



# **NADIA'S** **INITIATIVE**

## SITUATION REPORT ON WASH IN SINJAR DISTRICT

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APRIL 2019 // CONDUCTED BY RELIEF INTERNATIONAL

# FOREWARD

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When ISIL began its campaign of genocide against the Yazidis on August 3, 2014, the vast majority of my people and our neighbors were forced from our homeland, where we had lived peacefully for centuries. Today, Sinjar has been liberated, but the Yazidis' struggle remains far from over.

Many displaced Yazidis remain missing, with scores of women still enslaved as I once was. Survivors like myself that returned to Sinjar found our villages and towns in rubble, leaving us to languish in camps and impoverished conditions. Despite our painful past, which persists to present day as we find more mass graves, I have committed Nadia's Initiative to looking towards the future by rebuilding my war-torn homeland.

I am pleased to share this report with you as a detailed look at the single greatest challenge Sinjaris face when returning home: lack of access to water and sanitation. As Nadia's Initiative sought to understand and address this critical resource deficiency, we chose to partner with a leading international NGO, Relief International, that has a long history of operating successful WASH programs in the region. Their assessment of existing needs and recommendations offers a plan of action for restoring fundamental rights to our district. Connecting Sinjar to these life-sustaining resources is Nadia's Initiative's first priority.

I ask that you join me in supporting the redevelopment of Sinjar to allow Yazidis and our neighbors to return home and begin to heal from this tragedy.



With gratitude,

Nadia Murad

***Founder of Nadia's Initiative and Nobel Peace Prize Laureate***



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# ACKNOWLEDGEMENTS

The following assessment has been carried out by Relief International (RI) for **Nadia's Initiative**, a non-profit organization founded in 2016 by Nobel Peace Prize Laureate Nadia Murad. The Sinjar WASH Assessment (SWA) Team thanks the individuals, local institutions and Yazidi families who contributed their time and expertise to this assessment.

The SWA Team also thanks all the NGOs, UN Agencies, and other humanitarian actors who provided guidance and feedback during the assessment with their expertise and knowledge of the Sinjar Region, Kurdistan, and Iraq.

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## PHOTOGRAPHY

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**Relief International** is an international organization established in 1990 that specializes in fragile, high-risk settings, responding to natural disasters, humanitarian emergencies, and chronic poverty with health, livelihoods, education, and WASH interventions. Relief International has been working in Iraq since 2003 and it has extensive experience in providing WASH support to the most affected populations in rural and urban areas of the country. In particular, RI has worked nationwide in Iraq and has maintained constant access to hard-to-reach and insecure areas, ensuring WASH support to the most vulnerable beneficiaries. RI's WASH programming is multifaceted and always adapted to the specific context and culture of the area. Previous interventions have focused on: the construction and rehabilitation of WASH infrastructure, awareness raising campaigns, hygiene kit distribution, hygiene promotion, water quality testing and maintenance, and the management of waste in communities. Throughout RI's WASH interventions, there is a high importance placed on capacity building at the Department of Water, but also local community members and structures, to ensure both durable and sustainable interventions.



# CONTEXT AND BACKGROUND

In 2014, Islamic State (ISIL) combatants forced millions of people in Iraq to flee their homes and destroyed the basic infrastructure of the country, leaving its population with very little or no access to basic services such as health, food, water, and education. Following the liberation from ISIL at the end of 2017, Iraq entered a transition period from emergency humanitarian relief to emergency recovery. Despite this transition, according to the Humanitarian Needs Overview for 2019, 6.7 million of people require assistance across the country: 30% of them are internally displaced (2 million); 60% are returnees (4 million); while host communities and refugees represent 6% and 4% of the total population in need in the country. Iraq's minorities continue to face challenges in terms of livelihoods, security, and basic services. Among these minorities, Yazidis remain one of the most affected communities in need of humanitarian intervention, with Sinjar district presenting immediate humanitarian needs as well as medium and longer term development issues.

The Yazidi community in Iraq has historically inhabited the district of Sinjar, in the northwestern area of Ninewa Governorate, on the border with Syria. In August 2014, the occupation of the district by ISIL forces led to the destruction of the region as well as the displacement of 130,000 people to other areas of the country. Harsh violence was perpetrated against those who could not escape, specifically the Yazidis.

The ISIL invasion in 2014 resulted in what is known today as the Sinjar Massacre and the Genocide of Yazidis. As detailed in Nadia's Initiative report *In the Aftermath of Genocide* published in 2018, those who were not killed were besieged on Mount Sinjar - between 40,000 and 50,000 people - with extreme temperatures and very little access to water and food, causing deaths from dehydration and starvation. Additionally, according to the same report, more than 3,200 women and children were imprisoned and turned into slaves. The long-lasting effects of the occupation of almost two years can still be seen. ISIL fighters damaged the key livelihood means in Sinjar, specifically in relation to agriculture and livestock; many Yazidi still struggle to return to Sinjar because of their perception of the district as an insecure area. Other humanitarian needs remain high in terms of education, health, shelter, protection, and infrastructure, and perpetrate the inability of Yazidis to restore and rebuild their lives in Sinjar.

Specifically, the district still presents significant challenges in the field of Water, Sanitation, and Hygiene (WASH). WASH service deficits create an immediate health risk caused by inadequate access to safe water, poor sanitary conditions and bad hygiene practices in private households, schools, and hospitals, in and out of camp settings. Affected communities in rural villages have insufficient access to safe water and sanitation, have inadequate quantities of safe drinking water, lack of functioning latrines, and have limited availability of basic hygiene items. In particular, the lack of WASH infrastructure in schools represents an enormous challenge as the current situation prevents children from returning to education or exposes those who do return to the risk of communicable diseases.





# INTRODUCTION

## EXECUTIVE SUMMARY

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After safety and security issues, the largest barrier for the Yazidis to return their homes is the lack of household services, specifically water and sanitation. The assessment, carried out by Relief International for Nadia's Initiative, sought to better understand the barriers to water and sanitation (WASH) and deliver an actionable plan for restoring critical WASH to communities in Sinjar that wish to rebuild their lives in the aftermath of genocide.

Although there has been much movement in the population in the various villages in Sinjar (some increased, some decreased, and some new settlements were formed), the WASH assessment established previous and current WASH conditions (page 8 and 9) for each village based on previous populations. Although it would be tempting to predict where these populations will be distributed in the future, this assessment only evaluated pre-Genocide populations and WASH to service those numbers. In addition, many Sinjari claim that WASH was deficient before the Genocide. However, since RI cannot establish that in any concrete manner, the assessment can only look at WASH issues and list obvious deficiencies (page 10).

The WASH gaps by component for each of the 10 communities assessed are listed on a table on page 11 in order to list all deficiencies from previous standards on one page for quick reference. The subsequent pages describe each community individually by existing WASH services and needs.

The report then presents three Platforms of projects to inform the design and implementation of potential WASH interventions in the region. All recommendations place Protection considerations as the forefront limit and balance the struggle for limited water resources between competing domestic and agricultural needs. Platforms are categorized by themes: (a) **Immediate Response** program; (b) **Rehabilitation** program; and (c) **Transformational** program. These themes represent, respectively: fast WASH response projects; larger rehabilitation projects to bring WASH back to previous conditions; and, innovative new projects that surpass previous WASH and leapfrog into stronger water resiliency. All projects have approaches that include ideas of Water Conservation (similar to all projects having a Protection-centric approach), but Platform C specifically identifies Water Conservation measures.

## METHODOLOGY: ASSESSMENT PROCESS

The field data collection was conducted by the SWA Team from April 1 to April 15, 2019 for a total of 11 working days in the Sinjar communities. Ten Sinjar villages identified as needing WASH support were confirmed as safe for the review team to visit. Two other areas identified by the Department of Water (DoW) for WASH support, namely the villages outside of Wardiya and the 15 informal villages along the plateaus at the base of the Sinjar Mountain, among others were not assessed due to security restrictions and access limitations.

The following table shows the schedule of interviews and discussions, and the areas and WASH infrastructure evaluated by the team on each day of the assessment.

Both primary and secondary sources were utilized. Firstly, to enhance their understanding of the context and the challenges faced by the Yazidi community in Sinjar region, background research was carried out consulting reports of other international organizations working in the area, as well as the report conducted by Nadia's Initiative in 2018: *In the Aftermath of Genocide*.

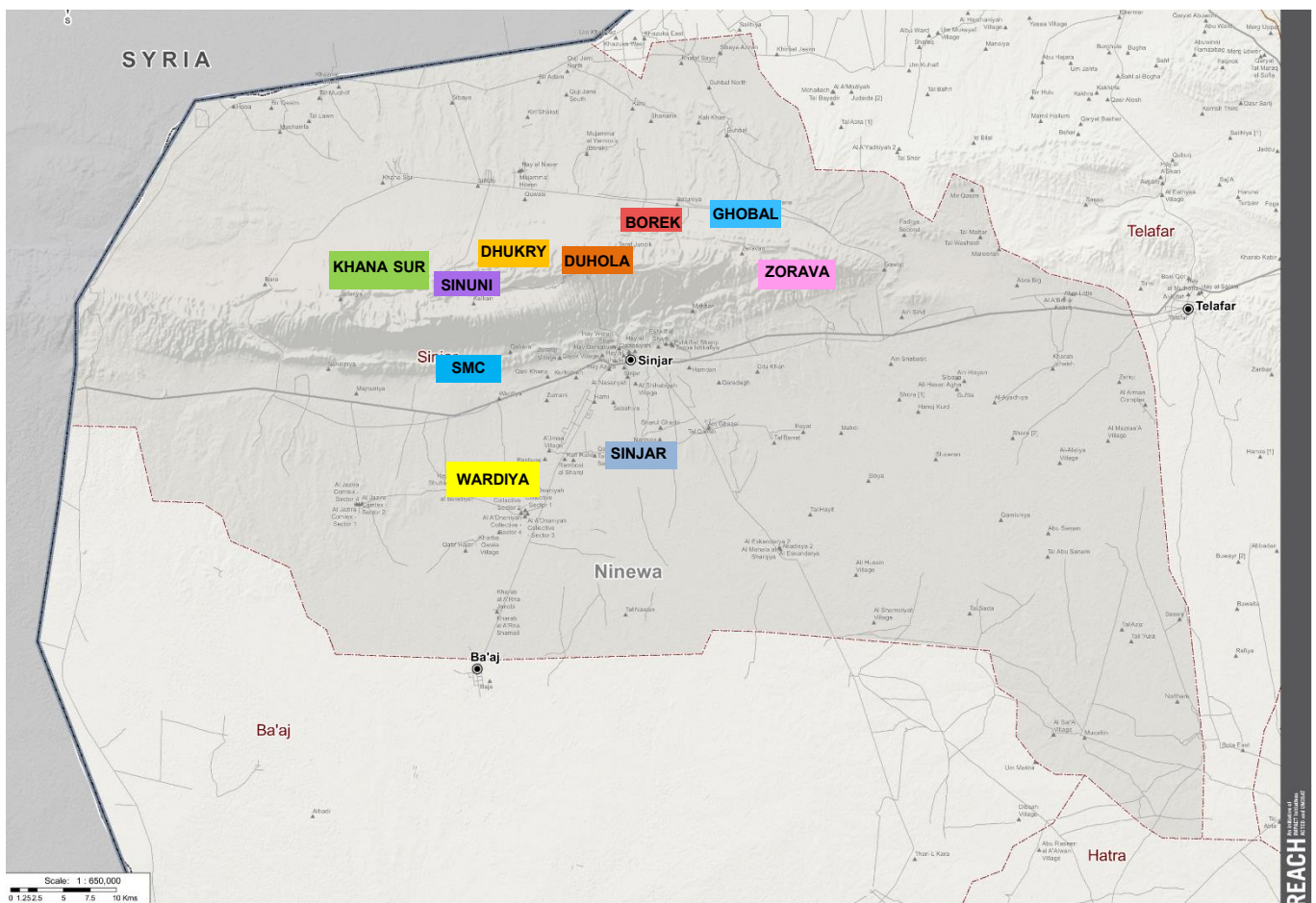


Next, the SWA Team conducted high-level WASH discussions at the Iraq federal government level, specifically with key focal points from the Directorate of Water (DoW) and the Directorate of Sanitation (DoS) in Mosul. Once reaching an agreement of cooperation, the SWA Team obtained access to local communities in the district of Sinjar. The SWA Team was then able to carry out interviews with the local staff of the directorates at the community level as well as conduct frequent meetings with the mayors of Sinjar Center and Sinuni, the municipal managers and staff, and the youth leaders.

Finally, interviews and discussions took place with village Muktaars (leaders), community members, and business owners. All information provided by the various stakeholders was documented and compared with information gathered during site visits; the needs assessment analysis is predominantly based on SWA Team witnessed data. During the field assessment, local and international non-governmental organizations (NGOs) were approached to determine the needs already being covered and to ensure that the assessment was focusing on WASH challenges that have still not been addressed. The SWA Team also participated in the informal United Nations Office for the Coordination of Humanitarian Affairs (UNOCHA) regional meeting.

The team utilized survey tools based on the System’s Approach Methodology of Relief International. However, the tools were tailored and adjusted in relation to the participants’ role in WASH activities in Sinjar. Additionally, during the 11th and last day of the assessment, a community gathering was arranged. Sample demographic members from each village attended to discuss WASH needs, challenges, and opportunities in Sinjar region. Prior to this open discussion session, a specific but simple survey was provided to each participant and all the survey results were then collected. During the open session, all community members’ talking points were documented.

The following map shows the areas visited and assessed. The report presents the main findings from the field and final recommendations on the WASH interventions required in the region on a village-by-village basis and segregated by duration and approach.





# OVERVIEW OF WASH SITUATION IN SINJAR

Prior to the conflict, WASH infrastructure and activities in Sinjar were robust and the government had plans in place to build new infrastructure and budgets to sustain existing assets. However, these activities were heavily impacted by the 2014 attacks. Currently, the community in Sinjar Region is in critical need of WASH assistance: maintenance reserve funds are insufficient to rehabilitate and rebuild damaged or destroyed equipment and networks; continuous delays in the general maintenance of existing assets has generated an accumulation of neglected works; agriculture competes with domestic water needs over limited access to water; and existing WASH assets need to be restored to facilitate and improve living conditions of those former residents who decide to return to the region.

The entire Sinjar region employs boreholes to extract **groundwater** for domestic and agricultural purposes. The boreholes managed by the DoW and those developed by private companies generally reach depths of 180 m to 200 m, enabling access to lower confined or “closed” aquifers; these water sources have high salinity in northwest areas and production rates are mostly consistent, typically 35m<sup>3</sup>/h. Some Sinjar residents have built their own onsite hammered wells for domestic purposes to reach the best quality water at 15 – 25m below ground level; these uncased boreholes likely extract shallow groundwater from unconfined or “open” aquifers vulnerable to fecal contamination and saline water from deeper aquifers. As such, the quality of water has been reported to be poor in many areas and quantity is susceptible to acute weather changes. The management of boreholes remains inconsistent across the Sinjar region.

Several villages, and the main urban centers of Sinjar Center and Sinuni Center, have **water distribution** systems, all conveyed by gravity when they functioned properly prior to the genocide. However, these pipe networks have been predominantly destroyed, either from catastrophic damage during the 2014 attacks or from mutilation by residents who remained and tried to access water. These networks are controlled by the local DoW and extend to nearly all residences within their areas, theoretically reaching more than 90% of the households. Pre-conflict budgets were sufficient for capital investments to expand existing systems to unserved areas and to improve existing assets, and for maintenance. In most areas, the pre-conflict distribution quantity was sufficient to meet the Iraqi standards; however, post-conflict distribution has been irregular and as such, residents tapped into feeder mains when local mains were dry, creating network leaks. Currently, most Sinjar water distribution networks are extensively riddled with leaking unregulated connections and damage from the 2014 attacks, to the point that water can no longer be conveyed to all households. As such, residents have resorted to purchasing questionable water from water trucks or paying for onsite water wells to be drilled in their yards, yielding low quality water and inconsistent quantities.

**Wastewater collection** coverage in Sinjar is low, with only two collection networks built prior to the conflict by the DoS. In most locations, residents have installed their own onsite sewage tank to collect either blackwater or all sewage; these tanks lack flooring and the liquid waste flows into the ground under the tanks to the local environment, possibly the open aquifers. These informal sewage disposal systems likely flow into neighboring onsite wells, contaminating neighbors’ water supply. Wastewater collected in the two existing networks is discharged into the environment at outlying areas in settling ponds; these ponds allow fecal contaminated water to soak into the surrounding soil or flow to the local creek.

Most Sinjar villages are located on sloping topography and as such they enjoy the benefit of a natural **rainwater drainage** system to the local creek: these natural systems prevent flooding and are a benefit to the community. However, Sinjar residents often use these natural conveyance systems to discharge their household greywater, which can become septic and a source of groundwater contamination. Some Sinjar villages have piped networks with manholes managed by the DoS. These rainwater drainage systems have been damaged in the conflict and require immediate maintenance and rehabilitation which have been delayed due to budget restrictions at the DoS.

**Solid waste** (garbage or rubbish) is managed by local municipal authorities and residents do not directly pay for solid waste collection. Sinuni Center provides solid waste collection for itself and the northern villages; Sinjar Center only collects solid waste for itself and does not support the southern villages. These municipalities have solid waste collection trucks but do not process or recycle any materials, nor do they divert organic wastes. Most solid waste is disposed of into the local creeks, some is informally dumped into outlying unlined pits. Leachate control is not present. According to one of the participants, it is unlikely that there is much appetite for residents to pay for sustainable waste disposal and the construction of an engineered landfill. The municipalities recognize that their current solid waste disposal practices do not meet Iraqi standards but are not able to fund new landfills; however they are able to support the operation and maintenance of collection trucks.

**WASH in Schools** program is based in Duhok under the authority of the Department of Education and is currently stalled. Toilets and handwashing sinks exist in nearly all schools, but municipal water distribution is often lacking and consequently, WASH activities are stunted. Some schools have onsite boreholes and “at tap” water treatment units, but nearly all treatment units viewed are broken, hallways water storage tanks are empty, and borehole water quality is not trusted. In many schools, students are required to bring drinking water with them to their classes. Onsite wastewater collection tanks often exist, but are not maintained with regularity and discharge overflows directly into the surrounding environment.

Two **hospitals** serve the population of Sinjar region: one in Sinjar Center and the other in Sinuni Center. The Sinjar Center hospital was destroyed and is temporarily housed in a former community center that requires substantial WASH support; the Sinuni Center hospital is supported by Médecins Sans Frontières (MSF) and is well serviced. Sinuni hospital has an incinerator for solid waste disposal, while Sinjar hospital lacks a method to safely dispose of biohazard wastes. Both hospitals would benefit from an onsite liquid waste treatment system and incinerator ash disposal system. Both hospitals have septic tanks but lack treatment systems; these tanks overflow into the local creeks, creating a potential health risk to their communities if waterborne diseases arrive. Other **community centers and institutions** lack WASH facilities and require basic WASH support. **Businesses** rely on the same WASH services provided at the domestic level.

**Agriculture** competes with residents for water resources while serving as a critical livelihoods source in Sinjar. The **livestock** water demand is consistent, as is the typical domestic water demand, once populations stabilize and resident migration stops. These water needs could be supplied through existing boreholes if all illegal connections that steal away drinking water were removed.

More challenging to determine are the **irrigation system** needs for the Sinjar district, which can fluctuate with environmental conditions. Frequently, leaks and increased risk of contamination are created from residents tapping into in the water distribution systems for agricultural purposes; some villages have so many illegal connections on their feeder mains that the pipe runs dry and downstream neighborhoods receive no water. Some larger agricultural operations are believed to have tapped into transmission lines from borehole fields kilometers away from villages, thereby significantly reducing the amount of water arriving at village boundaries upstream of the distribution networks. Many residents have installed shallow onsite wells that are insufficient for drinking water, likely contaminated from animal wastes and septic tank overflows, and susceptible to ambient environmental fluctuations. However, these wells are suitable for household agriculture.



# PRE-EXISTING WASH ISSUES

Despite the efforts of the DoW and DoS to provide WASH services, after the 2014 attacks the existing WASH servicing in Sinjar villages were significantly damaged and all WASH activities were stunted. Since then, the allotment of water for private and public activities and WASH servicing responsibilities became unclear as governing authorities changed. New governing structures were unprepared to fund the capital investments necessary to rebuild infrastructure, even when they had sustainable operations and maintenance (O&M) budgets. As a result, many WASH services and networks, which could have continued to operate after the crisis if immediate capital funds were available, instead were neglected as the O&M budgets were insufficient to make necessary repairs or replacements. As such, entire systems fell into neglected conditions and possible disrepair. However, prior to the Sinjar Genocide, other WASH-related issues existed:

70% of Sinjari identify agriculture as their predominant source of income. Water demand for **agriculture competes for domestic use needs** for limited available water resources, thereby creating tension within communities. While some families require water for irrigation of plants and for water supply to livestock, their neighbors receive insufficient drinking water quantities from network systems and resort to negative coping activities such as paying for the drilling of a shallow open well of questionable water quality.

Water sharing among communities has been unsuccessful. During this assessment, Borek had its connection to an adjacent village's **water source abruptly terminated**. Plans to extend water supply from river through Tel Afar to Sinjar district would likely have similar issues, increasing Sinjar's vulnerability and decreasing water security.

Various governing bodies share the responsibility of water as a resource but there is no national Water Resource Management Plan (WRMP) outlining the **water resource allotment** among various domestic and livelihoods activities. Sinjari residents have no designated allotment for domestic water purposes to demand as a minimum standard from the Department of Water; conversely, water allotment for irrigation is undesignated and assumed to be unlimited.

The borehole fields and transmission lines of the Department of Water, as well as the internal village water distribution networks, are littered with **leaking unregulated connections**. Residents crudely tap into these pipelines for domestic and agricultural uses when the local water distribution network is dry and/or their onsite open boreholes run dry; these uncontrolled and rudimentary connections leak, typically draining the pipe (release more water than required if no valves are added), and often provide an access point for contamination to enter into the pipelines, thereby increasing the risk of low water quality.

No sanitary sewer networks exist in Sinjar and as such **bottomless septic tanks** are typically installed at each household. In appropriate ground conditions, the soil matrices can attenuate liquid wastes from households when sufficient space and soil structures are provided, but in the Sinjar village settings, the disposal areas under these sewage tanks are too small and no appropriate soil configuration exists. Likely, biomass builds up under these tanks and creates an impermeable layer which pools septic water under these tanks and could potentially flow to shallow open boreholes on the same or adjacent properties, contaminating onsite boreholes with fecal matter.

Open discharge of kitchen sink and cleaning water onto the streets is typically practiced in Sinjar. This informal **open greywater disposal** to streets creates a hygiene hazard as untreated greywater can turn septic within 24-48 hours when left stagnant. Greywater in open drainage ditches and pooling near residents can create WASH issues as vectors collect and breed in open water, and contamination can be spread from septic greywater upon contact.

Neither the Sinjar municipality nor the Sinuni municipality have solid waste landfills that meet the Iraqi standards. All areas in Sinjar **have insufficient solid waste collection**. While landfill improvements were recognized as needed by these municipalities, no plans existed to fund improvements. Currently no "tipping fees" are applied to fund operations at the landfills and no auxiliary landfill stream diversion (biohazard, recycling and resource collection, organic waste system) plans exist.

# WASH NEEDS BY COMMUNITY

The table below summarizes the main findings for WASH needs, segregated by WASH component and by each community. The following pages provide an overview of the current WASH needs and challenges, as well as proposed recommendations for each assessed area.

		SINJAR CENTER	WARDIYA	SINUNI CENTER	DHUKRY	BOREK	KHANA SUR	ZORAVA	GHOBAL	DUHOLA	SINJAR MOUNTAIN CAMP (SMC)
POPULATION	Families	3,092	74	4,000	1,200	2,325	1,500	700	500	1,000	2,550
WATER SOURCE	Current Situation	16 BH and 5 springs: 12 BH functioning	1 BH: not functioning, 3km away	10 BHs	5 BHs: All not functioning	6 BHs: 4 functioning	10 BHs	5 BHs: 4 BH functioning, 1 BH dry	10 BHs: All functioning	8 BHs: All functioning	4 BHs: 3 BH functioning, 1 BH not working
	Needs identified	Rehabilitate 4 BH	Rehabilitate 4 BH	--	Redrill 5 BH	Drill 4 new BHs on private land, elevated storage tanks	--	--	--	1-2 more BHs	4-5 new BHs
WATER DISTRIBUTION SCHEMES	Current Situation	4 distribution stations to distribute water by gravity. Water network under rehabilitation by IOM.	No water networks. Water trucking only.	Water networks, with extensive leaking.	Water network exists but no water source. Water trucking only.	Water network exists but no water source. Water trucking only.	Water networks are leaking. Water trucked to elevated tower.	Water network	Water network	Water network, 80% functional (rehabilitation ongoing).	Water network covering about 300 HH. 3 water trucks deliver water to roadside tanks.
	Needs identified	--	Water distribution network	Distribution network rehabilitation, disconnect program	Water distribution network	Water distribution network	Water source connection, network rehabilitation, disconnect program	--	--	--	Water distribution from roadside tanks to households, water distribution network
WASTEWATER COLLECTION AND TREATMENT	Current Situation	Bottomless septic tanks. No municipal desludging.	Unknown	Bottomless septic tanks. No municipal desludging	Bottomless septic tanks. No municipal desludging	Bottomless septic tanks. No municipal desludging	Bottomless septic tanks. No municipal desludging	Bottomless septic tanks. No municipal desludging	Bottomless septic tanks. No municipal desludging	Bottomless septic tanks. No municipal desludging	Most households have own latrine to open pit, greywater to street
	Needs identified	Private latrines, sealed collection tanks, greywater piping to tanks	Unknown	Private latrines, sealed collection tanks, greywater piping to tanks	Private latrines, sealed collection tanks, greywater piping to tanks	Private latrines, sealed collection tanks, greywater piping to tanks	Private latrines, sealed collection tanks, greywater piping to tanks	Private latrines, sealed collection tanks, greywater piping to tanks	Private latrines, sealed collection tanks, greywater piping to tanks	Private latrines, sealed collection tanks, greywater piping to tanks	Private latrines, sealed collection tanks, greywater piping to tanks
RAINWATER DRAINAGE	Current Situation	Rainwater system, with 340 MHs	Unknown	Rainwater system, with 180 MHs	No rainwater drainage system	No rainwater drainage system	No rainwater drainage system	No rainwater drainage system	No rainwater drainage system	No rainwater drainage system	No rainwater drainage system
	Needs identified	70 MHs need repairs or replacement, cleaning and flusing network	Unknown	Cleaning and flusing system							
SOLID WASTE	Current Situation	Collection every day to inadequate landfill. **only cover Sinjar Center and no other villages	No collection system	Collection every 2nd day to inadequate landfill that is nearly full. **Sinuni covers other northern villages	Collection every 2-7 days	Collection every 2 days	Collection every 2-7 days	Collection every 2-7 days	Collection every 2-7 days	Collection every 7 days	Irregular
	Needs identified	Design and construct an engineered landfill to standards, garbage trucks and other equipment, hiring labourers for cleaning campaign	Collection support from Sinjar, collection bins, household bins	Design and construct an engineered landfill to standards, garbage trucks and other equipment, hiring labourers for cleaning campaign	Household collection bins	Household collection bins	Household collection bins	Household collection bins	Household collection bins	Household collection bins	Household collection bins, garbage collection trucks, hiring labourers for cleaning

# WASH NEEDS AND CHALLENGES IN SINJAR CENTRE

## SINJAR CENTRE: WASH NEEDS IN A NUTSHELL



**3,092 families** living in Sinjar Centre



The water distribution network does not function, and **water trucking** is being used to deliver water



**16 boreholes** supplying water: ten are functional and six require rehabilitation



**Septic tanks** are available but require rehabilitation, and **drainage system** is heavily damaged



## WATER SOURCE AND DISTRIBUTION

**10** Functioning boreholes



**6** Boreholes in need of rehabilitation

Water from **five natural springs** can be also collected, chlorinated, and sent for distribution to two stations by pumps powered by the electrical system, when available.



This water distribution network has been destroyed during ISIL occupation and is currently under rehabilitation, with water trucking being used to deliver water to the families.

The boreholes have a pump that conveys water to local water stations. Four boreholes serve each of the four stations that distribute water to households by gravity.



## SANITATION AND WASTE MANAGEMENT

The drainage system is heavily damaged. **70 out of 340 manholes** need rehabilitation. All manholes and piping need to be cleaned. The overflow of the **septic tanks** in the households goes to three creeks within the drainage system. These, alongside toilets need **rehabilitation**.



After ISIL occupation, the efforts to ensure proper solid waste collections have decreased: only **60 labourers** and **7 vehicles** are available, compared to 200 and 24 prior to ISIL attacks. The solid waste is deposited in an **open pit** less than 6 km away from Sinjar, not in compliance with Iraqi or SPHERE standards.

The hospital has two onsite boreholes and one onsite septic tank with overflow to the creek. Solid waste is sent to the municipality and **no Incinerator for biohazards** is available.



## PROPOSED RECOMMENDATIONS



Design and construct an **ENGINEERED LANDFILLS** based on Iraqi standard.



Provide **EQUIPMENT** (garbage trucks, graders and other heavy equipment) to improve solid waste management.



Conduct a **CLEANING CAMPAIGN** to help support solid waste littering.



**CLEAN** the rainwater drainage system and **REHABILITATE** the manholes.



Provide **FUNDS** to increase the number of solid waste labourers.



Provide an **INCINERATOR** and **ASH STORAGE SYSTEM** to the hospital.



Provide small packaged treatment plant for hospital **LIQUID WASTE**.



**INSTALL** a simplified sewer system for the community.



**REHABILITATE** the boreholes.



Provide **DESLUDGING TRUCKS**.



# WASH NEEDS AND CHALLENGES IN WARDIYA VILLAGE

## WARDIYA: WASH NEEDS IN A NUTSHELL



**74 families** living in Wardiya



**Water trucking** is utilized to provide water since no water distribution network is available



**Private boreholes** supply salty water



**Garbage collection** is not available and **garbage bins** are insufficient



## WATER SOURCE AND DISTRIBUTION



**0** Boreholes are functioning

**1** Deep borehole is not completed

Each household has a **shallow borehole** which is salty, hence there is no deep borehole. Families use their borehole water for domestic and agricultural uses.

There is a deep borehole about 3 km from the village, and it is **not completed**. No water distribution network exists.

## WATER TRUCKING

**IQD 5,000**

FOR 1,500L OF WATER



## SANITATION AND WASTE MANAGEMENT

There are **no drainage systems** and grey water goes to the streets and creeks. Black water goes typically to **septic tanks** and the municipality sometimes desludges these tanks.

There is a need to rehabilitate or supply **latrines** in the village.

Solid waste is collected every two days and **garbage bins** are needed for all the households.



## PROPOSED RECOMMENDATIONS



Complete the **DEEP BOREHOLE** installation.



Install a **DRAINAGE SYSTEM** for the community.



Install a **WATER TOWER** and a **DISTRIBUTION NETWORK**.



Provide assistance with a **SOLID WASTE MANAGEMENT** and **RECYCLING** program (landfill, truck, and garbage bins).



# WASH NEEDS AND CHALLENGES IN SINUNI CENTRE

## SINUNI CENTRE: WASH NEEDS IN A NUTSHELL



**4,000 families** living in Sinuni Centre



**Intermittent power supply** causes challenges in providing consistent water supply to the water towers



**10 boreholes** located in a well field, provide water



**Septic tanks and drainage system** are available but require maintenance



## WATER SOURCE AND DISTRIBUTION

**10** Functioning boreholes



The daily city distribution of water from the water towers is approximately 600 m3. Because of illegal connections, many households do not receive any water and instead rely on **trucking and shallow onsite boreholes**. The latter are expected to be contaminated, have poor quality water and residents complain that they taste salty.



Water is collected into a **550 m3 reservoir** at the well field and flows by gravity to the Sinuni water towers. Local water distribution is supplied from the water towers to households by gravity conveyance. **Chlorination** occurs at the reservoir but the system is currently **not working**.



## SANITATION AND WASTE MANAGEMENT

There is no sufficient equipment to provide sanitation services to residents in Sinuni Centre. Septic tanks are **not desludged**; drainage systems (pipes and manholes) are **not cleaned out**.

The drainage system consists of 160 manholes (unknown condition) and does not cover the whole area. The majority of septic tanks and households' greywater drains into the drainage system. Each household has one septic tanks which is occasionally desludged, costing residents approximately **IQD 25,000**. Many household septic tanks are at less than 5 m distance from onsite shallow borehole.

### HIGH RISK for cross contamination

Solid waste is collected in 7 northern villages: however, **equipment and staff are insufficient** - 40 laborers, compared to 187 prior to ISIL occupation. Solid waste is dumped approximately 3 km from city center into an **open area**.



**29 schools**, all rehabilitated. However some of them are not connected to the water distribution network. No **drinking water** is available for students and WASH facilities are badly damaged and neglected.

## PROPOSED RECOMMENDATIONS



### REHABILITATE:

- WASH facilities in schools.
- Water towers.
- Water network.
- Chlorination system.
- WASH facilities at the household level (toilets and septic systems).

### INSTALL:

- Pre-packaged Wastewater Treatment Plant at the hospital.
- Simplified sewer system to replace septic tanks.
- Pre-packaged Wastewater Treatment Plant for the community.

### PROVIDE:

- Heavy equipment for solid waste management.
- Desludging (vacuum) trucks.
- Extended drainage system to cover unserved areas.
- 20 permanent labourers for solid waste collection.
- Cleaning Campaign to help support solid waste littering.

# WASH NEEDS AND CHALLENGES IN DHUKRY VILLAGE

## DHUKRY: WASH NEEDS IN A NUTSHELL



1,200 families  
living in Dhukry



Water trucking is the only  
functioning option available



5 boreholes:  
all incomplete



Drainage system does not cover  
the entire village

## WATER SOURCE AND DISTRIBUTION

0 Functional  
Boreholes

5 Boreholes will be  
built by the  
Development Bank  
in another location



Residents currently get water  
from **water trucks** delivering  
water to their household  
**storage tanks**.

One engineer of the local Directorate of  
Water recommended the installation of  
up to **five more boreholes** for Dhukry.



## SANITATION AND WASTE MANAGEMENT

The existing drainage  
system does not cover the  
entire village of Dhukry  
currently.

There is no sewer network.  
All residents use **septic  
tanks** and most discharge  
their grey-water into septic  
tanks.



## PROPOSED RECOMMENDATIONS



- Install a pre-packaged **REVERSE OSMOSIS SYSTEM** to filter water from shallow boreholes for rapid response water supply
- Install up to five more deep **BOREHOLES**
- Install a **SIMPLIFIED SEWER SYSTEM**





# WASH NEEDS AND CHALLENGES IN BOREK VILLAGE

## BOREK: WASH NEEDS IN A NUTSHELL



**2,325 families** living in Borek



**Water trucking** is the only option since March 2019



**6 boreholes** supplying water: Four are functional and two require rehabilitation



**Septic tanks and drainage system** do not exist or lack maintenance



## WATER SOURCE AND DISTRIBUTION

**4** Functional Boreholes



**2** Boreholes in need of rehabilitation

The boreholes are all controlled by Sharfadeen: a **valve** has been installed to cut off the transmission line flow to Borek. Since March 2019 the village has restored to **water trucking**.

The community possesses available land that it can donate to the Directorate of Water to install **four** boreholes and serve **seven** neighborhoods of the village.

## WATER TRUCKING IQD 5,000



For **1,400 l** of water, with families typically needing 3,000 l/week



## SANITATION AND WASTE MANAGEMENT



Most households have septic tanks. However, families have to pay contractors for desludging maintenance, since the Directorate of Sanitation does not provide it. No drainage system is available.

## PROPOSED RECOMMENDATIONS



Install **FOUR DEEP BOREHOLES** on the land donated to the Directorate of Water to provide unserved areas of Borek with water supply.



Install a simplified **SEWER SYSTEM** in the village.



Supply families with **GARBAGE BINS**.



Install a **WATER TOWER** to distribute water in seven surrounding areas of Borek.



Provide families with household **WASH** support through the **REHABILITATION** of toilets and septic tanks.

# WASH NEEDS AND CHALLENGES IN KHANA SUR VILLAGE

## KHANA SUR: WASH NEEDS IN A NUTSHELL



**1,500** families living in Khana Sur



**Shallow onsite boreholes** have been drilled to receive water



**10 boreholes** all in need of rehabilitation



**Septic tanks** are utilized but only one street has a **drainage system**

## WATER SOURCE AND DISTRIBUTION

**0** Functional Boreholes  
**10** Boreholes in need of rehabilitation



The boreholes are connected to a concrete reservoir of 300 m<sup>3</sup>. From this reservoir tank, the water flows by gravity to two **water towers** in Khana Sur.

More **IPD returns** are expected, and with these population changes, a higher water demand and shortages.

The existing water distribution network functions by gravity but is damaged and leaking, requiring rehabilitation.

Leaks caused by **illegal connections** decreases the amount of water received by downstream households.

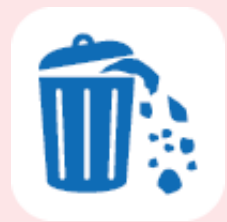
Households without water from network represents **70% of the families** living in Khana Sur: they have drilled shallow onsite boreholes to receive water.



## SANITATION AND WASTE MANAGEMENT

Every household has a septic tank. Residents utilize local contractors to desludge due to the **lack of equipment** of the Directorate of Sanitation. The waste is then dumped into open areas. Only one street in Khana Sur has a drainage system.

Rehabilitation of household **toilets** is needed as well as more **garbage collectors** to increase solid waste collection in the community.



## PROPOSED RECOMMENDATIONS



**REHABILITATE** the water network, fixing damages and leakages.



Distribute **GARBAGE BINS** to families.



Install a simplified **SEWER SYSTEM** in the village.



Provide families with household **WASH** support through the **REHABILITATION** of toilets and septic tanks.



# WASH NEEDS AND CHALLENGES IN ZORAVA VILLAGE

## ZORAVA: WASH NEEDS IN A NUTSHELL



700 families living in Zorava



**Electrical and maintenance issues** lead to malfunctioning of the water distribution network.



Five deep boreholes supply water



**Garbage collection** is not available and **garbage bins** are insufficient



## WATER SOURCE AND DISTRIBUTION

2 Boreholes rehabilitated

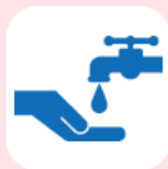
1 Borehole is dry

The Department of Water installed five deep boreholes: one is dry, and two were rehabilitated by ICRC. They are 6 km far from the village and **illegal connections** from the main pipe are made for agricultural purposes.

The water distribution network does exist, but it does not work due to **electrical issues** and maintenance.

Shallow boreholes are used at the household level, and where fresh water is not available, **water filters** are used to treat the salty water received. However, not everyone has water filters.

There are two **water towers**, one of which has been rehabilitated.



## SANITATION AND WASTE MANAGEMENT

There is no grey water network, **no drainage system** and no sewage system.

Since the municipality is not responsible for the solid waste, families **do not have garbage collection**. Garbage is directly dumped onto the streets and adjacent lands.

**Garbage bins** are not sufficient.



## PROPOSED RECOMMENDATIONS



Rehabilitate the **WATER DISTRIBUTION NETWORK**.



Distribute **GARBAGE BINS** to all families and install a simplified **SEWER SYSTEM**.



Distribute **WATER FILTERS**.



Rehabilitate and install **LATRINES** for all households.



# WASH NEEDS AND CHALLENGES IN GHOBAL VILLAGE

## GHOBAL: WASH NEEDS IN A NUTSHELL



**500 families** living in Ghoibal



**Septic tanks** are not available to every household



**10 boreholes** supplying water: three were rehabilitated and seven drilled by INGOs



**Garbage collection** is performed once a week, or less



## WATER SOURCE AND DISTRIBUTION

**3** Boreholes rehabilitated



**7** Boreholes drilled by INGOs

There is an old water distribution network built approximately five years ago, which is **not functioning**.

Everyone has access to fresh 'sweet' water thanks to the boreholes and no complaints were received about the water network not working. The **risk of contamination** is high and it is believed that the water has **not been tested**.



It is believed that **only 30%** of the total number of households have septic tanks. Some of the households require **improvements** in their toilets.

## SANITATION AND WASTE MANAGEMENT

Garbage collection happens once a week and some community members mentioned that in practice it happens **once per month**.

There are not enough **garbage bins** for all households living in Ghoibal.



## PROPOSED RECOMMENDATIONS



Frequent **TESTING** of **WATER** supplies (shallow boreholes).



Supply **PRE-FABRICATED LATRINES** or rehabilitate latrines for every household.



Supply families with **GARBAGE BINS**.



Remove the risk of contamination with the installation of **SEALED SEPTIC TANKS** at each residence and install **SIMPLIFIED SEWER**.



# WASH NEEDS AND CHALLENGES IN DUHOLA VILLAGE

## DUHOLA: WASH NEEDS IN A NUTSHELL



**1,000 families** living in Duhola



**Water trucking** utilized due to onsite boreholes that are salty and contaminated



**8 boreholes and 2 storage tanks** providing water



**Septic tanks** are utilized but no engineered **drainage system** exists



## WATER SOURCE AND DISTRIBUTION

- 8** Functional Boreholes
- 3** Collection tanks of 300 m3 each.



The water distribution network covers approximately 80% of Duhola and is being **rehabilitated** by WHH.

The location of the boreholes is higher than the elevation of the village: to reduce the pressure head as water reaches Duhola households, a **pressure-reducing-tank** was designed, but it overflows, wasting water.

The Directorate of Water manages the distribution network with **manually** operated valves. This configuration requires an operator to be present to change water distribution in each of the **five neighborhoods** in Duhola.



## WATER TRUCKING



**IQD 5,000**

For **1,500 l** of water for an average of **3,000 l** per week Per household

## SANITATION AND WASTE MANAGEMENT

- No engineered drainage system;
- Septic tanks but no desludging program;
- Wastewater drainage is relocated to a new tank when the current one is full.

Areas vulnerable to **contamination** around shallow boreholes



**Solid waste** collection is limited and more garbage bins are needed.



**ILLEGAL CONNECTIONS** for domestic and agriculture activities are taking water out of the distribution network

Unavailability of operators and consequent closure of the valves have caused **OVERFLOWING** volumes of water from the pressure reducing tank to be wasted

Increase in **ILLEGAL RESIDENCES** on the fringe of village boundaries were not included in the original water distribution network.

## MAIN WATER CHALLENGES

Downstream residents with no water

Some Duhola residents frequently without water

New residences need to be included in the water network

## PROPOSED RECOMMENDATIONS



Replace the pressure-reducing-tank with a **WATER TOWER**.



Extension of existing **WATER DISTRIBUTION** network to new residences.



Install a simplified **SEWER SYSTEM** for entire community.



Support household **WASH NEEDS** (i.e. toilet rehabilitation, garbage bins).

# WASH NEEDS AND CHALLENGES IN SINJAR MOUNTAIN CAMP

## SINJAR MOUNTAIN CAMP: WASH NEEDS IN A NUTSHELL



2,550 families living in Sinjar Mountain Camp



Water trucking provided by only three trucks to the whole camp



20 deep boreholes and storage tanks of 3000 l providing water



No drainage system or sanitation sewer exist in the camp



## WATER SOURCE AND DISTRIBUTION

18 Functional Boreholes



2 Boreholes need maintenance or cover the camp by water trucking

## WATER TRUCKING



only 3 trucks

To support the 16km-long camp

There are 20 deep boreholes, most belong to the host community. 15 private boreholes are used for both domestic and agricultural purposes. 4 public boreholes were drilled by Barazani (BCF): 3 are functional; 1 is not working since it needs maintenance and fuel. The 3 working public boreholes are connected to the water distribution network servicing about 300 families. The last borehole was drilled by PKK, covering about 60% of the camp by water trucking.

JEN provided 3,000L water tanks adjacent to the roads; however, it

is challenging for some residents to walk to the tanks and collect water by jerrycan. Community members have commented that they often do not receive water for up to 3 days. There are only 3 trucks to support the 16km-long camp, and sometimes roads are in insufficient condition for the water trucks to reach the furthest residents.



## SANITATION AND WASTE MANAGEMENT

No drainage system or sanitation sewer exist in the camp. In areas of the camp with a dense population, multiple families share latrines. The latrines are made of cloth and often there is no door, and a consequent lack of privacy. The toilet is shared by both genders and it is not lockable; there is no toilet venting, and the latrine is connected only to an open unlined pit in the ground. These latrines do not comply with the minimum improved sanitation standard. Often the latrine hole is covered by plastic or corrugated metal.



Grey-water is discharged directly on the streets, collecting in local puddles. Residents use their tent shelters for cooking, creating hygiene and fire hazards. For garbage collection, ICRC collects garbage once a week. It is unknown where the camp garbage collected are disposed. There are insufficient garbage bins in the camp.

Hazard for residents to come into direct contact with the sewage

## PROPOSED RECOMMENDATIONS



Install WATER DISTRIBUTION PIPING from the JEN tanks at the roadway to each household.



Deliver TRAININGS on WASH services maintenance in camp and for WASH construction and rehabilitation in former village residences.



Provide HYGIENE KITS and GARBAGE BINS to all residents.



Repair existing latrines and provide SEALED SEPTIC TANKS to collect all liquid waste from residents.



Install COMMUNAL LATRINES or WASH BLOCKS with gender separated toilets and showers.



Dig new deep BOREHOLES and provide more TRUCKS to distribute water from the existing boreholes.



Install WATER TANK/TOWER upstream of the households to deliver water by gravity.



Install washing stations with completely CONTAINED SEWAGE COLLECTION tanks underground.





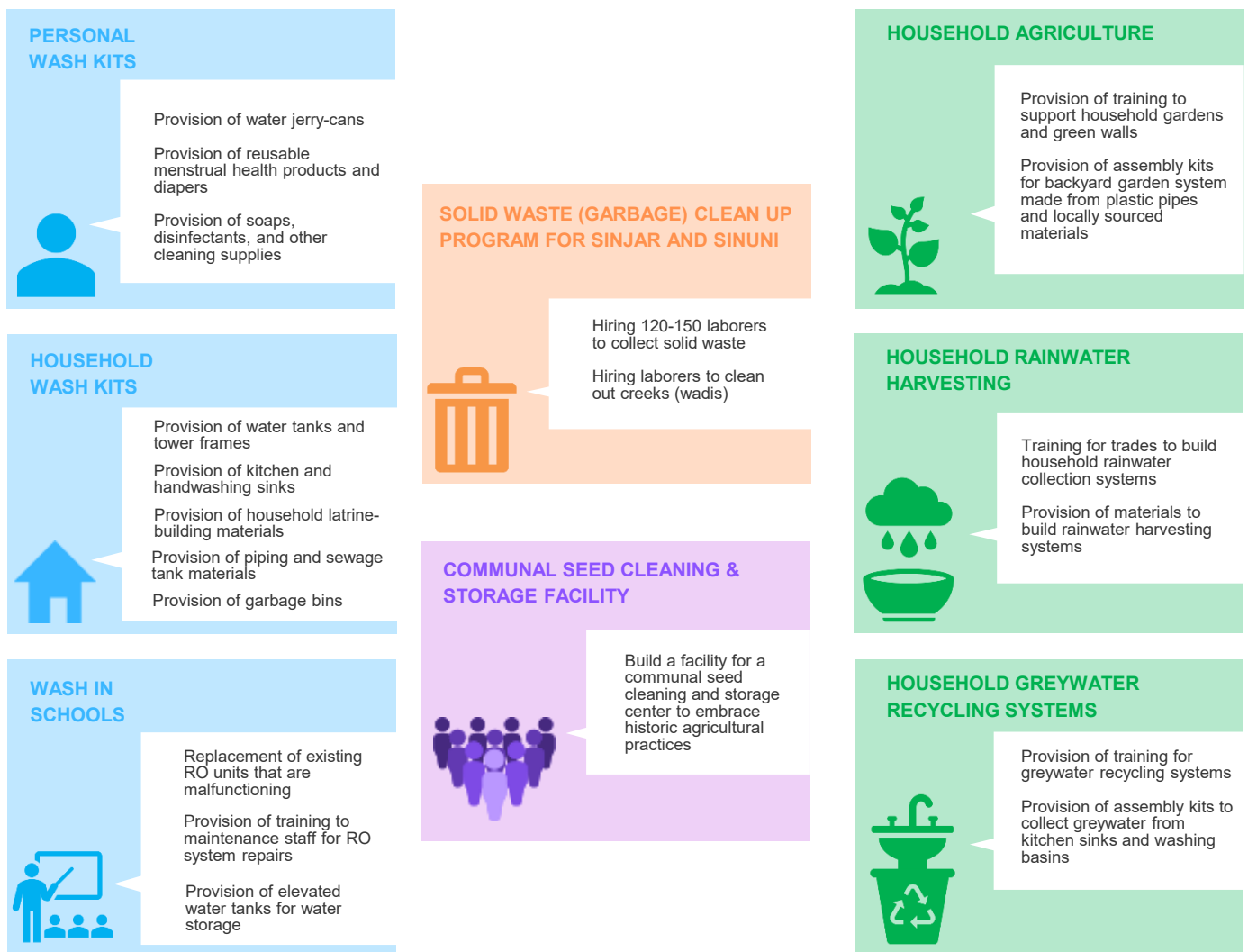
## RECOMMENDED PROJECTS

The WASH needs in Sinjar are mounting and evolving as the population grows, settles into new community clusters and migrates back to their former homes; communities are continuously morphing. As such, challenges arise in predicting where populations will be located and whether to satisfy their WASH needs for existing populations within a village or previous population counts. WASH solutions require agile delivery mechanisms to respond to the communities' development. To accomplish delivering flexible solutions, recommendations for WASH solutions in Sinjar have been segregated into themes: Immediate Response, Rehabilitation, and Transformation.

These recommendations are outlined in the following pages. The **Immediate Response** recommendations are listed on page 23; the **Rehabilitation** projects are outlined on page 24; and the **Transformation** program, further subdivided into large WASH infrastructure innovations (page 25) and conservation, policy and advocacy projects (page 26). The cost estimates for these programs were approximated based on Sinjar market surveys during the Sinjar field visit and are listed on pages 27, 28 and 29.

# PLATFORM A: Immediate Response Program

The Immediate Response program (Platform A) will provide all necessary WASH support for Sinjari residents who return to their former homes and for those in settlements to ensure that they have equitable access to WASH within their households, regardless of delivery method of these services. This program will provide **household level WASH support** and **personal level WASH support** to all residents, and basic interventions to support **WASH in Schools**. Household WASH kits will include all WASH provisions the Sinjari residents will require immediately for resettlement back into their homes, including but not limited to: household water storage tanks and raised tank frames; kitchen and handwashing sinks; household latrine-building materials; piping and sewage tank materials; and garbage bins. For those remaining in temporary settlements, the same household WASH kits will be provided based on components they are currently lacking. Household-level agriculture, **rainwater harvesting** and **greywater recycling** interventions will be launched. Additional household support will include personal WASH kits containing: water jerrycans; reusable menstrual health products and diapers (as per individual need); soaps and disinfectants; and other cleaning supplies. The outcome of the Immediate Response program is to establish every Sinjari resident with adequate and equitable WASH servicing, regardless of their location or service provider.






# PLATFORM B: Rehabilitation Program

The Rehabilitation program (Platform B) is aimed at more permanent interventions that restore WASH to Sinjar District at the level of pre-genocide standards and population distributions. Each community's WASH needs were determined (see page 11) and categorized by **WASH infrastructure** component, based on pre-genocide servicing or by community or DoW request. These longer-term, more permanent interventions can be launched in tandem with Immediate Response interventions outlined in Platform A, with the support of local authorities with whom the SWA Team are already in contact. These rehabilitation projects, many of which were requests from the interviewed communities, have been vetted for viability. In addition, as Sinjar Center was the economic hub of the district prior to the genocide, we recommend prioritizing the rehabilitation of Sinjar Center; the resurrection of this city center will provide for a follow-on revival of Sinjar district from economic and social development standpoints.

### REHABILITATE SINJAR CENTER




Extensive program to completely revitalize Sinjar Center to a functioning and habitable city

- Provision of trades training, logistical coordination training, and project management and rebuilding support.
- Provision of materials for household WASH structures such as pre-fabricated toilets, water storage tanks, plumbing for kitchen sinks and bathing drains, wastewater collection tanks to households.
- Provision of shelter building materials to repair existing buildings and to rebuild new homes.


Rehabilitate 4 boreholes, extend water distribution system to reach 100% coverage, extend rainwater drainage scheme, design and install engineered landfill, and install appropriate sewer conveyance system for treatment and disposal.

### CONSTRUCTION WASH/TRADES TRAINING PROGRAM FOR IDPs




- Basic plumbing training
- Masonry training
- Septic tank disposal field design training
- Heavy equipment operation training

### REHABILITATE ALL WATER DISTRIBUTION NETWORKS




- Provision of simple water towers (metal water tanks elevated on concrete blocks)
- Provision of small pumps and electrical supply at strategic points in various systems
- Provision of packaged RO systems at strategic boreholes

### REHABILITATE EXISTING RAINWATER DRAINAGE SYSTEMS, SPECIFICALLY MANHOLES




- Rehabilitation of existing manholes that have been damaged
- Provision of flushing trucks and heavy equipment to clear drainage networks
- Provision of culverts, sediment vaults and other materials at strategic locations

### IMPROVE EXISTING LANDFILL SITE




- Restructure existing landfill to optimize limited reserve capacity (space remaining)
- Reorganize trucking routes to optimize trucks and equipment
- Provide for daily cover to mitigate odors and mitigate vectors

### REHABILITATE IRRIGATION NETWORKS



- Repair or replace existing pipe networks and equipment
- Disconnect irrigation systems from domestic water mains (twin systems to provide water supply if necessary)
- Rehabilitate boreholes as needed

### REHABILITATE PROGRAM FOR ONE VILLAGE



Extensive program to generate livelihoods and WASH projects that are directly implemented by IDPs

- Provision of trades training, logistical coordination training, and project management and rebuilding support.
- Provision of materials for household WASH structures such as pre-fabricated latrines, water storage tanks, plumbing for kitchen sinks and bathing drains, wastewater collection tanks, and appropriate soak away beds if sanitary sewer is not available.
- Provision of shelter building materials to repair existing buildings and to rebuild new homes

## PLATFORM C: Transformation Program

The Transformation program (Platform C) will incorporate innovations and best practices to surpass previous WASH levels of service in Sinjar district, providing for much needed environmental protection and significantly improved WASH service. Pre-genocide WASH infrastructure was insufficient to provide adequate WASH servicing; hence it is important to provide beyond what previously existed in Sinjar district to move towards best practices. This Transformation program includes “hard” and “soft” components: construction of substantial WASH infrastructure previously not provided; and, governance building and resiliency protection to ensure that sustainable and culturally sensitive practices are employed. **Facility construction and other valuable WASH infrastructure** installations will leapfrog rebuilding projects in other districts and metamorphose Sinjar into an example of communities living in a sustainable manner, safeguarding the environment that provides them with their sustenance and livelihoods.

### INSTALLATION OF IMPROVED WATER DISTRIBUTION SYSTEMS

- Install water networks in all villages.
- Extend existing system to provide 100% coverage.
- “Loop” pressurized systems so that single water-main breaks do not shut down water servicing.
- Provide automated valve systems (telemetric or timer) at key points.
- Provide connection to independent water sources.
- Provide treatment as necessary.

### INSTALLATION OF IMPROVED RAINWATER DRAINAGE SYSTEMS

- Install rainwater drainage systems (pipes and open ditches/creeks) in all villages.
- Extend existing drainage systems to cover entire village.
- Provide treatment or discharge area (natural treatment) for drainage waters.

### INSTALLATION OF SEWAGE COLLECTION SYSTEM

- Install simplified sewer system with new sealed tanks to all clusters of households.
- Disconnect all greywater and septic system overflows to drainage system and redirect to simplified sewer.
- Provide discharge area for supernatant or simple treatment (packaged system).

### PROVISION OF CENTRALIZED SEWAGE TREATMENT PLANT

- Install appropriate technology packaged sewage treatment plant.
- Include sludge treatment stream in plant.

### PROVISION OF ENGINEERED LANDFILL

- Provide land selection to Iraqi standards.
- Install engineered landfill with leachate recycling system.
- Employ daily landfill cover to prevent vector spread.

### BOREHOLE TRACKING PROGRAM

- Complete borehole mapping and data collection/measurements
- Borehole water quality and quantity assessment and tracking

### BIO-HAZARDOUS WASTE MANAGEMENT AT HOSPITALS

- Provision of incinerator for both Sununi and Sinjar hospitals
- Provision of packaged wastewater treatment systems for each hospital

**Policy and advocacy campaigns**, listed under the Transformation Program, are considered more complex interventions and often require support from multiple government agencies. These long-term governance interventions are crucial to the success of the Sinjar WASH programs outlined above and inasmuch should be conducted in conjunction with them. While Sinjar district has sufficient groundwater volume to meet residents and commercial entities' water needs, water resources are currently being neglected, abused or mismanaged, resulting in reduced groundwater levels. To optimize this valuable resource, Sinjar would benefit from strategic WASH policy and advocacy campaigns, such as a National Water Resource Management plan, water conservation schemes, and drought mitigation strategies, among other measures.

### DEVELOPMENT OF WATER RESOURCE MANAGEMENT PLAN

Set water allocations for:

- domestic water use;
- agriculture demand limits;
- business and manufacturing requirements; etc.

Establish sustainable borehole withdrawal rates.

Determine seasonal aquifer fluctuations



### TRANSBOUNDARY AQUIFER MAPPING

Extend the work of the Advanced Survey of Hydrogeological Resources in Iraq, Phase II (ASHRI-2) and ensure aquifer analyses are conducted north of Sinjar Mountain.



### CREATION OF WASTEWATER MANAGEMENT DESIGN STANDARDS

Development of Iraqi standards for septic tank design

Work with various Iraqi Departments to create physical design limits, for the purpose of mitigating contamination risk to shallow boreholes.

Development of Iraqi standards for alternative sewer collection systems

Pilot alternative systems

Work with Iraqi Departments to create engineering protocols for the design of gravity and sanitary sewers for approval.



### ESTABLISH NATIONAL BOREHOLE PROTECTION PROGRAM

Create standards for the drilling procedures and casing requirements for deep boreholes.

Create minimum standards for onsite borehole drilling and water treatment.

Develop borehole capping program.



### WATER CONSERVATION PROGRAM

Develop alternative water sources (rainwater harvesting).

Develop district campaigns to reduce water consumption at household level and for targeted livelihoods.

Locate leaks and repair networks.

Implement telemetry for valve control to ensure overflow reductions and equitable water distribution.

Provide Asset Management training for DoW to optimize existing infrastructure and to extend lifecycle of assets.



### DROUGHT MITIGATION SCHEMES

Develop Drought Preparedness and Mitigation Plans

Install Sinjar Mountain rainwater capture ponds

Study climate patterns and create drought prediction models

Train farmers on soil and water conservation approached in agriculture (saucer basins, etc.)

Install percolation ponds in existing natural creeks (wadis)

Train farmers on herd management



# APPROXIMATE EXPENDITURE FOR SINJAR WASH PROJECTS

## PLATFORM A: Immediate Response Program

Provision of WASH supplies and support for immediate WASH needs will provide the residents of Sinjar with relief from the hardship of inadequate WASH servicing and will prepare them for recovery when WASH services are reinstated to previous levels of service. The Immediate Response program (Platform A) includes Personal WASH items for individuals to receive WASH support, such as but not limited to: jerrycans, soap and disinfectants, items for personal hygiene management. Additionally, household WASH kits will supply items required in a residence to receive WASH support, such as water storage tanks and elevated frames, latrine building kits, and garbage bins. These kits will provide items that allow for culturally appropriate items for residents to have dignified and equitable WASH provisions.

At the community level, the lack of solid waste management is detrimental to the environment and dampens the spirit of residents in feeling that their community is clean and moving forward to rehabilitation; the solid waste project and the seed cleaning facility foster livelihoods opportunities for construction and operations, all requests of the community.

WASH COMPONENT	DESCRIPTION	APPROXIMATE EXPENDITURE [in USD]
WASH KITS	Fund all WASH kits for: <ul style="list-style-type: none"> <li>- Individual/<b>Personal WASH kits</b> (jerrycans, soap, disinfectants, etc.);</li> <li>- <b>Household WASH support</b> kits (water tanks, pre-fab latrines, etc.); and</li> <li>- Simple <b>WASH-In-Schools</b> support (water treatment unit repairs, etc.)</li> </ul>	\$ 813,750
HOUSEHOLD WASH INNOVATION	Fund all innovative WASH projects at the <u>household level</u> for: <ul style="list-style-type: none"> <li>- <b>Rainwater Harvesting</b> support;</li> <li>- Sink <b>Greywater Recycling</b> kits (includes barrels, piping, taps, etc.); and</li> <li>- <b>Backyard Agriculture</b> kits (includes piping, pipe couplings, etc.).</li> </ul>	\$1.20 M
COMMUNITY PROJECTS	Fund all rapid-response projects at <u>community level</u> for: <ul style="list-style-type: none"> <li>- <b>Solid Waste Cleanup</b> (IDP labour, equipment, transportation); and</li> <li>- <b>Seed Cleaning</b> Facility (exclusive of property acquisition costs).</li> </ul>	\$1.51 M

## APPROXIMATE EXPENDITURE FOR SINJAR WASH PROJECTS

### PLATFORM B: Rehabilitation Program

Settlement areas in Sinjar are still in flux, and populations can change very suddenly and rapidly. However, the proposed rehabilitation projects (Platform B) are assumed to re-establish previously existing WASH infrastructure. The cost estimates for the recommended projects are clustered into: area (all WASH projects in Sinjar Center); or WASH component (for all areas except from Sinjar Center).

**Sinjar Center** was singled out as a standalone project as this city was formerly the economic hub of the district, but bore most of the damage during the conflict. As such, IDPs have been reluctant to return and the city has little support from INGOs. However, once rehabilitation measures are completed and services resume, Sinjar Center could be a thriving community, and, again, the focal point of the district.

AREA OR WASH COMPONENT	DESCRIPTION	APPROXIMATE EXPENDITURE [in USD]
SINJAR CENTER	Fund <b>all WASH projects for Sinjar Center</b> , including rehabilitation of water source (rehabilitate 4 BH), wastewater collection (provide private latrines, sealed collection tanks, greywater piping to tanks), rainwater drainage (rehabilitate 70 MH and clean/flush networks) and installation of engineered landfill (property costs excluded) with the exclusion of the WASH In Schools and Waste Management for the Sinjar hospital.	\$ 2.95 M
WATER SOURCE	Fund all rehabilitation or drilling of boreholes as domestic water source (excluding Sinjar Center).	\$ 1.39 M
WATER DISTRIBUTION SCHEMES	Fund water distribution network rehabilitation and connect 1 water source and launch unregulated disconnection program (excluding Sinjar Center).	\$ 2.33 M
WASTEWATER COLLECTION	Fund provision of sealed tanks for greywater and sewage collection from private latrines, piping, and connection/reconnection to tanks (excluding Sinjar Center).	\$ 8.07 M
WASH AND LIVELIHOODS PROGRAM TO REVAMP VILLAGES	Fund the innovative integrated WASH program that includes multiple livelihoods opportunities for Sinjari IDPs to be trained in construction trades & logistics, and for IDPs to work on rehabilitation of an existing small village, starting with the launch of the rehabilitation of household WASH structures and shelter.	\$ 2 M - \$ 5 M

# APPROXIMATE EXPENDITURE FOR SINJAR WASH PROJECTS

## PLATFORM C: Transformation Program

The Transformation program taps into appropriate technologies and innovations to deliver adequate water and sanitation servicing to Sinjar district; in many activities, WASH in Sinjar will surpass levels of service found elsewhere in the Middle East.

Water conservation looms over all activities proposed in every Platform of this report; however, Platform C clearly identifies specific campaigns to have residential and commercial water conservation measures implemented to protect this vital resource.

The Transformation program is subdivided into two areas: large WASH infrastructure projects; and policy & advocacy work. The large infrastructure projects can be sustained through DoW and DoS budgets and through community user fees for the operations & maintenance costs, but the capital expenditures to install this infrastructure initially are cost prohibitive. Through policy changes and water resource advocacy, the future of good water conservation measures in Sinjar will be strong and less water will be extracted in the future, thereby protecting water resources and halting the current path of saltwater intrusion and mitigates groundwater levels dropping.

WASH PROGRAM	DESCRIPTION	APPROXIMATE EXPENDITURE [in USD]
WATER DISTRIBUTION	Fund the provision of new water distribution networks in 7 small villages and extend the Sinjar Mountain Camp water distribution network to 100% coverage.	\$ 2.33 M
WASTEWATER CONVEYANCE	Fund Simplified (Effluent) Sewer network installation for 7 small villages and Sinjar Mountain Camp (excluding Sinjar Center and Sinuni Center).	\$ 4.89 M
WASH IN SCHOOLS	Fund: additional reverse osmosis water filtering systems' installations, provision of water storage tanks, rehabilitation or installation of sewage collection tanks; provision WASH equipment training to operators.	\$ 1.25 M
HOSPITAL WASTE MANAGEMENT	Fund the provision of: 2 incinerators (Sinjar Center hospital and Sinuni Center hospital) and ash storage tanks; 2 packaged wastewater treatment systems (Sinjar Center hospital and Sinuni Center hospital).	\$ 2.29 M
SOLID WASTE	Fund the design and construction of an engineered landfill site (property costs excluded), provision of garbage trucks (2) and other equipment, community collection bins.	\$ 1.87 M
RAINWATER DRAINAGE	Fund the provision of new drainage networks in small villages and the Sinjar Mountain Camp.	\$ 3.72 M
POLICY AND ADVOCACY CAMPAIGNS	Fund the campaigns to build governing authorities' capacities: to optimize existing WASH assets; to build resiliency into programs; and to implement sustainable planning priorities.	\$ 600,000

## REFERENCES

Al-Yasi, Ameen, Alridha, N. A., and Shakir, W. M. (2013). *The exploitation of Dar-Zarrouk parameters to differentiate between fresh and saline groundwater aquifers of Sinjar Plain Area*. Iraqi Journal of Science, vol. 54, n. 2, pp. 358 – 367.

Al-Yasi, Ameen, Alridha, N. A., and Shakir al-Khafaji, W. M. (2013). *The role of (geoelectric and hydrogeologic) parameters in the evaluation of groundwater reservoir at South of Jabal Sinjar area*. Iraqi Journal of Science, vol. 54, n. 3, pp. 628 – 637.

Qader, Umar N. A. (2009). *Mapping of ground water quality of Injana aquifer south of Sinjar Anticline/ Northern Iraq*. Iraqi Journal of Earth Sciences, vol. 9, n. 2, pp. 11 – 26.

Tinti, Alessandro (2017). *Water Resource Management in the Kurdistan Region of Iraq: A policy report*. Institute of Regional and International Studies (IRIS), American University of Iraq, Sulaimani.

United Nations Economic and Social Commission for Western Asia, and Bundesanstalt für Geowissenschaften und Rohstoffe (2013). *Jezira Basin Neogene aquifer system (North-West): Upper and Lower Fars*. Inventory of shared water resources in Western Asia, Chapter 25.

Zakaria Saleh, Al-Ansari, N., Ezz-Aldeen M., and Knutsson, S. (2012). *Rain water harvesting at eastern Sinjar Mountain, Iraq*. Geoscience Research, vol. 3, issue 2, pp. 100 – 108.



# APPENDICES

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## TECHNICAL TERMINOLOGY

**AGRICULTURE:** practice of farming, including cultivation of the soil for the growing of crops and the rearing of animals to provide food, wool, and other products.

**AQUIFER:** an underground layer of permeable water-bearing rocks; groundwater.

**BIOHAZARD:** any risk to human health or the environment arising from biological work (hospitals), especially with micro-organisms.

**DRAINAGE:** removal of surplus water through pipes, culverts and natural creeks and other water networks for the purpose of mitigating flooding.

**FAMILY:** a social group made up of parents and their children.

**FEEDERMAIN:** uninterrupted pipeline conveying water from source or community boundary to localized branched water distribution network, typically from reservoir to reservoir or pumping station.

**GREYWATER:** all liquid wastewater from sink, shower, and bathtub drainage.

**HOUSEHOLD:** a social unit composed of those living together in the same dwelling, estimated to be 6 people on average for Sinjar calculation purposes.

**IRRIGATION:** supply of water to land or crops to help growth, typically by means of channels or pressurized spraying structures.

**ISIL:** Islamic State of Iraq and Levant, ISIS

**LIFT STATION:** wastewater pump station where sewage is lifted in elevation and then returned to gravity sewer pipeline to flow by gravity.

**LIVESTOCK:** farm animals regarded as an asset, food source.

**MUKTAAR:** community leader, typically unelected.

**PUMPING STATION:** water pump station where water is forced by high pressure through unbranched pipelines to one specific discharge/receiving facility.

**SANITATION:** provision of services and facilities to ensure public health and adequate hygiene, fundamental is the management of liquid wastes (wastewater, drainage) and solid wastes (garbage).

**SOLID WASTE:** any garbage, refuse, sludge from a wastewater treatment plant, water supply treatment plant, or air pollution control facility and other discarded materials from industrial commercial and agricultural operations.

**TRANSMISSION LINE:** long distance water pipe under high pressure to convey water from water source (typically borehole field) to community boundary.

**UNREGULATED CONNECTIONS:** breaks in various DoW water piping, not authorized by the DoW, to access water in distribution networks, often roughly installed and prone to leaking.

**WASH:** Water, Sanitation, and Hygiene.

**WASTEWATER:** all liquid wastes from domestic (household), institutional (schools) and commercial (business) operations, includes both blackwater (toilet wastes) and greywater (sink and shower drainage wastes).

**WATERMAIN:** local water distribution pipeline with branching to service water to various neighborhoods and streets, typically found under streets

**WATER NETWORK:** system of pipes conveying water from source to household taps, includes transmission lines, feeder mains and the distribution lines and water services to household.

**WATER SERVICE:** small diameter water distribution pipe which conveys water from the watermain under the street to the household connection, ownership can be mixed (public and private service).

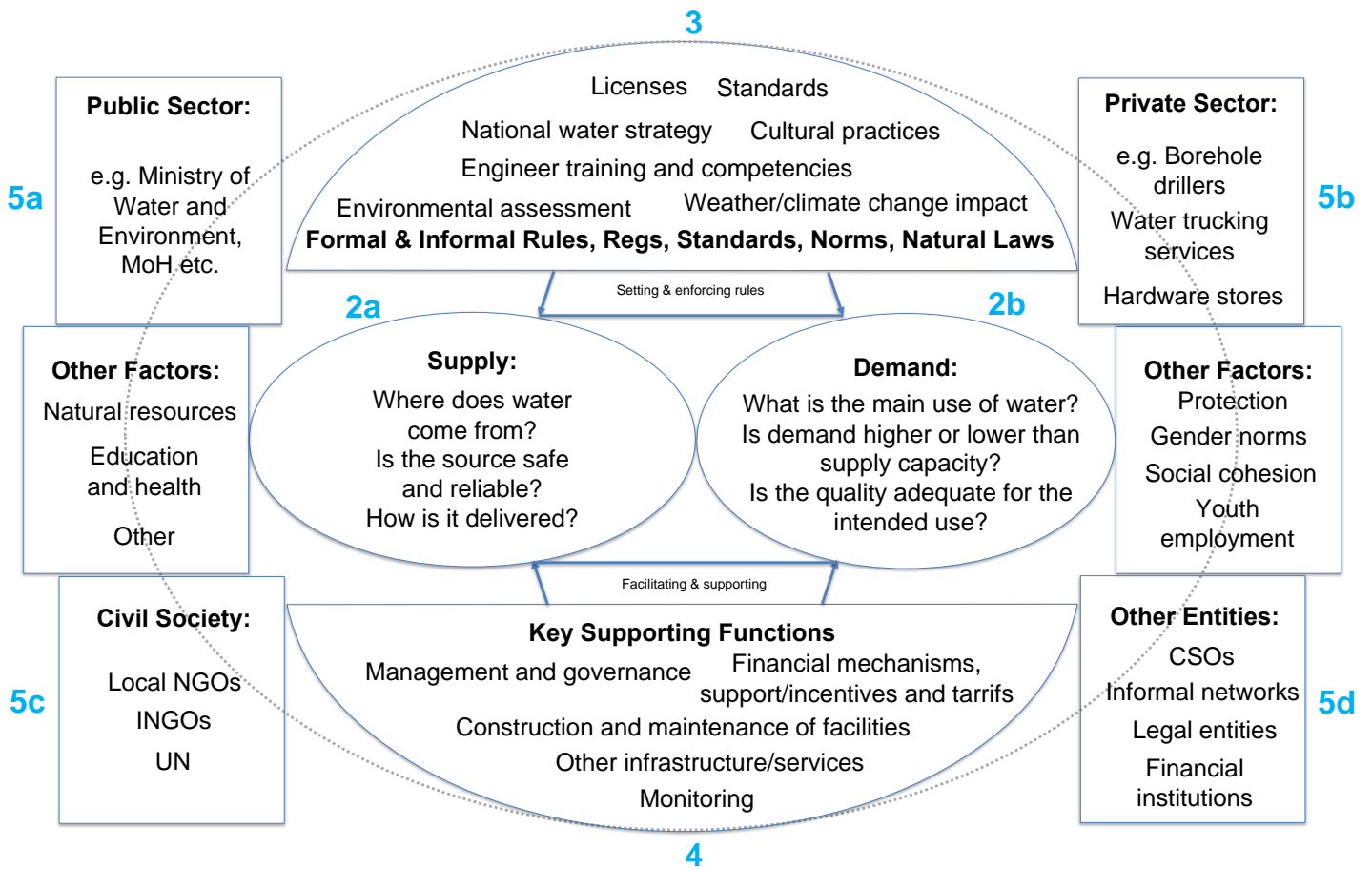
# RI'S SYSTEM APPROACH - WATER

## 1a System Mapping for Water and Hygiene

1b Entry Point: XXXX

1c Location: XXX, XXX

1d Proposed Goals & Target Beneficiaries: Provide water infrastructure / water management for XXXXX



1	Define the System	Response
1a	What is the <b>primary sector</b> ? What is the <b>context</b> ? (rural, urban, semi-urban etc.)	
1b	What is <b>RI's entry point</b> and the gap RI seeks to fill? Is RI doing the system map as part of a country strategy; a response to sudden or slow onset emergency; a specific concept note or proposal development; ongoing implementation; or end of project learning? The entry point should clearly state the need/gap to be addressed and the criteria used. Entry point and gap statement example: <b>UNICEF concept note for emergency refugee arrivals. RI seeks to provide access to safe water and support protection to displaced populations.</b> Why: lack of safe water, health risk for displaced people that are using unsafe sources, risk of conflict with host community (competition for safe sources), based on XX assessment done by XXX on XX.	
1c	What is the target <b>location</b> ? Note country and area within country if possible.	
1d	What are the <b>proposed goals</b> and who are the <b>target beneficiaries</b> ? For example, provide water for XXX refugees in XX camp setting.	
2	Describe the Supply and Demand	Response
2a	<b>Supply (on first pass, note only the basic supply components and then move to 2b, 3, 4 and 5a-d); as the systems map is filled can come back to other supply questions to fill in more details</b>	
Fill 1st then go to 2b	Where does the water supply come from (underground, surface, rainwater harvesting, combination)?	
	What is reliability (quantity and quality) and seasonality of supply? Is the water source generally safe? Does it need any treatment? What are the most common risk factors for water safety and reliability of the supply?	
	How are water infrastructure/services provided, controlled and accessed (water fetched for free, community managed borehole, central system, paid piped system, water trucking, irrigation channels etc.)?	
	Are there standpipes / household connections (depending on system) for water supply which are functional and providing basic level of service? Do the standpipes/household connections meet the criteria in terms of accessibility (distance from household, crowding at water point, ease of use for women, disabled, children, and elderly)?	
	Other issues:	
2b	<b>Demand (on first pass, note only the basic demand components and then move to 2b, 3, 4 and 5a-d); as the systems map is filled can come back to other demand questions to fill in more details</b>	
Fill 1st then go to 3	How are households in the community obtaining and using water? Is demand higher or lower than supply and how does this vary by season? Water is typically demanded for drinking and cooking, other household use, personal hygiene, sanitation, irrigation, livestock, and light industry.	
	What livelihood activities require a water supply (agriculture, livestock, other industry or business)?	
	Other issues:	
3	List the Formal and Informal Rules, Regulations, Standards, Natural Laws, and Cultural/Religious Norms	Response
	<b>Formal Regulations, Policies and Standards</b>	
	Is there a national policy that regulates water access, quality (Water Safety Plan), extraction and disposal, providers, private operators and tariffs? Are roles and responsibilities clear?	
	If emergency or camp setting: do regulations still apply? Is there any ad hoc regulation created in response to the crisis? Is there any coordination system in place managed by government, UN, NGOs?	

	Are there national/local norms regulating the construction of water supply systems? (design, location, capacity/crowding, accessibility, extraction permits and licenses etc.)?	
	What certifications and trainings are required for staff working with water supply services?	
	Are licenses and permits required for the sale/distribution of water?	
	Is there any requirement of environmental assessment for construction of water extraction and supply systems?	
	<b>Informal Norms (Cultural Practices) and Natural Laws (Mother Nature’s Laws which includes Seasonal Weather related factors (including Climate Change related factors (drought, flooding))</b>	
	Do households understand the benefits of safe water and the need for treatments? Is there already any commonly spread water treatment method at household level?	
	Does the community have specific cultural norms around the use of water in their community? e.g. designated areas for gender specific bathing, livestock use, clothes washing, etc. Is there any particular habit or tradition that can put at risk (temporarily or permanently) the access to safe water? e.g. nomadic populations competing with farmers.	
	Are there seasonal weather factors which impact water supplies e.g. water contamination during rainy season, or water scarcity during dry season?	
	Has vulnerability to climate (including droughts and floods) been assessed?	
	Have climate change adaptation measures been incorporated in the development of safe water supply infrastructures (including design, sizing, and siting of built infrastructure, and management of natural resources)? Are people, institutions and authorities aware of the potential risks and did they develop any coping mechanisms or response?	
<b>4</b>	<b>List the Key Supporting Functions</b>	<b>Response</b>
	<b>Infrastructure for Water and Hygiene (Construction of Water Facilities)</b>	
	Which institution is in charge for the planning and development of the water infrastructures? What other authorities and institutions are involved in the process?	
	What type of technical solutions are mostly in use? (drilling, submersible pumps and elevated tanks, dams, gravity systems etc.). What is the size and capacity of contractors?	
	<b>Management and Governance of Water Supply Systems</b>	
	Is there an institution devoted to water assets management? Is there one dedicated to development and enforcement of national policy?	
	Is there effective coordination between related ministries (i.e. ministry of health and ministry of environment)? Is there any independent regulator? If so, what is the role and level of capacity? How effectively independent is the regulator from other authorities and the government?	
	Who is responsible for day to day operations of the water facilities? Are there water committees in line with national norms and standards to manage water?	
	Is there any Public-Private Partnership arrangement for the management of Water Supply Systems? Are there CSO involved in the management of water utilities? If so, how?	
	<b>Maintenance of Water Supply and Distribution Infrastructure</b>	
	Who is responsible for maintenance of water supply systems? Are mechanics locally available? Are they capable to handle the systems and affordable?	
	How old/inefficient is the existent infrastructure?	
	Are spare parts locally available? What does the supply chain look like? What are the main challenges in terms of supply chain?	

	<p>What is the percentage of leakage/water lost throughout the distribution system? How often the water supply system experiences breakdowns? What type of coping mechanisms are in place? Are there alternative water sources or providers to rely upon? What are the repercussions on the daily life? List the major disruptions experienced, frequency and duration of breakdowns.</p>	
	<b>Financing of Water Infrastructures/Capital investments</b>	
	<p>Who is responsible for water infrastructures capital investments? Is there a specific budget allocated to support water supply services at the national, district and village/community level?</p>	
	<p>Is private banking used to finance water infrastructures? Are interest rates affordable for the local economy? Is there any other form of financing mechanism (e.g. VSLA and saving groups, governmental subsidies, international donors etc...)? Does the existing financing system meet life-cycle costs, while ensuring affordability, equity, and non-discrimination of water supply?</p>	
	<p>What is the average cost of water? Is the tariff fair? Is the water metered? Who is in charge to collect fees? How are the fees collected and reallocated? What is the % of fees collected? Are the fees collected effectively managed? Is the tariff sufficient to cover running costs and recover capital investments? What is the total cost of non-revenue water?</p>	
	<p>Do household pay for household water treatment? If so, why? (water provided is contaminated?).</p>	
	<b>Transportation and Other Infrastructure/Services</b>	
	<p>Is there a road system that allows access for trucks, heavy equipment and supplies to install and maintain water and sanitation systems? Is access seasonal and/or impacted by security issues? What are the road conditions?</p>	
	<b>Monitoring</b>	
	<p>Is there a monitoring plan (e.g. for water quality, assets, etc.)?</p>	
	<p>Is monitoring carried out regularly?</p>	
	<p>Are household water treatments promoted?</p>	
<b>5</b>	<b>Identify Key System Actors (Stakeholders) – Refer to Stakeholder Mapping Tool <a href="#">Guidance</a> and <a href="#">Template</a> in PMF</b>	<b>Response</b>
<b>5a</b>	<b>Public Sector</b>	
	<p>Which government entities are involved in policy for water management and infrastructure?</p> <ul style="list-style-type: none"> <li>• Ministries (executive)</li> <li>• Civil servants and departments (bureaucracy)</li> <li>• Elected representatives (legislature)</li> <li>• Courts (judiciary)</li> <li>• Political parties</li> <li>• Local government/council</li> <li>• Military</li> <li>• International bodies (UN, World Bank)</li> </ul>	
<b>5b</b>	<b>Private Sector</b>	
	<p>Who are the private actors involved in water supply and management? Examples include: borehole drillers, water trucking companies, hardware stores stocking pumps etc.</p> <ul style="list-style-type: none"> <li>• Corporations/Businesses</li> <li>• Business associations</li> <li>• Individual business leaders</li> <li>• Financial institutions</li> </ul>	

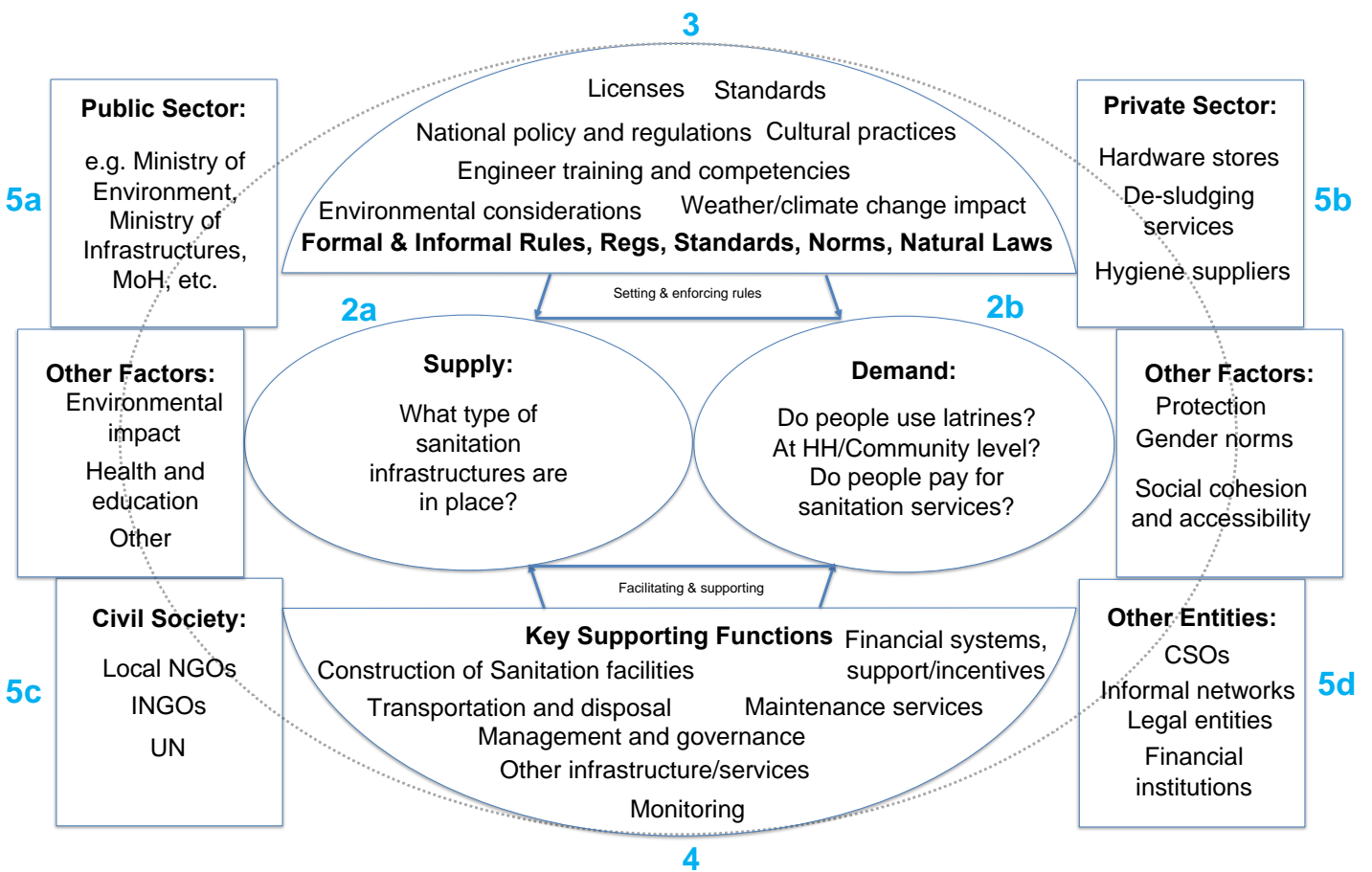
<b>5c</b>	<b>Civil Society</b>	
	<ul style="list-style-type: none"> <li>International and National NGOs – How long have they been active in sanitation?</li> <li>Women’s groups, Committees (formal and informal)</li> <li>Religious groups</li> <li>Schools and universities</li> <li>Social movements and advocacy groups</li> <li>Health professional associations and informal networks</li> <li>Trade unions (healthcare related)</li> <li>Media</li> </ul>	
<b>5d</b>	<b>Other Entities</b>	
	Legal institutions	
	List as needed:	
	<b>List Other Factors That Impact the System</b>	<b>Response</b>
	<b>Protection in Water</b>	
	Use WASH checklist in <a href="#">Minimum Inter-Agency Standard for Protection Mainstreaming</a> .	
	Are mechanisms set up to support and ensure the participation of vulnerable groups, including the elderly, women, children and people with disabilities, in the design and targeting of interventions?	
	Is there any potential threat of violence and harassment for beneficiaries while accessing water sources (e.g. proximity to checkpoints, settlements or access restricted areas), and threats to personnel repairing or maintaining the infrastructure?	
	What are the pick hours for water consumption/access to water points? Are there enough lights around the water points? Is access at night prevented by lack of safety?	
	<b>Gender and Water</b>	
	Use guidance in <a href="#">How to design and implement gender-sensitive social protection programmes</a> .	
	Is there a mechanism to ensure that men, women, girls and boys have equitable access to water?	
	Is there equal participation of men and women at all stages: initiation, design, site location, implementation, price setting and management of water distribution systems?	
	<b>Institutional Water Considerations</b>	
	Do schools/learning spaces have adequate access to water?	
	Do health facilities have adequate supply of water?	
	<b>Environmental</b>	
	Climate	
	Environment	
	Hydrology	
	Geology	
	<b>Other Factors (Define as needed)</b>	
	Remote management – Are services provided by direct implementation or through a partner organization? If partner organization, what policies and practices are in place to ensure quality of health care?	
	Sudden or slow onset disaster – How have services been tailored to the nature of the emergency? e.g. prioritization of life-saving services, mass vaccination campaigns, triage of care.	
	Social cohesion	
	Chronic civil conflict, instability	
	Other:	

# RI'S SYSTEM APPROACH - SANITATION

**1a System Mapping for Sanitation and Hygiene**

**1b** Entry Point: XXXX  
**1c** Location: XXX, XXX

**1d** Proposed Goals & Target Beneficiaries: Provide access to sanitation for XXXXX



1	Define the System	Response
1a	What is the <b>primary sector</b> ? What is the <b>context</b> ? (rural, urban, semi-urban etc.)	
1b	What is <b>RI's entry point</b> and the gap RI seeks to fill? Is RI doing the system map as part of a country strategy; a response to sudden or slow onset emergency; a specific concept note or proposal development; ongoing implementation; or end of project learning? The entry point should clearly state the need/gap to be addressed and the criteria used. Entry point and gap statement example: <b>UNICEF concept note for emergency refugee arrivals. RI seeks to provide sanitation and hygiene support.</b> Why: due to identification of high percentage of open defecation and need to prevent disease outbreak and maintain dignity, based on XX assessment done by XXX on XX.	
1c	What is the target <b>location</b> ? Note country and area within country if possible.	
1d	What are the <b>proposed goals</b> and who are the <b>target beneficiaries</b> ? For example, provide sanitation and hygiene for XXX refugees in XX camp setting.	
2	Describe the Supply and Demand	Response
2a	<b>Supply (on first pass, note only the basic supply components and then move to 2b, 3, 4 and 5a-d); as the systems map is filled can come back to other supply questions to fill in more details</b>	
Fill 1st then go to 2b	Do households have their own latrines? If not, are there latrines in the area? Is access to latrines controlled or open?	
	What type of sanitation system is in place? (e.g. septic tanks, open air channels for black waters, covered sewage system, etc.). Is there any service for desludging and maintenance of the infrastructures?	
	Other issues:	
2b	<b>Demand (on first pass, note only the basic demand components and then move to 2b, 3, 4 and 5a-d); as the systems map is filled can come back to other demand questions to fill in more details</b>	
Fill 1st then go to 3	Do people use latrines? Do households understand the environmental and health benefits of sanitation facilities? Does the system in place adequately responds to needs and is well maintained?	
	Do people pay for services? If so, what type of service do they pay for and to whom? (e.g. public utilities vs. private operators). Do households say that they are willing and able to pay for household sanitation and hygiene products, including filters, soap etc.?	
	Is water sufficient to clean sanitation facilities and for personal hygiene? Do people buy personal hygiene and cleaning products? If so, what kind and from where?	
	Is there a practice or tradition to compost and reuse human wastes? (i.e. for agricultural purposes).	
	Other issues:	
3	List the Formal and Informal Rules, Regulations, Standards, Natural Laws, and Cultural/Religious Norms	Response
	<b>Formal Regulations, Policies and Standards</b>	
	Is there a national policy on sanitation? If emergency or camp setting, is there a sanitation plan developed and how is this coordinated by host government, UN, NGOs?	



	Does the national sanitation policy define clear institutional mandates at national, district and local level?	
	Is there any mandatory environmental impact assessment to avoid safe water contamination and negative impact of sanitation infrastructures on the environment?	
	Are the roles and responsibilities clear with regard to the monitoring and enforcement of environmental impact mitigation standards for sanitation and wastewater management?	
	What certifications/licenses and trainings are required for personnel working with sanitation and wastewater management services? Are haulers/de-sludgers monitored and required to demonstrate compliance with licensing?	
	<b>Informal Norms (Cultural Practices) and Natural Laws (Mother Nature's Laws which includes Seasonal Weather related factors (including Climate Change related factors (drought, flooding))</b>	
	Do people practice open defecation in the community? To what extent? What are the main reasons? Is there any cultural belief behind open defecation?	
	Does the community have informal norms around use of sanitation facilities in their community? e.g. designated areas for gender specific bathing, gender segregation of latrines, etc.	
	Do all people in the household(s) use the sanitation facility 100% of the time? If not why?	
	Is the community free from ALL illegal dumping? If not, are there informal norms or groups that control dumping?	
	Are there seasonal weather factors which impact sanitation and hygiene? e.g. flooding of latrines and pits during rainy seasons, or reduced hygiene and cleaning of the facilities during dry season etc. Is there any coping mechanism in place?	
	Has vulnerability to climate-related impacts (including droughts and floods) been assessed for sanitation and/or wastewater treatment service?	
	Have climate-related adaptation measures been incorporated in the development of sanitation and/or wastewater treatment services (including design, sizing, and siting of built infrastructure, and management of natural resources)?	
<b>4</b>	<b>List the Key Supporting Functions</b>	<b>Response</b>
	<b>Infrastructure for Sanitation and Hygiene (Construction of Sanitation Facilities)</b>	
	Who provides/is responsible for construction of sanitation facilities? (public utilities, local authorities, shared responsibility).	
	Are there national/local norms regarding the construction of sanitation facilities (materials, design, location, capacity/crowding, accessibility, environmental protection etc.)? Do national standards protect the natural environment? Do the handwashing and sanitation facilities meet the norms?	
	Is there a local capacity to construct and maintain household and institutional sanitation and hygiene facilities according to standards?	
	<b>Management and Governance of Sanitation Systems</b>	
	Is there an institution devoted to household sanitation and responsible for carrying out the national policy on sanitation?	
	Is there effective coordination between related ministries (i.e. ministry of health and ministry of environment)?	
	What type of management is in place for sanitation infrastructures? (e.g. self-managed latrines at HH level, community level, public utilities, private operators etc.) Is the same entity in charge of water too?	
	Are there committees to manage hygiene and sanitation facilities, and environmental health? Are they formalized and in line with national norms and standards?	
	<b>Maintenance of Sanitation Infrastructure</b>	
	Who is responsible for maintenance of hygiene and sanitation facilities? Is there any private operator at the district level to conduct maintenance and repairs within the local norms? What type of sanitation service is provided?	
	Are sanitation services, equipment and material affordable and accessible for the community?	
	Do households have direct responsibility for pit-emptying? Do they have the ability to meet long-term operational and capital maintenance expenditures of sanitation facilities	

	Do users/community members contribute to the maintenance of the communal sanitation infrastructures?	
	Does local government support the use and maintenance of household sanitation facilities? Is a training provided? Does training include principles and practices of social marketing and hygiene behavior change communication strategies?	
	<b>Financing of Sanitation and Hygiene</b>	
	Who is responsible for financing HH sanitation? Is there any community saving group dedicated to sanitation infrastructures?	
	What is the fee for desludging and disposal of the sewage? What type of payment systems are in place? Are funds effectively managed?	
	Is there a specific budget allocated to support sanitation services at the district and village/community level?	
	Is there a national/local mechanism beyond community contributions, to meet life-cycle costs, while ensuring affordability, equity, and non-discrimination?	
	<b>Transportation and Other Infrastructure/Services</b>	
	Is there access to a road system that allows access for trucks, heavy equipment and supplies to install and maintain sanitation systems? Is access seasonal and/or impacted by security issues? What are the road conditions to transport goods and services for sanitation and hygiene facilities?	
	<b>Monitoring</b>	
	Is there a sanitation monitoring plan (e.g. follow use of sanitation facility, status of infrastructure, environmental contamination etc.)	
	Is monitoring carried out at least once every 6 months (or as specified)?	
	Is there continued promotion for the use of sanitation facilities?	
	Is monitoring used to inform future sanitation planning?	
<b>5</b>	<b>Identify Key System Actors (Stakeholders) – Refer to Stakeholder Mapping Tool <a href="#">Guidance</a> and <a href="#">Template</a> in PMF</b>	<b>Response</b>
<b>5a</b>	<b>Public Sector</b>	
	Which government entities are involved in sanitation policy, infrastructure and management? <ul style="list-style-type: none"> <li>• Ministries (executive)</li> <li>• Civil servants and departments (bureaucracy)</li> <li>• Elected representatives (legislature)</li> <li>• Courts (judiciary)</li> <li>• Political parties</li> <li>• Local government/council</li> <li>• Military</li> <li>• International bodies (UN, World Bank)</li> </ul>	
<b>5b</b>	<b>Private Sector</b>	
	Who are the private sectors (note how many if known) involved in hygiene and sanitation services, supplies and management? Examples include: hardware stores, stocking pumps and toilets, de-sludging services, hygiene suppliers. <ul style="list-style-type: none"> <li>• Corporations/Businesses</li> <li>• Business associations</li> <li>• Individual business leaders</li> <li>• Financial institutions</li> </ul>	
<b>5c</b>	<b>Civil Society</b>	
	<ul style="list-style-type: none"> <li>• International and National NGOs – How long have they been active in sanitation?</li> <li>• Women’s groups, Committees (formal and informal)</li> <li>• Religious groups</li> <li>• Schools and universities</li> <li>• Social movements and advocacy groups</li> <li>• Health professional associations and informal networks</li> <li>• Trade unions (healthcare related)</li> <li>• Media</li> </ul>	
<b>5d</b>	<b>Other Entities (If having difficulty determining place on map here)</b>	
	Legal institutions	
	List as needed:	

## COMMUNITY GATHERING - SURVEY

1) HOW DO YOU RECEIVE DRINKING WATER:	HOUSEHOLD BOREHOLE	PIPED NETWORK	WATER TRUCK	BOTTLES
2) HOW DO YOU RECEIVE DOMESTIC WATER:	HOUSEHOLD BOREHOLE	PIPED NETWORK	WATER TRUCK	BOTTLES
3) DO YOU TRUST THE QUALITY OF DRINKING WATER:	YES	NO	USUALLY	
4) DO YOU RECEIVE ENOUGH WATER EVERY DAY:	YES	NO		
5) DO YOU HAVE A HOUSEHOLD TOILET:	YES	NO		
6) DO YOU HAVE A SEPTIC TANK:	YES	NO		
7) DO YOU DISCHARGE GREYWATER (SINK, WASHING) INTO SEPTIC TANK:	YES	NO		
8) DOES YOUR SEPTIC TANK OVERFLOW INTO DRAINAGE SYSTEM/CREEK:	YES	NO		
9) DO YOU HAVE A GARBAGE BIN FROM THE MUNICIPALITY:	YES	NO		
10) HOW OFTEN DO YOU HAVE GARBAGE COLLECTION EACH WEEK:	EVERY DAY	EVERY 2 DAYS	EVERY 3 DAYS	EVERY 1 WEEK



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