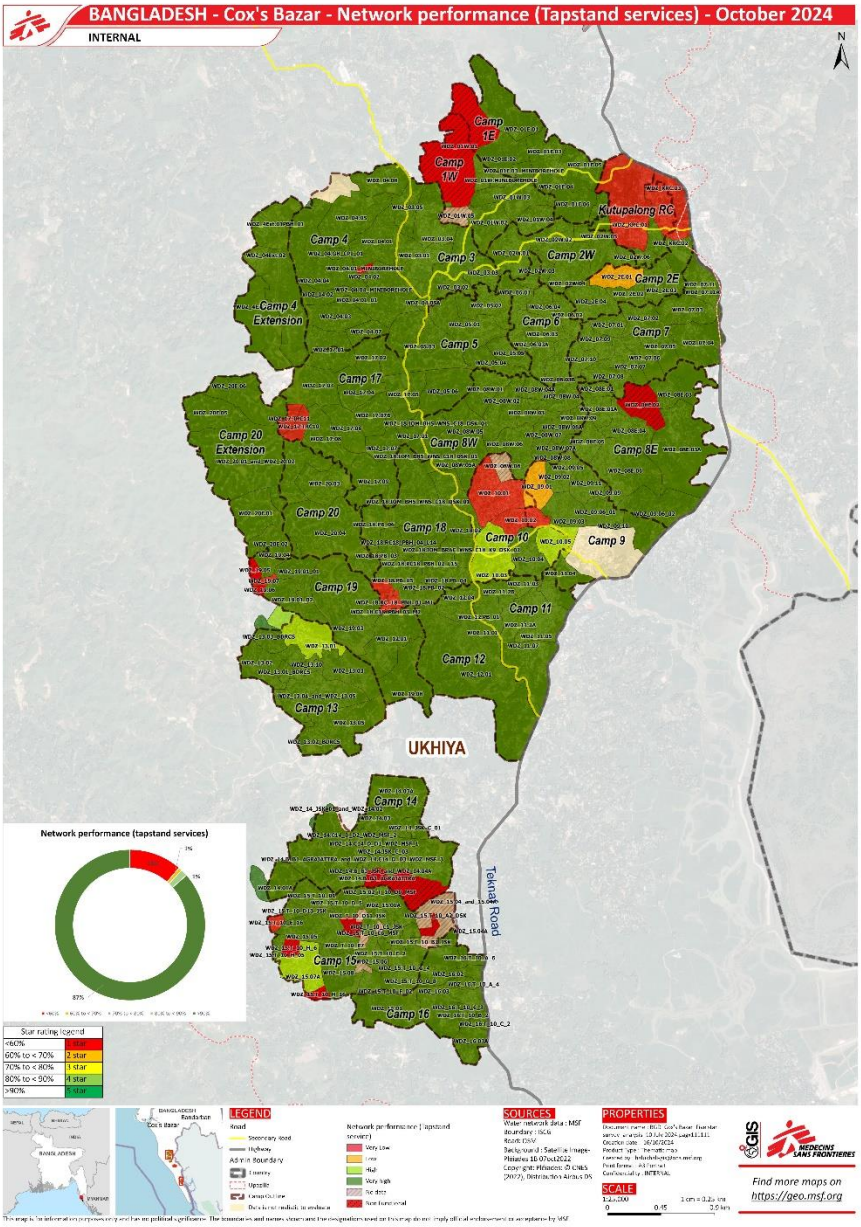

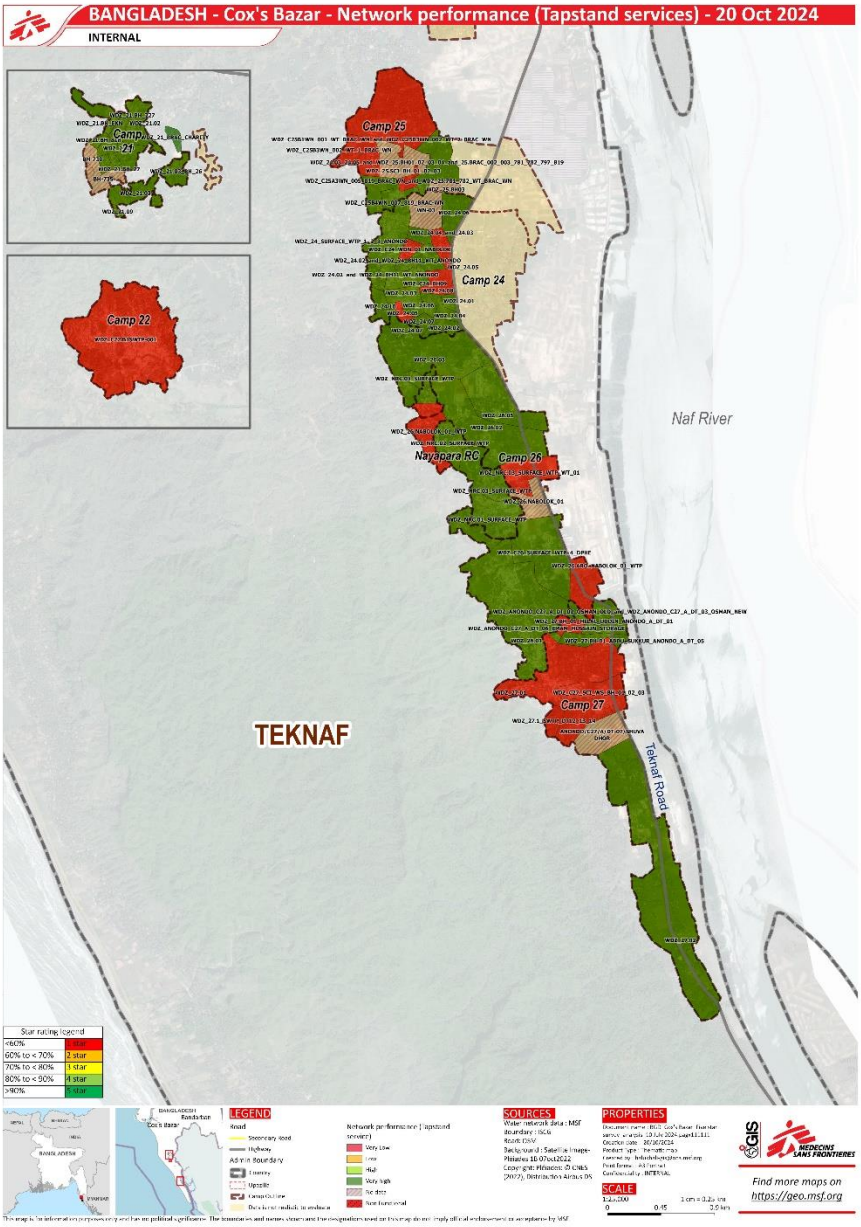

Overall Performance

Figure 17: Overall camp performance presented by the 5 stars indicators, Rohingya camps, Cox's Bazar

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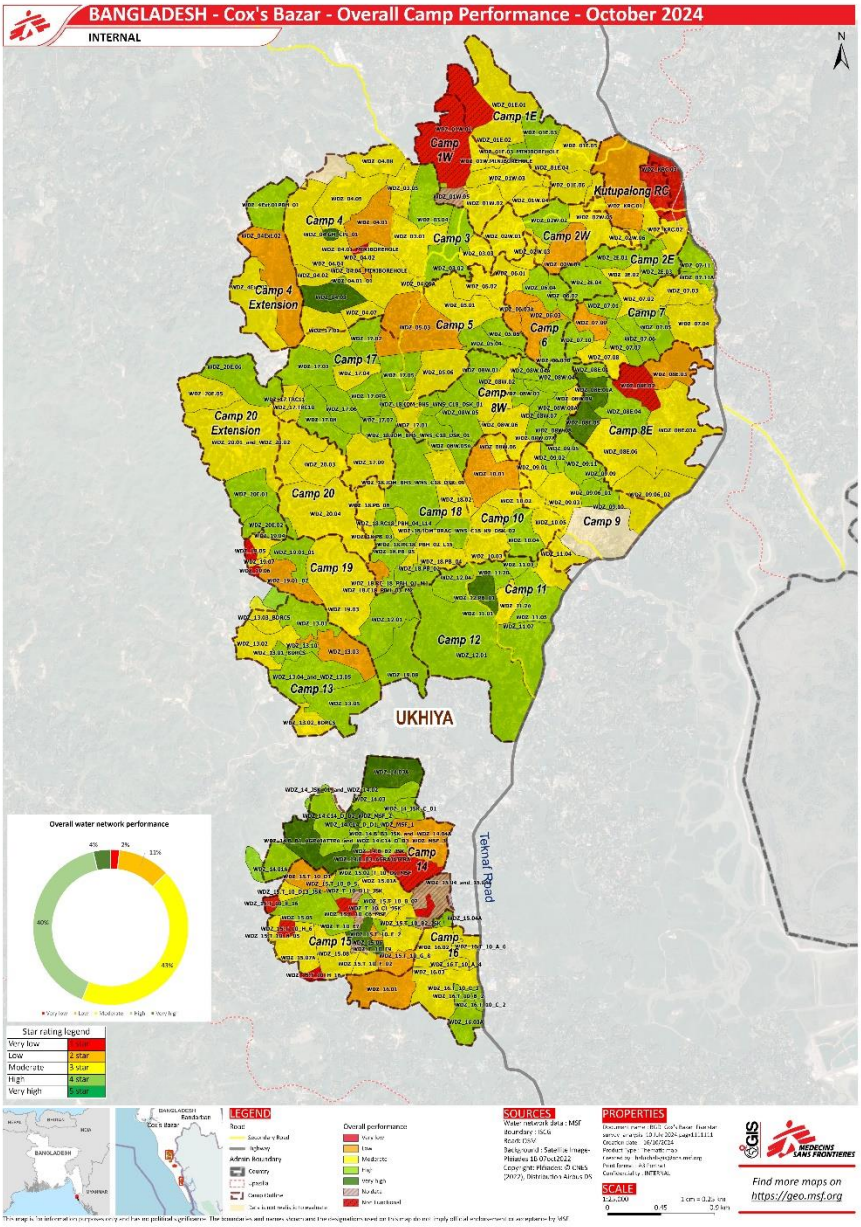
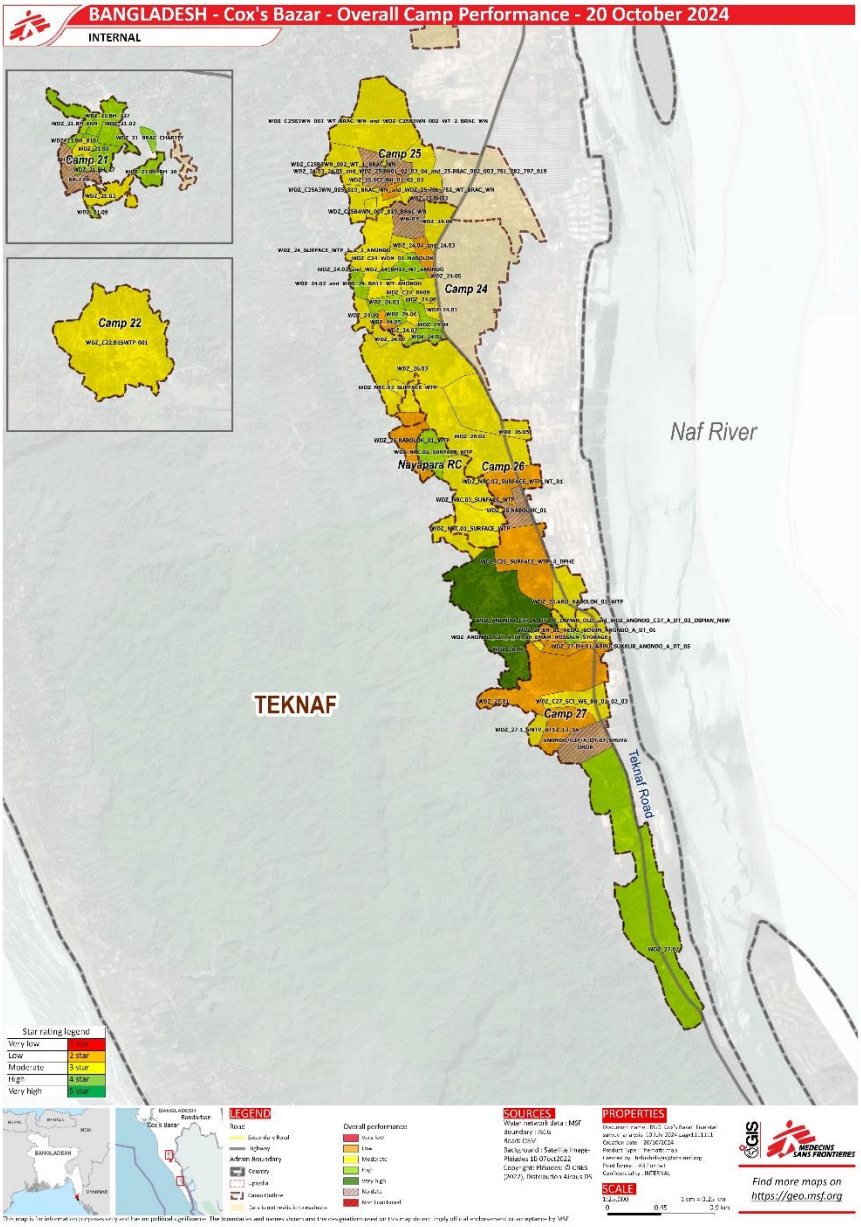
WASH Sector
Cox's Bazar





In Ukhia, Dark green (5-star) networks like part of 8E, 4, and parts of 14 & 15 are with reliable water access and chlorination. Light green (4-star) camps are strong but slightly inconsistent, while yellow (3-star) and orange (2-star) camps, such as part of KRC, 2W, 5, 6, and 14, face moderate issues. Red (1-star) camps, including part of KRC, 1W and 14, have critical water and sanitation gaps. In Teknaf, Nayapara RC and other dark green (5-star) networks perform well. However, yellow (3-star) and orange (2-star) camps like 25 and parts of 26 struggle with supply consistency.

Other indicators & Findings

Topography

Table 2: Frequency and percentage of types of topography

Topography	N	percent
down hill	491	58.31%
not respond	2	0.24%
up hill	349	41.45%

Table 2 provides an overview of the topographical distribution within the survey area, with the majority of camps (58.3%) situated in downhill locations. A smaller proportion, 41.5%, are located uphill, which may influence factors such as water access and infrastructure stability. Only a minimal number (0.2%) did not respond to this question, suggesting a low rate of nonresponse and a reliable capture of the terrain characteristics across camps. These topographical insights are important for planning service delivery, as elevation may impact the feasibility and method of water distribution and other essential services.

Logbook availability

Table 3: Logbook availability analysis in 95% CI

Logbook availability	N	%	(95% CI)
no	126	35.00%	(30.08 - 40.17)
yes	234	65.00%	(59.83 - 69.92)

Of the total three observations**,** 65% (95% CI: 59.83 - 69.92) had logbooks available, indicating a majority of the sites are equipped with this important documentation. The relatively narrow confidence interval suggests good precision in the estimate, reflecting a high level of certainty in the findings. However, the fact that more than one-third of settings either lack logbooks or have missing data (35%) raises concerns about the comprehensiveness of data management and potential impacts on monitoring and accountability processes.

Functional Flowmeter

Table 4: Functional flowmeter status with percentage and 95% CI

Flow meter	N	%	(95% CI)
no	158	43.89%	(38.69 - 49.19)
yes	202	56.11%	(50.81 - 61.31)

The majority of Table 4 observations, 56.11% (95% CI: 50.81 - 61.31), reported having functional flow meters. This indicates that over half of the settings have the necessary equipment for measuring flow, which is crucial for monitoring and ensuring proper service delivery. There are notable gaps, with 44**%** of settings lacking this critical equipment. This shortfall could impact the ability of these settings to effectively monitor.

Chlorine Stock

Table 5: Descriptive table for chlorine stock

Chlorine stock	N	%	(95% CI)
no	181	50.28%	(44.99 - 55.56)
yes	179	49.72%	(44.44 - 55.01)

The findings of Table 5 show that half of the facilities are adequately stocked with chlorine (49.72%), ensuring they can carry out water chlorination processes. However, the fact that other half of the facilities lack chlorine stock is a concern, potentially compromising water safety in those areas. Addressing this gap is critical to ensure all facilities are equipped to perform essential water treatment.

Chlorine Logbook Availability

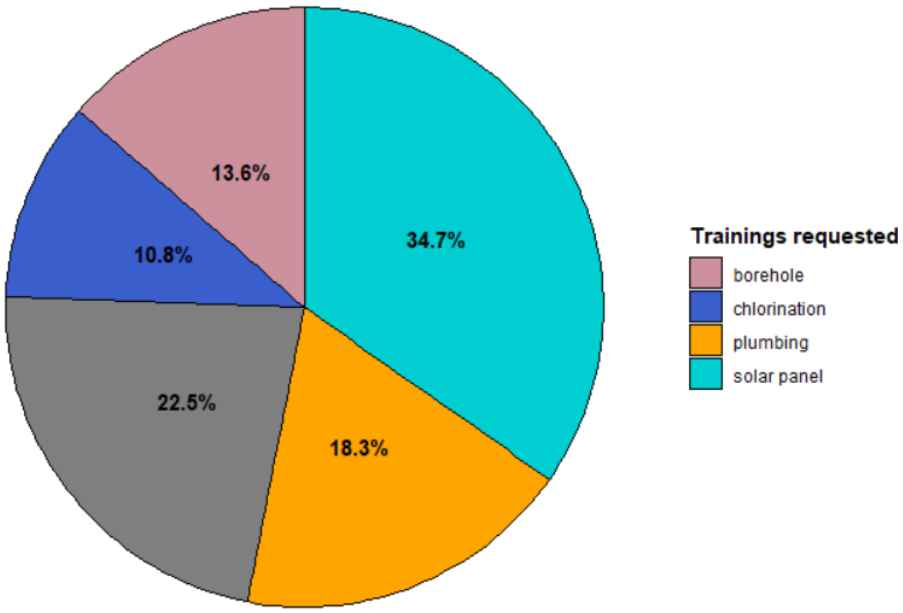
Table 6: Analysis table for chlorine logbook availability

Chlorine logbook	N	%	(95% CI)
no	214	59.44%	(54.17 - 64.56)
yes	146	40.56%	(35.44 - 45.83)

Table 6 highlights the chlorine logbook availability across the sample. Meanwhile, 40.56% of logbooks report not available and another 59.44% indicate the presence of a chlorine logbook. This suggests an imbalanced distribution between the absence and presence of chlorine labels.

Training Requested by Operators

Figure 18: Most common types of training requested by the operators



Among the respondents, 35% indicated a need for training on solar panel installation, the highest proportion compared to other training needs, including plumbing (18%) and borehole maintenance (13%). Nearly a quarter (23%) of respondents did not provide an answer during the survey.

Frequency of Working Taps Associated with Water Distribution Hours

Table 7: frequency of working taps associated with water distribution in hours

Characteristic	**1-2hrs**, N = 85[1]	**1hr<**, N = 213[1]	**2hrs**, N = 327[1]	**2hrs>**, N = 177[1]
Number of taps working				
1_time	37 (44%)	116 (54%)	315 (97%)	37 (21%)
2_times	46 (54%)	94 (44%)	10 (3.1%)	132 (75%)
3_times	2 (2.4%)	3 (1.4%)	0 (0%)	4 (2.3%)
4_times_&>	0 (0%)	0 (0%)	0 (0%)	3 (1.7%)
Unknown	0	0	2	1

[1]n (%)

Table 7 presents the frequency of functional tap stands in relation to daily water distribution hours across camps, illustrating variations in access based on distribution times. Notably, tap functionality is highest

(97%) when water distribution occurs for two hours, with single-time distributions showing a moderate level of functionality (44–54%) across all distribution durations. Camps receiving water more than twice daily show minimal tap functionality, with only a few taps operational in the 3 or more times per day category (0–2.4%). These findings suggest that increased distribution duration, specifically around two hours per day, may be associated with optimal tap functionality. Conversely, more frequent water distributions may not proportionately increase tap operation, which could indicate logistical or mechanical constraints that affect consistent water access within shorter distribution windows. These patterns provide valuable insights into water access strategies and infrastructure requirements for sustainable tap functionality across camp settings.

Reactivity to solve issues

Figure 19: Proportion of tap stands reactivation by time duration

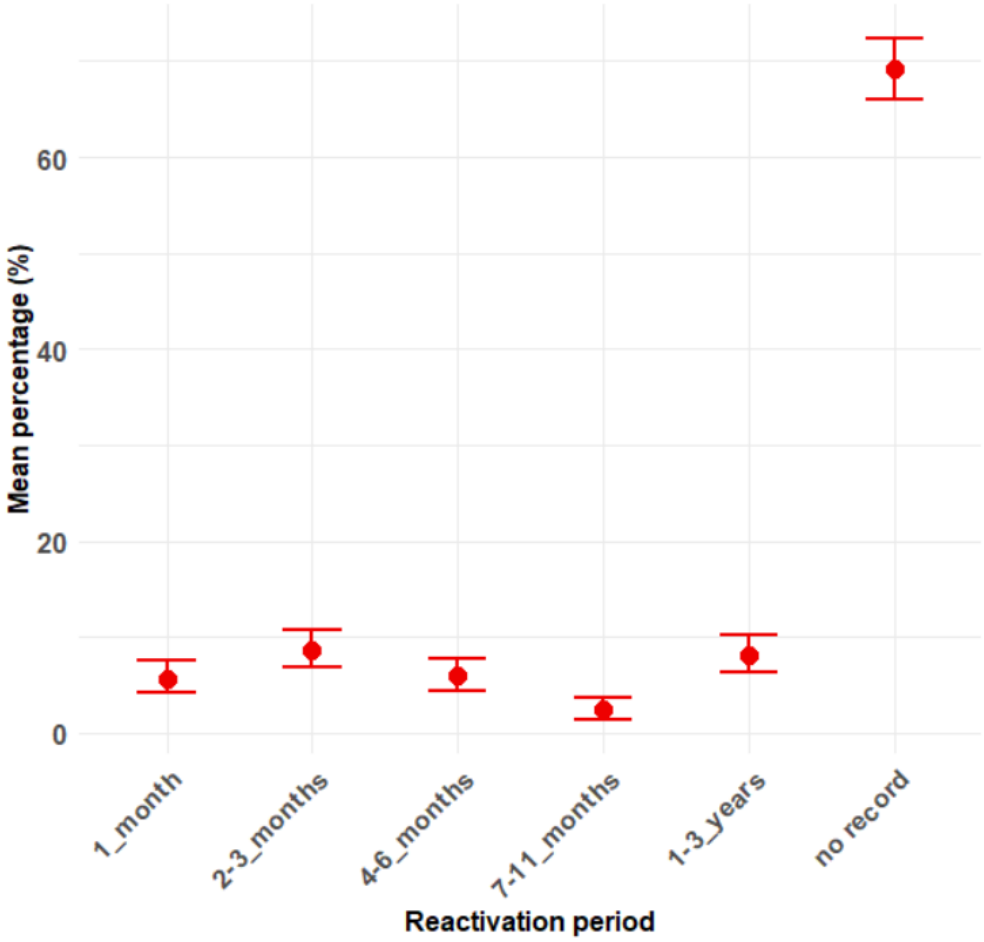


Figure 20 summarizes the reactivation periods for non-functional tap stands across surveyed camps, providing insights into the duration and prevalence of service interruptions. A significant portion of tap stands (69.2%) lacked the records on functionality, with a 95% confidence interval (CI) ranging from 66.0% to 72.3%, highlighting potential gaps in monitoring or maintenance documentation. Shorter reactivation intervals were less common, with only 5.7% of taps reactivated within one month (95% CI: 4.2% - 7.5%) and 5.9% within four to six months (95% CI: 4.4% - 7.8%). Reactivation over two to three months and one to three years accounted for 8.7% (95% CI: 6.9% - 10.8%) and 8.1% (95% CI: 6.3% - 10.1%), respectively. Only 2.4% of taps were reactivated within seven to eleven months (95% CI: 1.5% - 3.6%). These findings suggest that while a subset of taps receives timely repairs, many lack regular monitoring, which could impact water access reliability. Addressing these extended reactivation intervals is essential for improving water infrastructure resilience in the camps.

Human resources

Table 8: Association between number of tap stands and staff deployment

Characteristic	**1-3**, N = 271[1]	**10-12**, N = 2[1]	**13-15**, N = 3[1]	**4-6**, N = 26[1]	**7-9**, N = 3[1]
Number of taps stands					
above_50	10 (3.7%)	0 (0%)	0 (0%)	1 (3.8%)	0 (0%)
less_10	118 (44%)	0 (0%)	0 (0%)	4 (15%)	2 (67%)
less_20	46 (17%)	1 (50%)	0 (0%)	7 (27%)	0 (0%)
less_30	34 (13%)	0 (0%)	0 (0%)	8 (31%)	0 (0%)
less_40	18 (6.7%)	1 (50%)	0 (0%)	2 (7.7%)	0 (0%)
less_50	41 (15%)	0 (0%)	3 (100%)	4 (15%)	1 (33%)
Unknown	4	0	0	0	0

[1]n (%)

Table 8 presents an association between the number of tap stands and staff deployment across different groups based on the count of tap stands in each camp setting. Operated by 1-3 staff represented the majority (2,711 cases), where 44% with fewer than 10 tap stands and a smaller percentage (3.7%) had over 50 tap stands. For water networks with higher, such as those with 10-12 or 13-15 staff counts, was exclusively allocated to sites with fewer than 50 tap stands, with no networks in these categories having over 50 tap stands. Networks with 4-6 staffing showed a more varied distribution, with 31% operating less than 30 tap stands, 15% operating fewer than 10 and only 3.8% having more than 50 tap stands. The 7-9 staff group primarily managed fewer than 10 tap stands, constituting 67% of the deployments in this category.

Challenges from the operators

Table 9: Challenges faced by operators

Challenges	N	% (95% CI)
chlorination	10	2.78% (1.34 - 5.05)
generator/fuel	44	12.22% (9.02 - 16.06)
not respond	156	43.33% (38.15 - 48.63)
other	58	16.11% (12.47 - 20.32)
pump	12	3.33% (1.73 - 5.75)
solar panel	43	11.94% (8.78 - 15.75)
storage	11	3.06% (1.53 - 5.40)
working hours	26	7.22% (4.77 - 10.40)

The most commonly reported challenge relates to generator/fuel issues (12.22%) and solar panel problems (11.94%), both of which reflect energy supply challenges critical for the operation of water systems. The high percentage of unreported information (43.33%) raises concerns about incomplete reporting, which limits the ability to draw comprehensive conclusions from the data. Other challenges (16.11%) represent a significant category, requiring further clarification, while issues like chlorination and pump problems are less frequently reported but still relevant for maintaining water quality and distribution systems.

Concern from the beneficiaries

Table 10: Proportionate calculation of beneficiary concern

Issues in taps	N	% (95% CI)
access	34	2.02% (1.40 - 2.81)
not respond	68	4.04% (3.15 - 5.09)
other	56	3.33% (2.52 - 4.30)
quality	191	11.34% (9.87 - 12.95)
quantity	258	15.32% (13.63 - 17.13)
queue time	208	12.35% (10.82 - 14.02)
sustainability	27	1.60% (1.06 - 2.32)

Total	842	100% (100 - 100)

Table 10 summarizes beneficiaries' concerns regarding tap functionality, highlighting specific issues encountered in accessing water resources. The most frequently reported concern is water quantity, accounting for 15.3% (95% CI: 13.63 - 17.13) of responses, suggesting that water supply adequacy is a prominent issue across camps. Queue time follows as a notable concern, with 12.4% (95% CI: 10.82 - 14.02) of respondents indicating prolonged waiting times to access water, which may impact daily routines and overall satisfaction with water access services.

Water quality was also highlighted by 11.3% (95% CI: 9.87 - 12.95) of respondents, pointing to potential issues in water safety or potability, which could increase health risks if left unaddressed. Other concerns, such as access (2.0%), sustainability (1.6%) and other unspecified issues (3.3%), were less commonly reported, yet may represent significant barriers for smaller subsets of the population. Notably, a small portion of beneficiaries (4.0%) did not respond, indicating minimal nonresponse bias and suggesting that the data largely reflects the concerns of the surveyed population.

Discussion

The MSF Five Star Assessment (2024) builds on the baseline data provided by the IWM assessment conducted in 2023, offering insights into both improvements and deteriorations across key water network indicators in the Rohingya camps. The following analysis provides a concise comparison of progress or regression based on this updated data.

Water Production: MSF's 2024 assessment shows that 27% of camps currently meet or exceed the emergency standard of 20 liters per person per day, reflecting some progress in select camps. However, many remain below this level, with average production around 15 liters per person in several locations. Compared to the 2023 IWM baseline, which indicated even lower production rates in some camps, there is moderate improvement in water distribution in camps such as 15 and 14. However, Camps 20 Ext and 22 continue to lag significantly, highlighting a persistent need for focused improvements in under-served areas.

Time Distribution: The MSF findings from 2024 indicate variability in time distribution, with some camps only receiving water once daily for less than an hour, a trend consistent with the IWM 2023 baseline. While Ukhiya camps showed a slight improvement, now averaging 2-3 times daily with around 3 hours of supply, camps in Teknaf continue to experience limited frequency and duration, reflecting minimal change from 2023. This stagnant performance

suggests the need for extended distribution schedules, particularly in Teknaf camps, to ensure more consistent water access.

Water Treatment (Chlorination): Chlorination levels show a concerning trend. According to MSF's 2024 data, 50% of camps still fall below the minimum Free Residual Chlorine (FRC) standards, with levels often below 0.3 mg/L. This is a deterioration from the 2023 baseline, where IWM recorded detectable FRC in 55% of tap stands, though only 20% met optimal FRC levels of 0.5 mg/L. The 2024 data suggests a decline in chlorination consistency, underscoring the need for standardized dosing systems and regular FRC monitoring to prevent potential health risks.

Tap Stand Functionality: Tap stand functionality remains variable but shows some pockets of improvement. MSF's 2024 assessment reveals that certain camps, like 15 and 24, maintain over 80% functional taps, slightly better than the 2023 baseline. However, camps such as 4 Ext and 20 Ext continue to struggle, with fewer than 30% of taps functional, consistent with last year's findings. This limited progress suggests that while some camps have benefited from regular maintenance, others still require better upkeep and access to spare parts.

Beneficiary Satisfaction: Beneficiary satisfaction levels in 2024 indicate ongoing dissatisfaction in certain camps, with 42% of respondents expressing concerns about water availability, long wait times, and inequitable distribution. This aligns with the 2023 baseline data, where dissatisfaction was particularly high in camps with low per capita water allocation and frequent service disruptions. Camps like 15 have shown slight improvement in satisfaction due to consistent schedules, but areas such as Camps 4 Ext and 22 continue to report high levels of dissatisfaction. This persistent gap underscores the need for community engagement and responsive adjustments in service delivery.

Other findings:

Logistics and Maintenance: Issues such as chlorine shortages and non-functional flow meters persist, requiring strengthened inventory management and training on equipment maintenance.

Topography and Access: Camps located on challenging terrain, experience more severe service interruptions. Upkeep of water infrastructure in uphill areas has suffered, as funding limitations curtail specialized equipment and additional staffing support needed for these regions.

Human Resources and Training Needs: MSF reported a demand for training in solar panel installation and borehole maintenance. This finding aligns with IWM's observations on the technical skill gaps among local operators, particularly in camps with lower tap functionality.

Challenges and limits of the study

Challenges

The assessment faced several operational challenges that impacted coordination, data collection, and logistical efficiency:

Communication and Coordination: Communication gaps were observed between operation teams and the Camp-in-Charge (CiC), leading to occasional misunderstandings and inefficiencies. Additionally, limited information sharing between WASH focal points and implementing partners affected coordination and the integration of crucial data.

Collaboration and Approvals: Some implementing partners displayed limited collaboration during the assessment, which impacted the comprehensiveness of data collection. Delays in obtaining approvals from the Department of Public Health Engineering (DPHE) further extended timelines.

Security and Safety Concerns: Security issues, including isolated incidents of gun violence, posed significant risks to personnel and affected operational stability. Broader security concerns within some camps contributed to an environment of caution, impacting team morale and safety.

Environmental and Logistical Constraints: Heavy rainfall created access challenges, complicating logistics and delaying assessment activities. Additionally, time constraints on water distribution affected the planning and timely execution of assessments.

Time and Data Constraints: Overall time limitations placed pressure on the assessment process, potentially affecting the depth and accuracy of data. The absence of previous monitoring data presented challenges in establishing baselines, while some discrepancies in IWM data highlighted data reliability issues.

Limitations of the Study

Timing and Accessibility: Logistical timing issues meant that some teams faced difficulties arriving on-site in advance of water distribution, which occasionally disrupted assessment preparation and execution.

Training and Data Quality: Due to time constraints, data collector training was shortened, which may have impacted data quality. Movement restrictions also limited the availability of experienced data collectors from the Community-Based Targeting and Monitoring (CBTM) team, particularly in Teknaf, further affecting data quality

Recommendations

For Each Implementing Partner

Extend Distribution Times: Increase water distribution in under-served camps and ensure functional flow meters are installed for accurate monitoring.
Standardize Chlorination: Implement automatic chlorination systems and maintain FRC logbooks; train operators on precise dosing to improve water quality.
Maintain Tap Stands: Keep sufficient stocks of spare parts to allow for quick repairs, ensuring tap stands remain functional.
Engage Beneficiaries: Regularly collect feedback from beneficiaries on water availability and satisfaction to guide service adjustments.

For AFA/DPHE

Repair Networks: Focus on repairs in non-functional and underperforming networks, particularly pumps and solar systems, to stabilize water access.
Ensure Consistent Chlorination: Standardize chlorination practices and conduct regular FRC monitoring to maintain safe water quality.
Increase Staffing: Align staffing levels with network demand, placing additional personnel in high-need areas and providing training on network operations.
Enhance Monitoring: Install flow meters and maintain logbooks to improve monitoring accuracy and accountability across networks.

For the WASH Sector

Secure Increased Funding: Advocate for additional funding and prioritize resource allocation for critical infrastructure repairs and high-need areas.
Standardize Protocols: Establish unified standards for chlorination, flow monitoring, maintenance and HR coverage across all partners to ensure consistent service quality.
Incorporate Beneficiary Feedback: Use insights from community feedback to adjust services in ways that directly address user needs and concerns.

Way Forward for MSF

Provide Technical Support: Offer expertise to strengthen local capacity in managing networks, chlorination, and maintenance.
Conduct Targeted Upgrades: Supply essential equipment, such as pumps and dosing systems, to stabilize high-need networks.

Lead Training Initiatives: Focus on training operators in chlorination, maintenance, and emergency responses to uphold high service standards.
Continue Advocacy and Monitoring: Conduct regular assessments to support advocacy for sustainable WASH funding and ensure consistent, safe water access.
Link Functionality to Health Outcomes: Connect the functionality of infrastructure and the provision of safe drinking water to WASH-related morbidity in the camp. This will help generate clear evidence of the health impacts of WASH interventions, strengthening advocacy efforts.

Conclusion

The Five Star Survey across 33 Rohingya refugee camps in Cox's Bazar reveals critical areas for improvement in water network performance, accessibility, and safety. Despite initial progress in establishing emergency WASH infrastructure, the assessment highlights significant challenges in maintaining these services amid funding constraints and resource limitations.

Key gaps identified include the inconsistent provision of safe water, with several camps unable to meet the emergency standard of 20 litres per person per day. Chlorination practices across networks lack uniformity, compromising water quality and posing potential health risks for the population. Additionally, the absence of functional flow meters in many networks restricts accurate monitoring, impacting service reliability and the ability to respond effectively to demand fluctuations. Beneficiary feedback has further underscored concerns around water availability, long wait times, and inequities in distribution, particularly affecting high-demand areas and vulnerable households.

This assessment underlines the urgency for strengthened, coordinated efforts from all WASH actors to address these deficiencies. By focusing on systematic improvements in distribution, treatment, and monitoring, there is an opportunity to enhance service reliability and safeguard the health and well-being of camp residents. The findings provide a roadmap for targeted interventions that prioritize sustainable, equitable, and safe access to water, reinforcing the resilience of the water network infrastructure under challenging conditions

ANNEXES

Questions

Individual Actor - Narratives

Maps