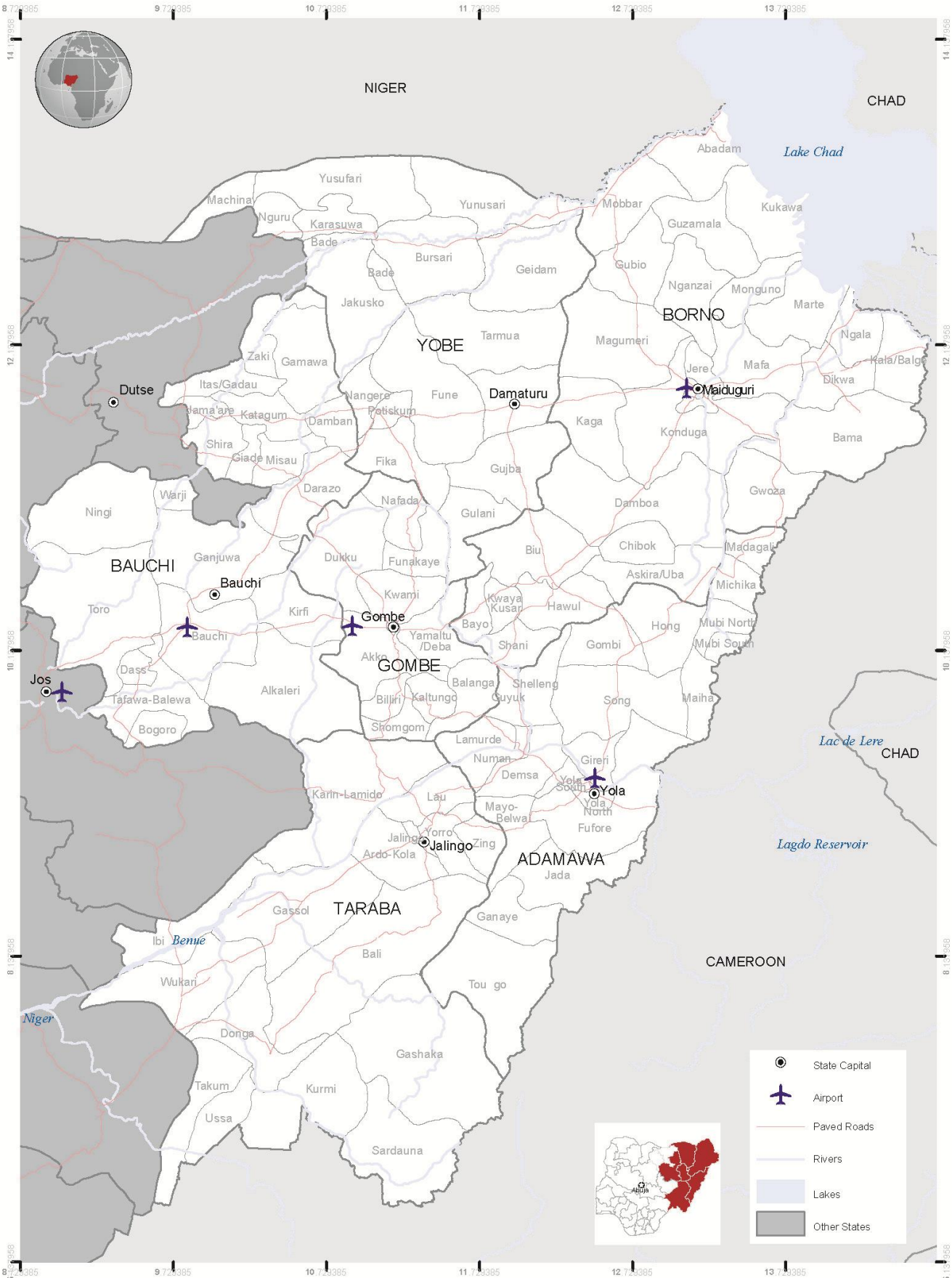
WASH Sector Nigeria Emergency Technical Guidance

November 2016

Nigeria - Northeast States: Reference Map

OCHA



The boundaries and names shown and the designations used on this map do not imply official endorsement or acceptance by the United Nations.

Creation date: 28 January 2016 **Sources:** UNCS, International Organization for Migration, World Health Organization **Feedback:** ochanigeria@gmail.com

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Objective

The objective of this document is to provide technical guidance to partners implementing emergency water, sanitation, and hygiene (WASH) programs in Nigeria to ensure effective and efficient interventions to address humanitarian needs and acute emergencies. This document also provides guidance for the harmonized standards. The harmonized standards provide a reference to ensure that affected populations receive a minimally acceptable standard of services in WASH.

Limitations

This guidance was developed in consultation with government, non-governmental organization (NGO), and United Nations (UN) partners implementing emergency WASH programs in Nigeria. A small sample of focus group discussions with internally displaced person (IDP) beneficiaries also informed the recommendations. Due to the large number of IDPs living in a large number of host communities, inaccessible areas, and various formal and informal camp settlements all stakeholders and beneficiaries could not be consulted. Technical design issues were guided by feedback from partners. It is recommended that this guidance be reviewed and revised based on changes in the emergency operating context and future best practices identified by WASH actors.

Costs illustrated below are examples provided by contributing partners. Installation and repair of infrastructure will vary significantly based on a variety of factors that include location, soil type, depths, and siting. Costs are based on exchange rates prior to the currency float for urban locations, ranging from 185-215 naira as compared to the United States Dollar (USD). At the time of writing the official exchange rate was 315.

This guidance is not inclusive of all considerations for planning, implementation, and operation of WASH services in Nigeria. This guidance covers some of the technical issues encountered during the review of existing services prior to development of this guidance. It is highly recommended that WASH practitioners review the recommended references at the end of this document before initiating activities in Nigeria.

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Acronyms

AAH	Action Against Hunger
BOSEPA	Borno State Environmental Protection Agency
CCCM	Camp Coordination and Camp Management
CFU	Colony Forming Unit
CHIRPS	Climate Hazards Group InfraRed Precipitation with Stations
CLTS	Community Led Total Sanitation
CTC	Cholera Treatment Center
DTM	Displacement Tracking Matrix
FCT	Federal Capital Territory
FEWS NET	Famine Early Warning System Network
FMOWR	Federal Ministry of Water Resources
FRC	Free Residual Chlorine
GAM	Global Acute Malnutrition
HH	Household
HTH	High Test Hypochlorite
ICRC	International Committee of the Red Cross
IFRC	International Federation of Red Cross and Red Crescent
IDP	Internally Displaced Person
IEC	Information, Education, and Communication
IOM	International Organization for Migration
JMP	WHO/UNICEF Joint Monitoring Programme for Water Supply and Sanitation
LGA	Local Government Area
MHM	Menstrual Hygiene Management
MoEnv	Ministry of Environment
NAFDAC	National Agency for Food and Drug Administration and Control
NBS	National Bureau of Statistic
NEMA	National Emergency Management Agency
NFI	Non Food Item
NGO	Non-Governmental Organization
NTU	Nephelometric Turbidity Unit
O&M	Operation and Maintenance
ORS	Oral Rehydration Solution
PDM	Post Distribution Monitoring
PET	Polyethylene Terephthalate
POU	Point of Use
RUWASSA	Rural Water Supply and Sanitation Agency
SAM	Severe Acute Malnutrition
SEMA	State Emergency Management Agency
SMOWR	State Ministry of Water Resources
TCU	True Color Units
UN	United Nations
UNFPA	United Nations Population Fund
UNHCR	United Nations High Commission for Refugees
UNICEF	United Nations Children's Fund
USGS	United States Geological Survey
VIP	Ventilated Improved Pit
WASH	Water, Sanitation, and Hygiene
WASHCOM	WASH Committee
WEDC	Water, Engineering, and Development Centre, Loughborough University
WHO	World Health Organization

Access to water and sanitation

The tables and figures below illustrate the overall WASH situation in Nigeria before and during the emergency phase.

Table 1: 2015 Access to sanitation in Nigeria, Source: Adapted from 2015 WHO/UNICEF Joint Monitoring Programme for Water Supply and Sanitation (JMP) Update and 2010 JMP Report

Year	Population(x1,000)	Percentage urban population	Use of sanitation facilities (percentage of population)												Progress towards MDG target	Proportion of the 2015 population that gained access since 1990 (%)
			Urban				Rural				Total					
			Improved	Unimproved			Improved	Unimproved			Improved	Unimproved				
				Shared	Other Unimproved	Open Defecation		Shared	Other Unimproved	Open Defecation		Shared	Other Unimproved	Open Defecation		
1990	95,617	30	38	43	12	7	38	16	15	31	38	24	14	24	Limited or no progress	9
2000	124,842	43	37	40	13	10	32	16	20	32	34	26	17	23		
2008	151,212	48	36	38	14	12	28	14	27	31	32	26	20	22		
2015	183,523	48	33	38	14	15	25	11	30	34	29	24	22	25		

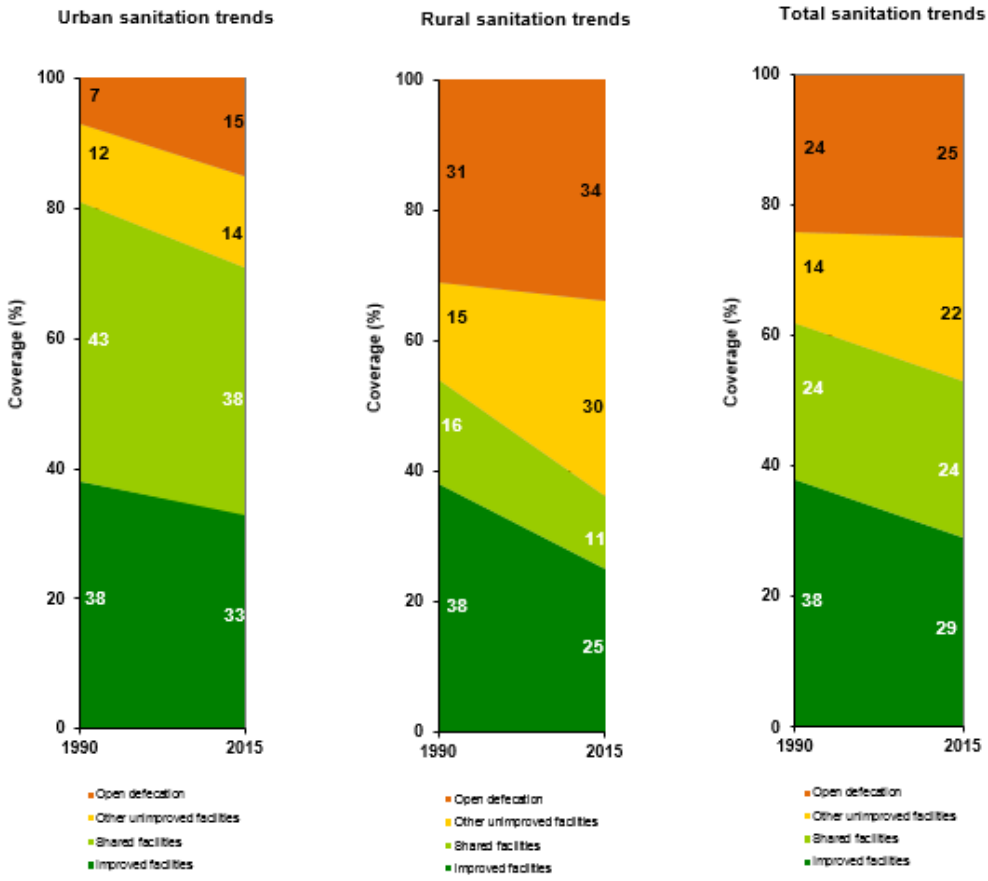


Figure 1: Trends in sanitation in Nigeria, Source: 2015 JMP Update

The JMP data demonstrates that shared sanitation facilities are common in urban areas of Nigeria (38%). The data illustrated above also demonstrates that the trend of decreased access to sanitation began prior to the emergency context. It is worth noting that the population of the country doubled from 1990 to 2015 which may account for decreases in overall coverage by percentage of the population.

Table 2: Access to drinking water in Nigeria, Source: Adapted from 2015 JMP Update

Year	Use of drinking water sources (percentage of population)															Progress towards MDG	Proportion of the 2015 population that gained access since 1990 (%)
	Urban					Rural					Total						
	Improved					Improved					Improved						
	Total Improved	Piped on Premises	Other Improved	Unimproved	Surface Water	Total Improved	Piped on Premises	Other Improved	Unimproved	Surface Water	Total Improved	Piped on Premises	Other Improved	Unimproved	Surface Water		
1990	76	32	44	18	6	25	3	22	25	50	40	12	28	23	37	Met target	48
2015	81	3	78	16	3	57	1	56	27	16	69	2	67	21	10		

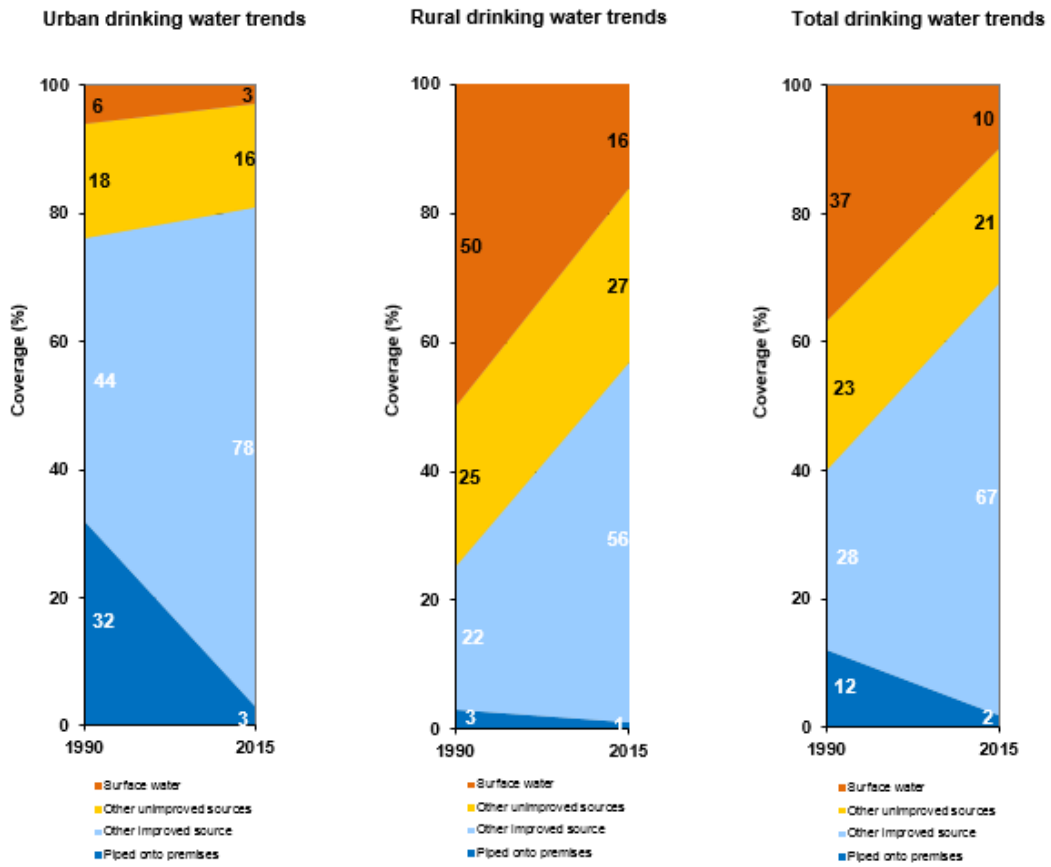


Figure 2: Trends in drinking water in Nigeria, Source: 2015 JMP Update

Pre-emergency conditions provide a reference for restoring access to water and sanitation to pre-emergency levels. Access to water and sanitation varies by state. The North East area of the country where humanitarian assistance is focused was noted as

having the lowest overall WASH coverage prior to the emergency. The water coverage from 2005 and improved sanitation access from 2011 is illustrated below by state for the North East states.

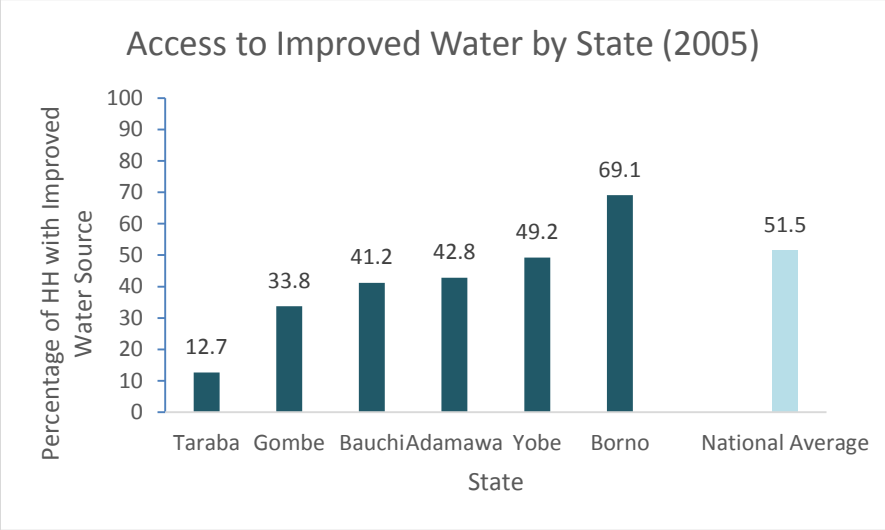


Figure 3: Access to improved water source by state in Nigeria, Source: Data extracted from WHO/UNICEF Rapid Assessment of Drinking Water Quality in the Federal Republic of Nigeria Country Report (2004-2005)

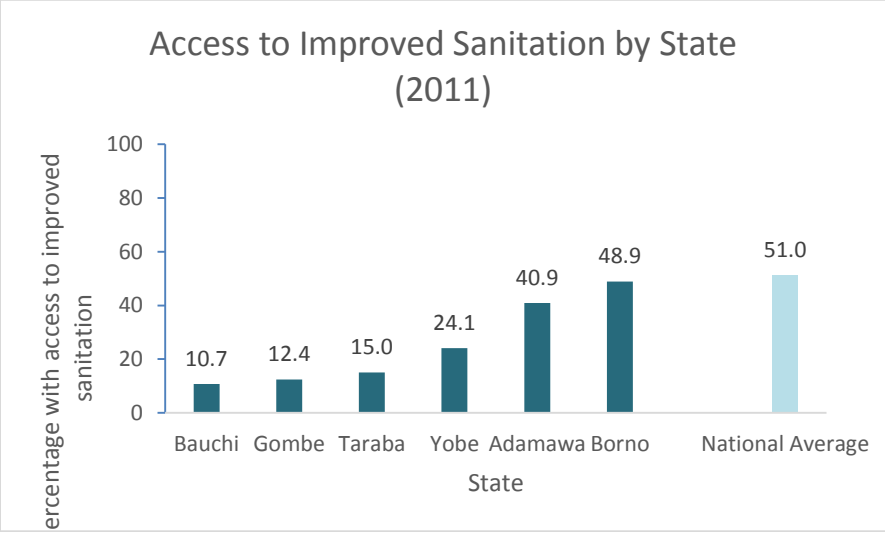


Figure 4: Access to improved sanitation by state in Nigeria, Source: National Bureau of Statistics (NBS)/United Nations Population Fund (UNFPA)/UNICEF Multiple Indicators Cluster Survey, 2011

The most common improved sanitation facilities in North East Nigeria were pit latrines with a slab. The most common unimproved sanitation facilities were pit latrines without slabs. Ventilated improved pit (VIP) latrines were not common throughout with region as can be seen in the table below. Open defecation practices in areas of origin for the IDPs necessitate hygiene promotion on the use of sanitation facilities.

Table 3: Access to sanitation by type and state in Nigeria, Source: NBS/UNFPA/UNICEF Multiple Indicators Cluster Survey 2011

State	Piped sewer system	Septic tank	Pour flush to pit latrine	VIP latrine	Pit latrine with slab	Compost toilet	Flush/pour flush to somewhere else	Pit latrine without slab/open pit	Open defecation
Bauchi	0.4	0.0	0.4	1.6	8.3	0.0	0.0	53.9	35.2
Gombe	0.1	0.3	1.2	0.0	10.8	0.0	0.0	60.3	27.3
Taraba	0.7	0.0	0.9	0.1	13.2	0.1	0.0	32.3	52.5

State	Piped sewer system	Septic tank	Pour flush to pit latrine	VIP latrine	Pit latrine with slab	Compost toilet	Flush/pour flush to somewhere else	Pit latrine without slab/open pit	Open defecation
Yobe	0.9	0.5	9.0	4.0	9.6	0.1	0.4	35.8	39.5
Adamawa	2.0	0.9	1.1	0.2	36.7	0.0	0.0	25.1	33.9
Borno	0.5	0.9	0.9	0.6	46.0	0.0	0.0	27.9	22.7
National	4.4	14.8	5.0	1.5	25.1	0.2	0.1	18.3	28.5

WASH financing

As illustrated in the figure below, the non-emergency emphasis on Community Led total Sanitation (CLTS) requires households in rural settings to finance sanitation facilities. CLTS promotes household latrine construction with complete coverage and usage of households so that the entire community is open defecation free. This is an important consideration when planning communal or household latrines as communal latrines may have implications on development strategies for eliminating open defecation. Communal latrines may be more appropriate in the urban context as seen from the percentage of shared latrine users in the JMP table above. This could be attributed to the large gap in urban sanitation financing and programs in Nigeria. The figure below also illustrates that water supply is prioritized for domestic investment by government stakeholders.

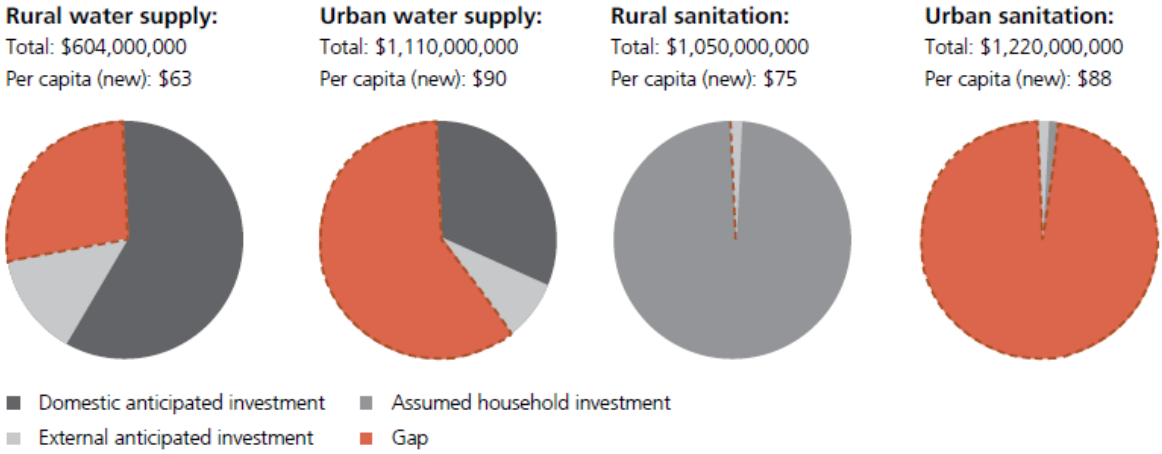


Figure 5: Overall annual and per capita investment requirements and contribution of anticipated financing source, Source: Water Supply and Sanitation in Nigeria African Ministers' Council on Water Country Status Overview, 2011

Financing for WASH is shared between different stakeholders. The 2013 WASH Policy for Borno outlines the proposed cost sharing for Borno State. This breakdown is included in the table below.

Table 4: National WASH Program Capital and Maintenance Cost-Sharing Formula, Source: Borno State Ministry of Water Resources WASH Policy, 2013

Agency	Rural Water Supply		Small Town Water Supply		Urban Water Supply	
	Capital (%)	O&M (%)	Capital (%)	O&M (%)	Capital (%)	O&M (%)
Federal Government	50	0	50	0	30	0
State Government	25	10	30	50	60	100 (tariff)
Local Government	20	20	15	30	10	0
Community	5	70	5	20	0	0

Cost recovery for operation and maintenance in urban areas has been minimal to date in urban areas of Maiduguri. The WASH sector should incorporate planning for operation and maintenance (O&M) of water supply infrastructure where the expected contribution of beneficiaries is anticipated to be high in rural areas. In urban areas residents may not be accustomed to tariffs for water supply, though tariffs are the current strategy for O&M through the state government.

Institutional WASH in emergency structures

The **Federal Ministry of Water Resources** (FMOWR) is the lead agency for the WASH sector and has overall responsibility for operational strategies, coordination, and implementation of the emergency sector approach in Nigeria.

The **National Emergency Management Agency** (NEMA) leads coordination of emergency assistance at the national level. In Borno NEMA is responsible for camp management of some formal camp settlements.

The **State Emergency Management Agency** (SEMA) leads coordination of emergency assistance at the state level. In some states such as Yobe this includes installation of water supply and sanitation facilities. In Borno, Yobe, and Adamawa SEMA is responsible for camp management of formal camp settlements.

The **State Ministry of Water Resources** (SMOWR) is responsible for urban and rural water supply and sanitation infrastructure. SMOWR manages urban water supply and sanitation infrastructure directly in Borno.

The **Borno State Environmental Protection Agency** (BOSEPA) is responsible for solid waste management and fecal waste management in Borno. BOSEPA is an operational division of MoEnv.

The **Ministry of Environment** (MoEnv) oversees environmental sanitation and is responsible for collection and drainage of stormwater.

The **Rural Water Supply and Sanitation Agency** (RUWASSA) is an operational division of SMOWR and is responsible for provision, operation, and maintenance of water supply and sanitation infrastructure outside of urban areas. RUWASSA manages non-reticulated water infrastructure such as handpumps in the administrative municipal areas outside of the urban centers.

Local Government Areas (LGAs) are responsible for the establishment, operation, and maintenance of rural water supply schemes and sanitation facilities.

WASH committees (WASHCOMs) are administrative units responsible for individual water points. These units maintain and operate water infrastructure such as handpumps, reticulation lines, soakaway areas, submersible pumps, generators, and solar panels. Collection of user fees varies by WASHCOM. Tap opening hours also varies depending on the management of the WASHCOMs.

Sanitation committees are community or camp members organized to maintain and clean sanitation facilities. Sanitation committees may also be responsible for solid waste management.

The United Nations **Office for Coordination of Humanitarian Affairs** (OCHA) is responsible for mobilizing and coordinating humanitarian actors in Nigeria.

The **International Organization for Migration** (IOM) is the intergovernmental organization co-lead for the Camp Coordination and Camp Management (CCCM), Non-Food Items (NFIs), and Shelter sectors in Nigeria. IOM is the sector focal point for Borno and Adamawa. IOM manages the displacement tracking matrix of IDPs in Nigeria.

Action Against Hunger (AAH) is the sector focal point for CCCM, NFIs, and Shelter for Yobe

Mercy Corps is the sector focal point for CCCM, NFIs, and Shelter for Gombe.

The **United Nations Children's Fund** (UNICEF) is co-lead for the WASH sector in addition to the Nutrition and Education sectors and Child Protection sub-sector. UNICEF provides coordination support to FMOWR.

WASH partners refers to all government, NGOs, Red Cross and Red Crescent Movement societies, and UN agencies providing humanitarian assistance for WASH in Nigeria.

Affected populations

Formal IDP camp settlements are camps of IDPs formally recognized and managed by the Government of Nigeria. Access is restricted for movements in and out of the camps for security of the populations.

Informal IDP camp settlements are comprised of twenty or more IDPs (or five or more households) hosted in one location or center that are not formally managed by the Government of Nigeria. These camps are located in schools, private property, or other open areas or buildings not originally intended to host people. The population of these camps can be as large as or larger than formal camps. This excludes IDPs renting accommodations.

Host communities are neighborhoods that are hosting IDPs on land or in existing homes. IDP families residing in these communities may be communally grouped in up to 100 individuals in a housing compound. Agreements with property owners or those otherwise responsible for the property vary.

Former host communities are wards, neighborhoods, or villages that formerly hosted IDPs.

Access constrained* camp settlements are IDP camps that are difficult to access due to security concerns or partner policies to travel to the affected populations for implementation and monitoring of relief activities.

Access constrained host communities are host communities in areas that are difficult to access due to security concerns or partner policies to travel to the affected populations for implementation and monitoring of relief activities.

Returnees are IDPs that have returned to their original place of residence. Support to returnees is considered recovery after life-saving interventions.

Transit returnees are Nigerians previously displaced to neighboring countries residing in transit camps during their return to their place of origin.

Return communities are neighborhoods where former IDPs have returned or where IDPs are planning to return to. Support to return communities is considered for recovery after life-saving interventions. Return communities may benefit from WASH infrastructure programs targeted toward IDPs.

Refugees are persons who are outside their country of nationality or habitual residence; have a well-founded fear of being persecuted because of their race, religion, nationality, membership of a particular social group or political opinion; and are unable or unwilling to avail themselves of the protection of that country, or to return there, for fear of persecution[1].

* Access constrained areas include areas where the Nigerian military has placed restrictions to access civilians without the use of armed escort (newly "liberated" LGAs). Other areas are completely restricted by the military for any civilian access. These areas are not covered under this guidance due to the complete lack of access by humanitarian WASH partners.

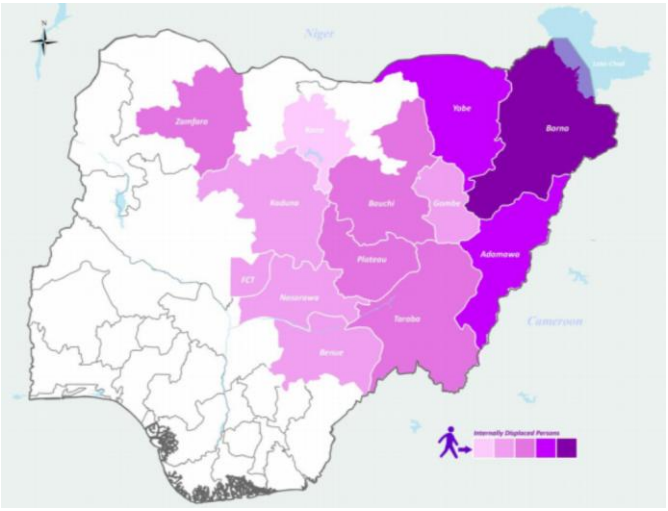


Figure 6: Severity map showing population density of IDPs per state of displacement, Source: IOM Displacement Tracking Matrix (DTM) Round XI, August 2016

[1] UNHCR 1951 Convention relating to the status of refugees and its 1967 protocol, http://www.unhcr.org/about-us/background/4ec262df9/1951-convention-relating-status-refugees-its-1967-protocol.html

Considering the overall displaced individuals and reported household breakdown this guidance will assume a **household size of six individuals per household**. Lower household values may be more appropriate for Adamawa State where reported sizes are closer to four as seen in the table below from the IOM DTM matrix.

Table 5: IDP reported average household sizes by state, Source: IOM DTM matrix, Round XI, August 2016

State	Households	Individuals	Average Household Size
Adamawa	36189	163559	4.52
Bauchi	10136	61717	6.09
Benue	5497	30584	5.56
Borno	253951	1446829	5.7
Federal Capital Territory (FCT)	3160	20924	6.62
Gombe	5111	28972	5.67
Kaduna	3842	28927	7.53
Kano	1841	9910	5.38
Nasarawa	3664	24795	6.77
Plateau	8692	45746	5.26
Taraba	8230	47195	5.73
Yobe	20901	135442	6.48
Zamfara	9175	48430	5.28

Environmental considerations

Hydrology and soil conditions

The Chad Basin is an interior drainage area in North Central Africa that expands 600,000 square miles (1,554,000 square kilometers). This includes an area of 200,000 km2 in Nigeria with 58% of this in Yobe and Borno States[2]. One tenth of this basin is in Nigeria. Parts of the area may be defined by the Kerri Kerri Formation with oxidized sand, clay, and sandstone. The Chad Basin within the Chad Formation includes an upper, middle, and lower water-bearing unit. These zones are described in a United States Geological Survey (USGS) Nigeria paper:

> *The upper zone consists of a widespread series of interbedded sand, clay, silt, and sandy clay which extend from the surface to an average depth of 200 feet [61 m] but locally to 600 feet [183 m]. The middle zone is composed of interbedded sand and clay, which underlie at least 20,000 square miles [51,800 square kilometers] of northeast Nigeria. A clay layer 200 to 1,000 feet [61 to 305 m] thick, confines the water in this zone and separates it from the overlying upper zone. The lower zone… in the Maiduguri area where it occurs at depths of 1,390 to 1,676 feet [424 to 511 m] consists of about 250 feet [76 m] of interbedded clay, sandy clay, and sand[3].*

A 2015 study of borewells by Yusuf reported yields of 2-5 L/s in the upper aquifer, 5-10 L/s in the middle aquifer, and 15-30 L/s in the lower aquifer. This same report provided the following geological section.

[2] Bunu, Groundwater management perspectives for Borno and Yobe States, Nigeria, Journal of Environmental Hydrology, 1999
[3] Miller et al, USGS, Ground-Water Hydrology of the Chad Basin in Bornu and Dikwa Emirates, Northeastern Nigeria, with Special Emphasis on the Flow Life of the Artesian System, 1968

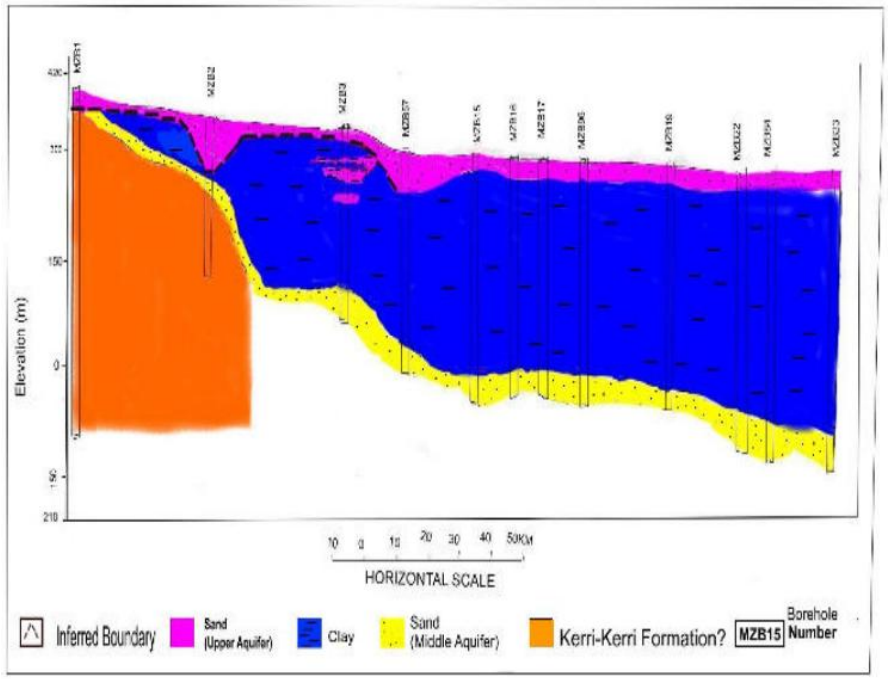


Figure 7: Geological section from Damboa to Lake Chad showing the relative positions of the aquifers of the Chad Formation, Source: Yusuf, Groundwater resource management strategy in the Nigerian sector of the Chad Basin, Journal of Natural Sciences Research, 2015

Water levels in the upper zone vary seasonally particularly near rivers and large streams. The USGS report illustrated this from water levels in Dalori below.

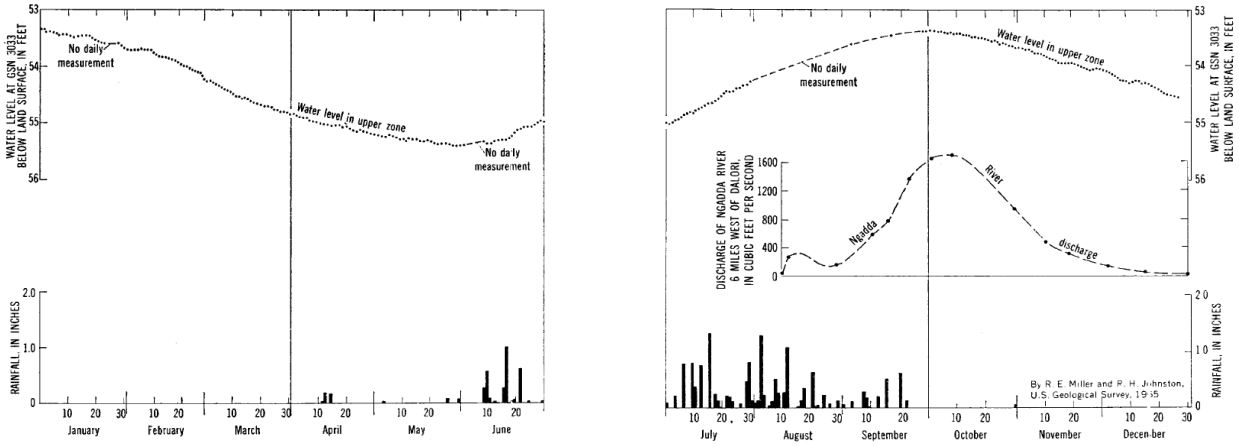


Figure 8: Water level in upper-zone well at Dalori related to Ngadd River discharge and daily rainfall at Maiduguri during 1964, Source: Miller and Johnston, USGS paper

Top soil in the Maiduguri area is sandy.[4] Below this sandy layer is rust-red laterite soil. Many clay soils in the area are reported as impervious to water.[5] Dibal found permeability rates of 9.26 x 10^{-6} cm/s, 7.66 x 10^{-6} cm/s, and 2.15 x 10^{-4} cm/s in a small sample

[4] 0-20 cm as sandy with 91.5% sand, 7.5% silt, and 1.0% clay; Akosim et al, Investigation of Soil Characteristics of Sambisa Game Reserve, Borno State, Nigeria, http://www.ijraf.org/pdf/v2-i2/1.pdf

[5] "Soil in this zone is deeply corroded, generally sticky and impervious to water and has low fertility. When the virgin forest on them is cleared it reduces the fertility further, thus making available soil of little agricultural value. When the soil is exposed to the surface, it become as hard as brick and for this reason, the soil here is most suitable for road paving and wall construction than for farming." Food and Agriculture Organization of the United Nations (FAO) Forage Resource Profile, 2005, http://www.fao.org/ag/agp/agpc/doc/counprof/nigeria/nigeria.htm

study near Maiduguri.[6] Percolation tests in Gwange reveal higher permeability of soils with an average of 550 L/m^2/day for clear water and 24 L/m^2/day for wastewater[7]. The sandy top soils emphasize the importance of compacting soils when replacing the soil from pit excavation around the pit lining as illustrated in the photos below.

Figure 9: Soil erosion and collapse after rain events due to improper backfilling of excavated pits

Impermeable layers below this sandy layer create a need for regular desludging due to reduced percolation and unstable soils. Soil conditions in parts of Yobe may be more permeable but vary by location. Sandy soils allow more infiltration of liquids from latrine pits and soakaway pits. Wells are commonly drilled up to 400 meters near Damaturu.

Water quality testing has shown that the risk of microbial infection is highest in the top water layer in Yobe and Borno. The deepest aquifer tends to have limited microbial contamination and is generally considered potable without treatment.

Precipitation

North East Nigeria is a semi-arid area with evaporation rates greater than 2,000 mm/year[8]. The single rainy season in the North East of Nigeria begins in May and ends in October with the bulk of rainfall falling between June and August. With less than 600 mm of precipitation for the rainy season, rainwater harvesting is not considered a viable option for emergency water supply for IDPs or host communities. Due to the considerably dusty conditions in the area the initial rainfall runoff would likely be unsuitable for consumption and reduce a high percentage of the usable water.

[6] Dibal et al, Water Intake Characteristics of Different Soil Types in Southern Borno Nigeria, 2013, http://www.ijsit.com/admin/ijsit_files/WATER%20INTAKE%20CHARACTERISTICS%20OF%20DIFFERENT%20SOIL%20TYPES%20IN%20SOUTHERN%20BORNO%20NIGERIA_IJSIT_2.6.4.pdf

[7] MSF percolation tests in Gwange, July 2016

[8] Yusuf, Groundwater resource management strategy in the Nigerian sector of the Chad Basin, Journal of Natural Sciences Research, 2015

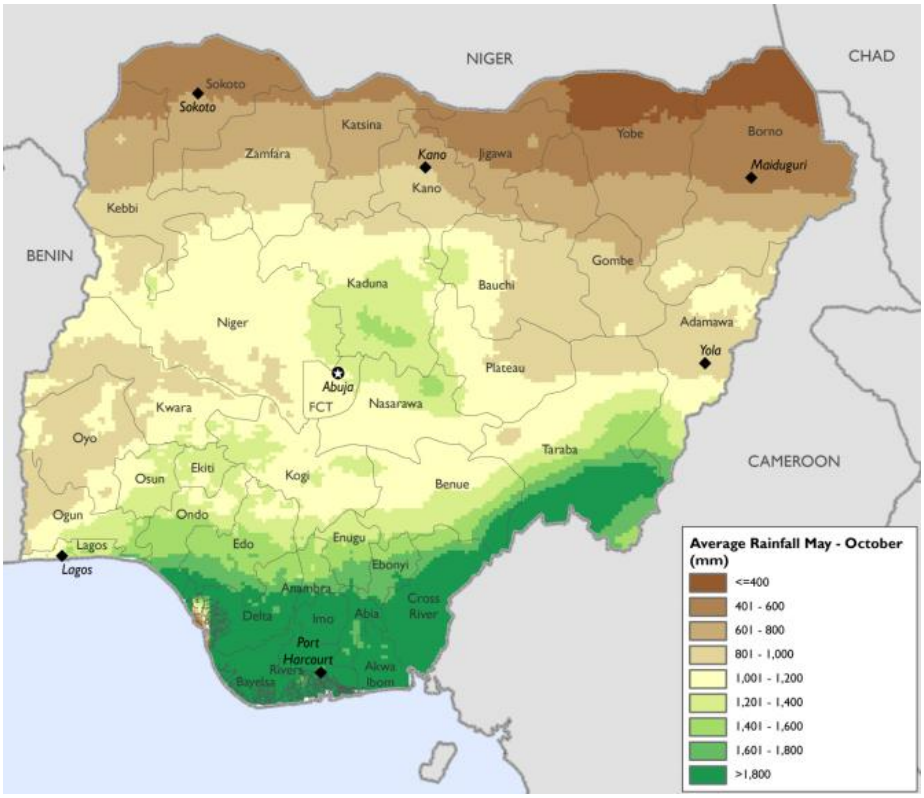


Figure 10: Average total May-October rainfall in Nigeria based on the 1981-2015 historical record (mm), Source: FEWS NET Nigeria Special Report, June 2016 (from USGS CHIRPS)

75% of this rainfall is seen during the months of June, July, and August (See figure below.) resulting in a large required storage capacity to utilize the harvested water. Harvesting amounts to viable supplementation of water sources for a small portion of the year. Rainwater harvesting is not recommended.

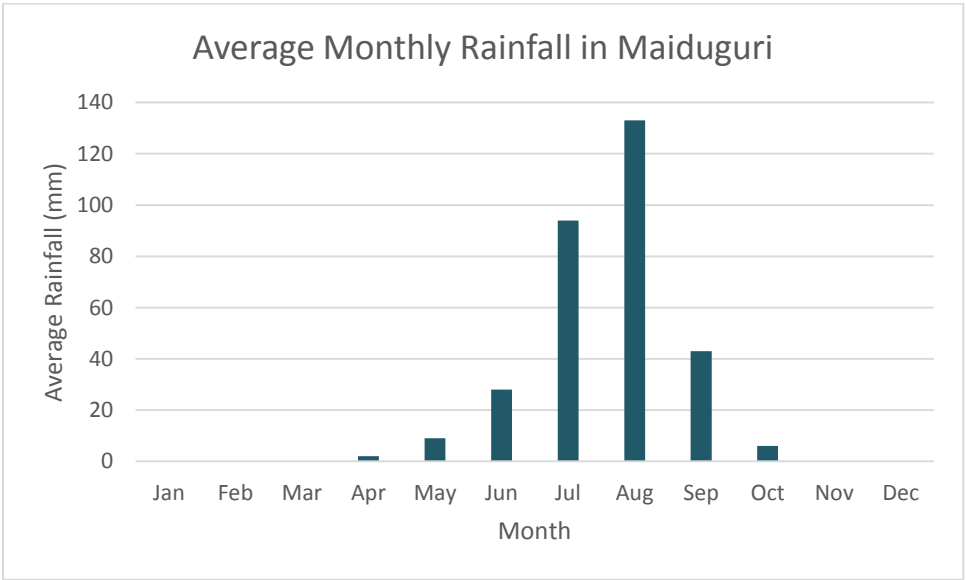


Figure 11: Average monthly rainfall for Maiduguri, Source: Data extracted from Deutscher Wetterdienst Global Precipitation Climatology Centre for years 1951-2000

Diarrhea rates and cholera

Diarrhea rates are seasonal in Nigeria. The table below illustrates a snapshot of diarrheal incidence in North East Nigeria.

Table 6: Diarrheal incidence for North East Nigeria, Source: National Population Commission and ICF International, 2014, Nigeria Demographic and Health Survey 2013

State	Percentage of children under five with diarrhea in preceding two weeks (%)	Percentage of children under five with bloody diarrhea in preceding two weeks (%)
Adamawa	16.6	2.3
Borno	10.8	0.5
Yobe	34.6	5.0

Cholera cases are reported annually in Nigeria. The first recorded case of cholera in Nigeria was in 1970. The table below shows the cases reported for each year since 1991.

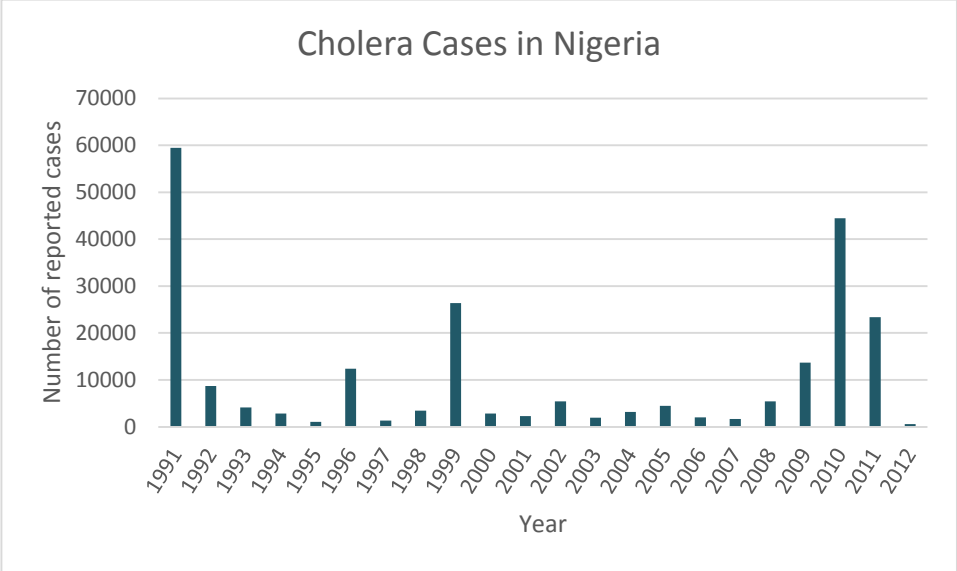


Figure 12: Yearly number of cholera cases in Nigeria, 1991-2012; Source data: WHO Global Health Atlas, http://apps.who.int/globalatlas/dataQuery/default.asp

The chart below shows the geographical distribution of reported cholera cases in Nigeria in 2015. The cholera section below includes more information on cholera hotspots throughout the country.

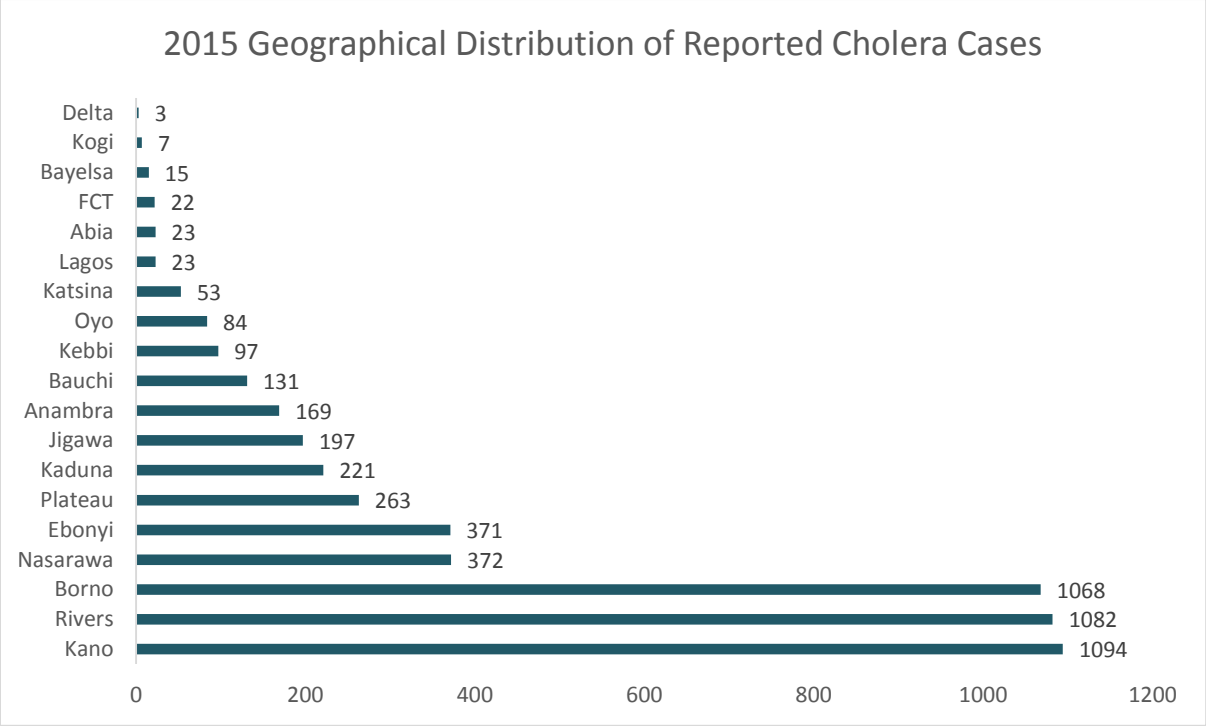


Figure 13: Geographical distribution of cholera cases for January 1, 2015 through December 31, 2015, Source: Nigeria Federal Ministry of Health, UNICEF West and Central Africa Regional Office Week 1 to Week 53 cholera cumulative cases

Water quantity and storage

15 L/p/d (drinking, bathing/personal hygiene, clothes washing, and cooking)
250 maximum people per tap or faucet
500 people per handpump
400 people per single user protected well
500 m maximum distance from the water point
1,500 L storage tank for every 400 people in camps[9]

Indicators:

- **Number of people benefitting from emergency safe water supply**
- Average number of liters of water used per person per day
- Number of borewells constructed with handpump
- Number of borewells rehabilitated with handpump
- Number of borewells constructed with mechanized or solar pumping and flow rate
- Number of borewells rehabilitated with mechanized or solar pumping and flow rate
- Number of water schemes constructed
- Number of water schemes rehabilitated
- Number of protected wells constructed
- Number of protected wells rehabilitated
- **Volume of emergency water provided to affected populations**
- Average waiting time at water points

Operational principles and practices

Water trucking may be used for newly accessed camp settlements with number of trips based on tanker refilling time, tanker travel time, tanker unloading time, tanker volume, on-site storage volume, and tap discharge capacity. Water trucking may also be required for drinking water if water points on-site become contaminated or experience higher turbidity levels during rainfall events. Households must have access to containers to collect water before distribution.

Water trucking for immediate response conditions and periods of high turbidity

Borewells are recommended when possible for longer-term provision of water in camp and host community settings in urban areas serving a population of 1,000 individuals or more. Handpumps in more rural settings may be appropriate for populations of less than 1,000 individuals. Solar powered borewells are recommended by government partners to reduce fuel requirements for operation of submersible pumps where possible. In urban areas connections to the existing reticulation system and increased yields through upgrading or additional borewells can provide water to IDP populations. Electrical boxes can be located under the panels to provide further protection from rain depending on the flooding risk. These boxes should be accessible for repairs and secured with fencing or locks as applicable.

Solar powered borewells for medium to long-term host communities and camp settings for populations greater than 1,000

For new borewells the following should be included:

[9] Storage should be calculated based on pump capacity or water trucking frequency and volume, population served, hours of operation, and number of functioning taps.

- The annulus of the well shall be grouted to a minimum depth of five meters (5 m) in basement and ten meters (10 m) in the sedimentary formations below ground surface.
- Pumping tests should be conducted for static and dynamic water levels, yield, drawdown, pump capacity, depth of installation, and water quality parameter samples (See water quality section below).
- Drilling logs and pumping tests should be submitted to SMOWR/RUWASSA.
- Casing should be installed at least 300 mm above the ground surface and securely capped.
- Artesian wells should include a flow regulating valve.
- The apron should include markings that detail **total depth of well** (m), **yield** (L/s), static water level (m), **well completion date**, pump installation date, depth of the pump intake, and rating of the pump (kW).
- Flow meters should be installed before the storage or reticulation system.

Drilling logs submitted to SMOWR

Apron marking total depth, yield, and well completion date

Installation of flow meters

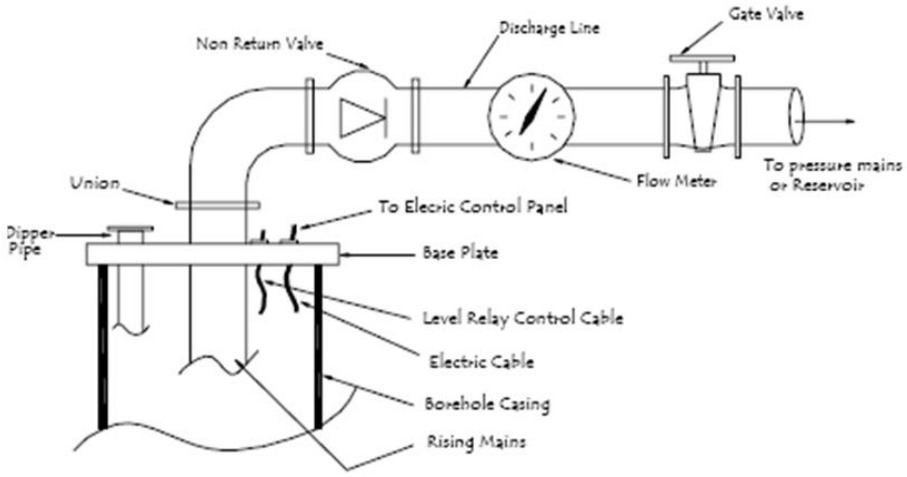


Figure 14: General layout of electrical pumping equipment installation at the wellhead, Source: Code of Practice for Water Well Construction in Nigeria, National Water Resources Institute, 2010

Wells should be protected with a cement grout with a minimum 1.5 m diameter apron for a sanitary seal to prevent contamination of the wells. The depth and yield should be marked into the cement before it dries so that this information is available for future repairs and sanitation siting. Super chlorination to 100 mg/L after drilling will disinfect the well from contamination introduced during the drilling process. The superchlorinated water should remain for four hours and then be purged. Additional protection against leaning children, animals, or other forces may be necessary to protect above ground pipes in open areas.

Wells protected with a minimum 1.5 m diameter apron

Wells superchlorinated and purged after drilling

Figure 15: Borehole protection

Steel casing must be used for wells deeper than 100 m:

Table 7: Minimum thickness for steel casing, Source: Code of Practice for Water Well Construction in Nigeria, National Water Resources Institute, 2010

Nominal Diameter (mm)	Wall Thickness (mm)
100	3.607
125	3.962
138	4.166
150	4.7
200	6.35
250	7.087
300	8.382
350 and larger	9.525

Tires can be positioned below handpump levers to reduce damage to the pump from over-extension as seen in the photo on the left below.

Figure 16: Handpump (left) and elevated storage with solar powered borewell (right)

Water points in host communities should be sited in public areas that are accessible to IDPs. Water points and associated equipment including storage facilities should not be sited on private property to avoid potential access restrictions for the most vulnerable populations. Fencing may be installed around solar panels and storage areas to secure infrastructure from damage but should not be placed around delivery points.

Planning

The primary standard for water provision for IDPs in formal camps, informal camps, and host communities is 15 liters of water per person per day. To most accurately determine the water supply being provided, **water meters should be installed on all new and rehabilitated water infrastructure**. Siting for water points should take into consideration a maximum distance of 500 meters from shelters and minimum distance of 30 meters from latrines for water sources.

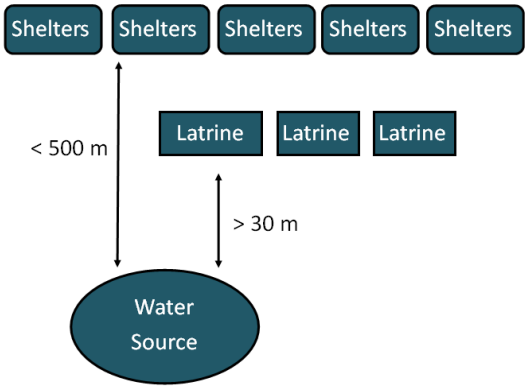


Figure 17: Water siting

Planning for water quantity should be determined by population served, volume of water storage, individual tap capacities, pump capacities, operational pump times, and operational tap times. The number of taps should be calculated using a standard of a maximum of 250 people per faucet. For 5,000 individuals the minimum number of faucets would be 20. This assumes a tap discharge rate of at least 0.125 L/s/tap for eight hours of tap operation each day with some spillage. If the tap discharge rate is below this volume the number of taps may need to be increased.

Planning for water quantity determined by population served, volume of storage, tap capacities, pumps, pumping times, and operational tap times

Assuming eight hours of peak sunlight and water storage tanks elevated to six meters, the total discharge capacity of the taps may be 3.5 L/s. Ideally the taps should be opened for a minimum of four hours in the morning and four hours in the evening to reduce queue time while allowing the tanks time to recharge during the day. Tap opening times should be regular and predictable so that users know when to collect water. Tap operation times may vary. The morning and evening times reduce queuing during peak temperature times and allow for water collection at peak use times. WASHCOMs in agricultural host communities may elect to have operating hours during the middle of the day during the planting season for planting breaks during peak sun hours. For the scenario above a pump capacity of 6 L/s and total storage volume of 80,000 L would allow eight hours of tap operation and 20 L/person/day.

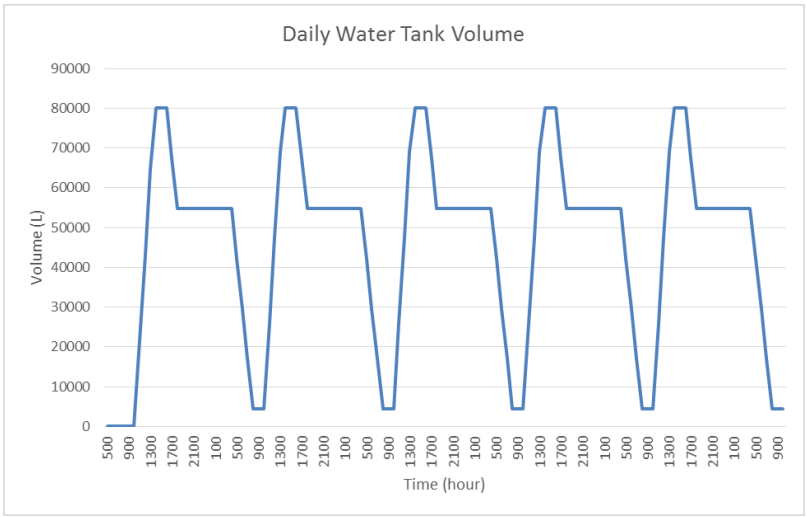


Figure 18: Water storage for 80,000 L volume and 6 L/s pump capacity with tap operation in morning and evening

Additional water is required for health clinics, feeding centers, and cholera centers:

60 L/p/d per patient for cholera centers
30 L/p/d for inpatients in feeding centers
5 L/p/d for outpatients in health facilities
40 L/p/d for inpatients in health facilities

Water quantity should be planned based on the number of beds in health facilities and cholera centers and the capacity of feeding centers. A water point and storage for these facilities should be positioned on-site when possible so that staff have separate water available for these highly vulnerable patients.

RUWASSA and private sector companies have drilling equipment in Borno, Yobe, and Adamawa. Once the water needs are calculated, drilling and pump sizes can be determined.

Table 8: Recommended diameters of boreholes for different pumping rates, Source: Davis and Lambert, Engineering in Emergencies, 2002

Anticipated pumping rate (L/s)	Nominal pump diameter (mm)	Optimum internal diameter of borehole casing (mm)
<5	100	150
5-10	125	200
10-22	150	250
22-44	200	300

Due to the flat terrain in North East Nigeria, elevated storage is typically required to distribute water through the reticulation system to multiple water points or taps. Water storage elevation is calculated based on the pressure head required for the reticulation system. Systems with minimal piping to water points will require less elevation. When multiple storage tanks are planned a diversion can be included for operation in parallel rather than series so that some tanks can be serviced while not disrupting all water provision. With the series example below if one tank needs to be serviced or is broken, the entire supply is disrupted. With the parallel tank example shown to the right half of the tanks can remain operational while one tank is being repaired. If batch chlorination is planned the parallel system could allow filling and batch chlorination for two tanks with contact time provided while the other two tanks are being utilized or filled, depending on the operation plan. Access ladders should be added to storage towers so that WASHCOMs can clean and repair connections and tanks.

Storage tanks installed in parallel

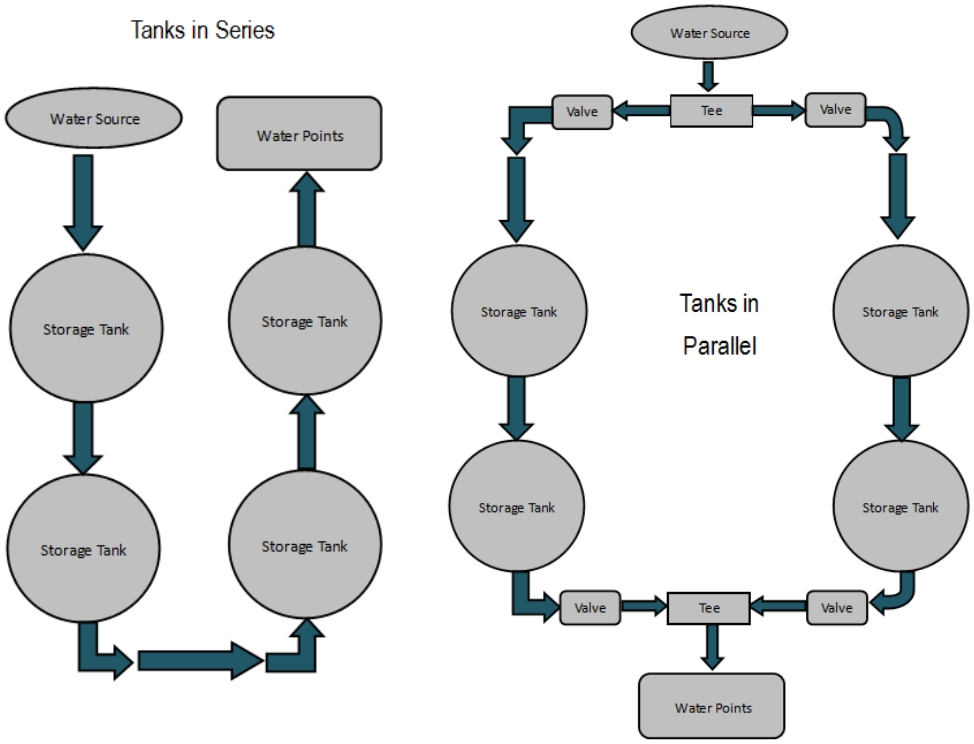


Figure 19: Storage tanks in series and parallel schemes

Operation and maintenance

WASHCOMs should be established and trained in the operation and maintenance of any water infrastructure installed in host communities. Organizations planning to install solar powered pumps should consider replacement, repair, and dust and debris clearing of panels as part of their operation and maintenance plan for this option. Mechanized pump options with generators must have a fueling plan for operation of the pumps.

WASHCOMs should be trained in the maintenance and replacement of faucets. Taps should be maintained and replaced when broken on a regular basis in camp settings by the lead WASH partner. Leaking taps should be replaced to avoid contributing to stagnant water. Higher quality faucets can reduce the replacement requirements for faucets. High quality faucets should be used for water points as broken faucets are a common challenge in all contexts. Monitoring of faucet functionality will inform whether the faucets being installed by WASH partners are adequate for the high level of use. Key faucets can be used to reduce damage of taps (See photos below.). WASHCOMs can manage the keys for individual taps when operating times are regulated. Each household can also be provided with a key faucet for larger tapstands without regulated operating times.

High quality faucets for water points due to frequent replacement and repair needs

Figure 20: Removable faucet key for taps

WASHCOMs should be trained in maintaining generators and solar panels as applicable. Operators should be trained in repairing any reticulation lines and connections. Water kits may be provided to WASHCOMs. These kits include tools for replacing pipes, repairing connections, installing new taps, and mixing chlorine. If WASHCOMs are responsible for chlorinating water, they should also be trained in mixing, storing, and handling chlorine.

WASHCOMs trained in financial management when tariff structures are in place in host community and returnee settings

Water supply tariff payments are not customary for most users in Nigeria (See WASH financing section above) except through private vendors. When tariffs are planned by WASHCOMs in host communities and returnee contexts they should be discussed in a participatory manner with the community members to encourage willingness to pay through an understanding of the running costs for water infrastructure. WASHCOMs in host communities may institute tariff structures for maintenance and operation of pumps. Tariff structures should be included in the charter of the WASHCOM when applicable. WASHCOMs should be trained in financial management to manage tariffs. Regular tariff collection is recommended for maintenance of water supply infrastructure and fueling of generators where applicable in host community settings. Tariff collection should be initiated prior to the exit of the supporting organization. This will help the WASHCOM to address any challenges that they may face in the collection and management of funds.

Water fully subsidized in camp settings (no tariffs)

Subsidies for water supply are not recommended in host community settings when WASHCOMs institute tariffs. The minimum standard of water quantity should be provided fully subsidized in IDP camps by the WASH sector until further review. No tariffs should be instituted for IDPs in formal and informal camps. Water subsidies must consider IDP ability to move in and out of camps and ability to pay. For host community settings subsidies for operation and maintenance should be reviewed by technical working groups in consideration of vulnerability levels of IDPs in host communities[10], prior practices for WASH payments, sustainability of services, multiple user types, and ability to pay.

Monitoring

WASH partners should monitor the following on a weekly basis:

- Functionality of water taps
- Flow rates of water from taps
- Number of individuals accessing the water points
- Hours of tap operation
- Functionality of generators
- Functionality of solar panels and inverters

WASH partners should monitor the following on a monthly basis:

- Transmissibility of solar panels
- Functionality of WASHCOMs
- Fuel consumption for generators

Handover

WASH partners must identify a management structure for maintenance and operation of water supply infrastructure when support to a host community or camp is completed. In camp settings this can be RUWASSA, SEMA, or NEMA as appropriate or another WASH sector or CCCM partner. For host communities the WASHCOM should have the appropriate maintenance equipment and training to operate and maintain the infrastructure. Water supply connected to reticulation lines within urban areas should be handed over to the SMOWR. Handpumps are handed over to RUWASSA.

[10] IDPs in host communities have more mobility and may be less vulnerable than camp residents.

Water quality

Water quality monitoring 0.5-1.0 mg free residual chlorine/L at point of delivery (rainy season and cholera)
0 fecal coliforms/100 mL at point of delivery
Maximum 5 NTU
Chemical water quality analysis meeting 2007 Nigerian Standard for Drinking Water Quality (initial testing)

Indicators:

- Percentage of households with chlorinated water (0.2-0.7 mg FRC/L)
- Percentage of chlorinated water points with safe water (no fecal coliforms per 100 mL of water at the point of delivery and 0.5-1.0 mg FRC/L at the point of delivery)

Operational principles and practices

Initial water quality testing and regular monitoring for coliforms, turbidity, and chlorine residual

Water quality for deep borewells in North East Nigeria can be potable without treatment. Shallow wells experience higher levels of fecal contamination. Initial water quality testing for wells should be done after drilling or rehabilitation of wells to confirm conformance with the 2007 Nigerian Standard for Drinking Water Quality. The full standard should be reviewed. Some of the key parameters are included in Annex 2. The 2010 National Water Resources Institute Code of Practice for Water Well Construction in Nigeria recommends initial parameters of pH, temperature, conductivity, total dissolved solids, and bicarbonate. Regular monitoring should be conducted for fecal coliforms, turbidity, and chlorine residual (when chlorinated).

The Nigerian National Agency for Food and Drug Administration and Control (NAFDAC) has a laboratory in Maiduguri that can perform water quality testing. The University of Maiduguri Teaching Hospital also has water quality testing capacity. The Water Board and RUWASSA in Yola has water quality testing capacity for Adamawa. **Sources that exceed the maximum permitted levels for parameters with no adverse health effects should not be excluded for emergency water provision.** Monitoring for these parameters should continue in consultation with SMOWR. Alternative sources should be identified for sources with excessive levels of harmful parameters such as arsenic and fluoride in water that will be consumed long-term.

All water in formal and informal camp settings chlorinated at the source during the cholera season at minimum

Chlorination of water at the source is recommended for the cholera season (July through November) beginning after the start of the rainy season (May through October) in all informal camp, formal camp, and host community contexts providing free residual chlorine (FRC) levels of 0.5-1.0 mg/L at the point of delivery. While deep groundwater sources are typically considered potable without treatment in North East Nigeria, the risk of contamination of water from the point of delivery to consumption is considered high in host community settings and very high in camp settings. The figure below is an illustrative example of potential sources of contamination for previously safe drinking water at the point of delivery.

Figure 21: Route from point of delivery to consumption with potential contamination sources

By chlorinating at the water source before delivery to the water users, residual chlorine will provide protection against contamination along these possible routes. Household treatment with chlorine solution is not needed when chlorination is done prior to delivery. This will reduce errors with mixing solutions at the household level and the need for regular distribution of household products. Different chlorine products have different transport restrictions. WASH partners should coordinate

with their logistics teams and the logistics sector when planning chlorination options. Some of these options are discussed below.

Figure 22: Chlorination before storage

Chlorinators can be installed during installation of the reservoirs so that the chlorinators are available during the rainy season. Chlorinators can also be added for systems that are already installed. If the chlorinator is added at the ground level, it should be protected with additional security measures so that children or others cannot access the chlorine supply or damage it.

Figure 23: Chlorinator options include flow activated (left), constant or variable rate (middle), and floating pot (right); Source: Oxfam equipment catalogue

Flow activated chlorinators dose the water as it passes through. Tablet options are available to avoid on-site mixing of chlorine. Constant or variable rate dosing pumps add a set volume of mixed chlorine solution. Operation requirements are higher due to the monitoring of the chlorine pump, the mixing of the chlorine solution, and the monitoring of the water pump flow. This option may be more appropriate for constant pump rates. Constant or variable rate dosing pumps are not recommended for solar pumps unless the inverter shuts off the chlorine pump and the water pump at the same time. If a lack of regular monitoring is a risk this option may not be appropriate.

Floating pots sit in the tank and release chlorine from tablets in the top of the pot. The tablets dissolve slowly and release trichloroisocyanuric acid. This option should not be in place for more than two months and is not recommended for the current context in Nigeria unless immediate emergency conditions require it for access constrained areas.

Table 9: Chlorination options

Chlorination option	Advantages	Disadvantages	Appropriate Contexts	Initial costs (USD)
Flow activated chlorinator	Minimal oversight for operation, adjusts for flow rate, can be added at ground level	High initial costs, tablet availability in country	Host communities and camp settings	$2,150
Variable rate chlorinator	Lower initial costs, can be added at ground level	Requires DC power, requires regular chlorine level checking, requires on-site chlorine mixing	Camp settings with trained operators and non-solar powered systems	$710
Floating pot	Low initial costs	Requires tank access to refill	Immediate emergency, not recommended for extended periods of use	$26
Manual batch chlorination	Initial costs include only safety gear and mixing materials unless additional tanks are required	Requires continuous monitoring, trained operators, and disruption of supply for batch dosing	Host communities and camp settings	

Manual batch chlorination prior to the storage tanks

Batch chlorination can be done manually at the storage tanks. This option requires filling the entire tank and dosing it with a determined chlorine solution. When multiple storage tanks in parallel are not in place additional tanks may be required for the batch dosing in series to avoid disruption of supply. Access to the storage tanks should be included in the storage elevation structure in order to add chlorine at the tank level. See the section on cholera below for more guidance on stock solution preparation, jar testing, and dosing calculations for batch chlorination.

Figure 24: Turbid water from a borewell in Damaturu

Water must be below 5 NTU for chlorine disinfection to be effective. While most deep groundwater sources in the North East have shown low turbidity water, some sources have shown high turbidity (See photo to left.). If alternative water sources are not available this water should be filtered and double dose chlorinated. Groundwater temperatures in North East Nigeria can be quite high. Allowing a contact time of 30 minutes should be sufficient.

POU options with chlorine residual when chlorination at the source not possible

If chlorination is not possible at the source, point of use water (POU) options are available. Below are some potential options:

Table 10: POU treatment options

Treatment method	Advantages	Disadvantages	Appropriate Contexts
Boiling	No capital costs	Requires wood or fuel for burning	Not recommended for formal and informal camps; potential for host communities
Solar disinfection	No or running capital costs, only PET bottles required	Intensive training requirements at the household level requiring large staff time; limited knowledge of method in country	Potential for host communities and returnees depending on staff availability and capacity
Water Guard solution, 1.25% sodium hypochlorite (NaOCl) solution	Somewhat known product with availability in country prior to emergency, introduces residual	Requires continuous distributions with larger transport constraints for volume and weight; requires training for users	Recommended in all contexts with training and appropriate instructions
Aquatab or Oasis, sodium dichloroisocyanurate (NaDCC) tablets	Introduces residual; easy to transport	Unknown product in Nigeria for users; requires continuous distributions; requires training for users	Recommended in all contexts with training and appropriate instructions
PUR, calcium hypochlorite ($Ca(ClO)_2$) powder	Flocculation treats high turbidity water, introduces chlorine residual	Potential mistrust of product due to media reports of bad product prior to emergency; requires continuous distribution and training for users, requires 2 buckets and clean cloth for filtering	Recommended for turbid water with training and additional bucket and cloth
Household filters	Long-term treatment with minimal running costs for replacement parts	Large transportation requirements, high initial cost inputs; requires training at household level; no chlorine residual	Not recommended
Chlorine solution dosing at distribution points	Dosing amount is regulated and observed by the individual dosing the buckets	Staffing and chlorine preparation requirements	Recommended for immediate response conditions

For the cholera/rainy season POU options that provide chlorine residual

For the rainy season a POU option that includes residual chlorine should be provided when chlorination at the source is not possible to reduce the risk of the spread of cholera. Due to the continuous distribution requirements this is not a longer-term solution for support to host communities and camp residents. Chlorinated water should be provided during all seasons for health facilities, feeding centers, and cholera centers.

Chlorinated water during all seasons in health facilities, feeding centers, and cholera centers

Table 11: POU chlorine distribution requirements, assuming 6 family members per household and 3 L drinking water per person per day

Treatment option	Treatment volume	Available chlorine (mg/L)	Unit	Quantity / family	Duration	Total cost
Water Guard solution, 1.0% sodium hypochlorite (NaOCl) solution, 250 mL[11]	25 L	1.6	4 mL cap	1 bottle (250 mL)	Three months	150 naira ($0.70 USD)
Water Guard solution, 1.25% sodium hypochlorite (NaOCl) solution, 250 mL	25 L	1.5	3 mL cap	1 bottle (250 mL)	Three months	150 naira ($0.70 USD)
Water Guard solution, 1.25% sodium hypochlorite (NaOCl) solution, 250 mL	20 L	1.875	3 mL cap	1 bottle (250 mL)	Three months	150 naira ($0.70 USD)
Aquatab or Oasis, sodium dichloroisocyanurate (NaDCC) tablets	5 L	4	33 mg tablet	8 packs (400 tablets)	3 Months	640 naira ($2.98 USD)
Aquatab or Oasis, sodium dichloroisocyanurate (NaDCC) tablets	10 L	2	33 mg tablet	4 packs (200 tablets)	3 Months	320 naira ($1.49 USD)
Aquatab or Oasis, sodium dichloroisocyanurate (NaDCC) tablets[12]	10 L	4	67 mg tablet	4 packs (200 tablets)	3 months	320 naira ($1.49 USD)
Aquatab or Oasis, sodium dichloroisocyanurate (NaDCC) tablets	20 L	2	67 mg tablet	4 packs (200 tablets)	3 months	320 naira ($1.49 USD)
Aquatab or Oasis, sodium dichloroisocyanurate (NaDCC) tablets	25 L	1.6	67 mg tablet	4 packs (200 tablets)	3 months	320 naira ($1.49 USD)
PUR, calcium hypochlorite ($Ca(ClO)_2$) powder	10 L	2	sachet	1 carton (240 sachets)	4 months	

One (1) 250 mL bottle of sodium hypochlorite solution or four (4) packs of 67 mg NaDCC tablets (200 tablets) for a three month supply

Hygiene promoters properly trained in the correct dosage of the POU water treatment option provided

Sanitary surveys conducted for new water infrastructure

Based on the table above the recommended distribution for POU chlorine options is one (1) 250 mL bottle of Water Guard or four (4) packs of 67 mg NaDCC tablets (200 tablets) for a three month supply. Water Guard has a lower chlorine residual for the recommended dosage as this is a long-term method of water treatment. Hygiene promoters must be properly trained in the correct dosage of the water treatment option provided. Ensure that hygiene promotion messages are accurate for the tablet weight provided. Instructions in Kanuri and Hausa as applicable should be provided for the proper use of chlorine products. Picture instructions are preferred for illiterate users. Chlorine products distributed to users cannot be expired[13].

Planning

A sanitary survey should be conducted for siting of the borewell to avoid threats to the water supply. Water quality test results will determine additional treatment needs. Water sources should be at least 30 meters from latrines. When possible well and tap sites should not be sited downgrade of drainage.

Operation and maintenance

Chlorinators should be installed at the water source prior to storage. If partners cannot administer chlorine products directly WASHCOMs should be trained on the proper handling, dosage, and monitoring of chlorine. For camp settings it is recommended that WASH sector partners manage

[11] Water Guard 1.0% solution is approved by NAFDAC.
[12] 67 mg Aquatab tablets are approved by NAFDAC.
[13] Expiration dates are on the packaging and should be reviewed. Expiration dates should be within a reasonable timeframe for usage.

chlorine levels directly in order to ensure that safe levels are in place and that a residual is continuously maintained during the rainy season. Safe storage space should be identified on-site for storage of chlorine powder or tablets. Staff should be trained in the proper handling of chlorine. Equipment for the safe handling of chlorine must be provided (gloves, aprons, mixing tools, and storage containers).

Monitoring

WASH partners should monitor the following on a daily basis:

- Chlorine residual levels at the point of delivery for the first week

WASH partners should monitor the following on weekly basis:

- Turbidity of water at the point of delivery
- Fecal coliforms at the point of delivery
- Chlorine residual levels at the point of delivery after the first week of chlorination

WASH partners should monitor the following on a monthly basis:

- Chlorine residual levels for a sample of households
- Fecal coliforms for a sample of households

WASH partners should monitor the following as needed:

- Water quality testing for Nigerian Standard for Drinking Water at time of well drilling
- Water quality testing as needed if water does not meet standard above

Handover

WASH partners must identify a management structure for maintenance and operation of chlorination systems when support to a host community or camp is completed. In camp settings this can be RUWASSA, SEMA, NEMA, IOM or another CCCM partner as appropriate or another WASH sector partner. For host communities the WASHCOM should have the appropriate storage facilities, mixing tools, and safety gear for handling chlorine products.

Sanitation

50 persons/latrine
Distance of latrines minimum 30 m from any water source
Distance of latrines less than 50 m from shelters
Distance of latrines more than 6 m from shelters
Lock on inside of stall
1:3 male/female ratio, physically separated and demarcated where household latrine not possible
1 latrine/household in host communities (latrine kit)
Provision for child feces collection and disposal
Provision for disabled toilet based on population of disabled users
Ratio of male/female sanitation committee members equal to latrines (1:3 male/female ratio)
Latrines in feeding centers (25 persons/latrine)
Latrines in health clinics (1 per 20 beds or 50 outpatients) in camps

Note: While it is not included as a standard for the emergency WASH sector, it is advised that lighting be provided by camp management structures to protect users and encourage use of latrines in camps at night.

Indicators

- Number of emergency sanitation facilities constructed
- Number of individuals with access to emergency latrines
- Number of latrines constructed in public places
- Number of inclusive latrine facilities constructed
- Number of users per functioning latrine
- Number of latrines desludged
- Number of sanitation workers trained and actively maintaining latrines disaggregated by sex

Operational principles and practices

Due to the large number of IDPs spread throughout the country, funding gaps, space constraints in already organized settlements, and pre-existing sanitation conditions in host communities the current standard for WASH sector partners is a ratio of 50 persons per ***functioning*** latrine. This is the Sphere standard for immediate response.

The Round XI DTM reported 54% of IDPs are children and 53% of IDPs are female[14]. Since children are reported to utilize the female latrines, the majority of users access the female latrines. The standard for the ratio of female to male latrines is 3:1.

Cross ventilation pit latrines for formal and informal camp settings and access constrained camp settings when possible

Option 1 – pit latrine with cross ventilation

Simple pit latrines are more common in North East Nigeria than VIP latrines. Due to high heat conditions partners and users may prefer a simple pit latrine design that includes cross-ventilation instead of ventilation through the pit. Screening provides more shade but reduces the ventilation and may trap flies inside the latrine. The recommended simple pit latrine with ventilation pipe option should include:

- Latrine superstructures should be dark to eliminate light sources that attract flies. This can be facilitated by limiting the gap between the roof and the structure.
- Screens may be installed (not required) around the top of the superstructure to allow cross-sectional wind flow to reduce the heat inside the latrine and limit direct sunlight entering the latrine.
- A ventilation pipe can be added to limit odors in the superstructure. Odorous air can travel up the heated pipe from the pit. The ventilation pipe diameter can be reduced to 100 mm (4 inch) for PVC pipes since the pipe is not intended to circulate air from the superstructure.
- Screens and pipe covers do not need to be added to the exit of the ventilation pipe, because fly trapping at the exit of the pipe is not part of the design.
- The ventilation pipe should be a minimum of 0.5 m above the tallest part of the roof to maximize air flow and allow air carrying odors to travel away from the superstructure. Strong wind conditions may require reducing this height.
- A self-closing hinge mechanism should be added to the inside of the door so that the door is closed at all times, reducing the number of flies that enter through the door and the light inside the superstructure.
- **The toilet hole is covered with a removable cover to reduce flies.**
- The slope of the roof is minimized to allow cross-sectional wind flow while limiting upward wind flow that can be disadvantageous in high wind[15].

[14] OM DTM matrix, Round XI, August 2016, http://nigeria.iom.int/sites/default/files/dtm/01%20DTM%20Nigeria%20Round%20XI%20Report%20August%202016.pdf

[15] The 2010 IASC Shelter Cluster Haiti Transitional Shelter Technical Guidance recommends a slope of 12-14 degrees for one-pitched roofs for hurricane wind strength. The recommended latrine design has a slope of 5 degrees.

Option 2 – VIP latrine

VIP latrines are one option to minimize odors and reduce flies that can spread disease. Ventilation occurs by circulating air through the front of the latrine, into the pit, and leaving through the ventilation pipe. The schematic below illustrates how this airflow should function. VIP latrines are not generally recommended due to the reduction of the cross ventilation in high temperature areas and due to lack of previous experience with these types of latrines in the area. VIP latrines should include the following in order to function correctly:

VIP latrines reduce the cross ventilation and are not generally recommended for the high temperatures

When VIP latrines are required they have additional requirements to function correctly

- Latrine superstructures should be dark to eliminate light sources that attract flies. This can be facilitated by limiting the gap between the roof and the structure.
- Latrines should have an opening in the front that is sufficient to allow airflow into the latrine. Screens should not be installed on the superstructure as they will limit the air flowing through the superstructure and can trap flies within the superstructure.
- The ventilation pipe diameter should be 150 mm (6 inch) for PVC pipes. Monitoring should confirm that the correct diameter pipe is being installed. Smaller diameter pipes limit airflow and light entering through the opening.
- Screens of 1.2 mm x 1.5 mm should be added to the exit of the ventilation pipe. Light is allowed to enter through the pipe while trapping flies that travel through the pipe.
- The ventilation pipe should be a minimum of 0.5 m above the tallest part of the roof to maximize air flow and allow air carrying odors to travel away from the superstructure.
- The ventilation pipe cover should allow light to enter to the pit chamber.
- A self-closing hinge mechanism should be added to the inside of the door so that the door is closed at all times, reducing the number of flies that enter through the door and the light inside the superstructure.
- The toilet hole remains open and is not covered with a cover so that air can continuously circulate through the latrine.

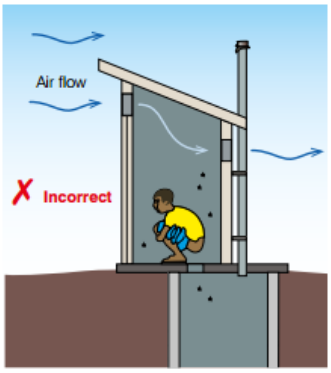


Figure 25: Cross flow ventilation does not circulate air through the pit but provides more air circulation for higher temperatures, Photo: Julien Graveleau

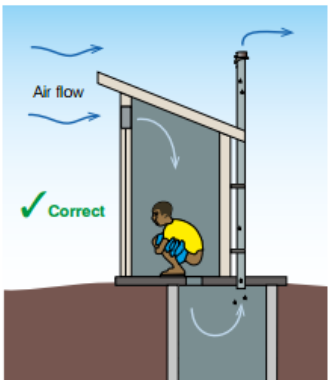


Figure 26: Incorrect and correct ways of venting a VIP latrine, Source: Reed, WEDC Guide 027, Ventilated improved pit latrines, 2014

Both latrine options

Reinforced concrete slabs are recommended for medium to long-term use in host communities and informal and formal camps. All latrines in informal camps that may be used as school buildings or clinics depending on their function prior to the emergency setting should have reinforced concrete slabs if they are intended to be used after the emergency phase. With the current design span for each chamber slab the recommended spacing for 8 mm rebar is every 125 mm in both directions for a 65 mm thick slab. Alternative rebar schemes are included below.

Confirm sufficient reinforced bars in concrete slabs

Table 12: Spacing for steel reinforcing bars in pit latrine slabs with span of 2 meters, Source: Excreta Disposal in Emergencies, A Field Manual, IFRC/Oxfam GB/UNHCR/UNICEF, 2004

Slab thickness (mm)	Steel bar diameter (mm)	Spacing of steel bars in each direction (mm)
65	6	50
65	8	125
80	6	75
80	8	150

Due to the infiltration of soil into the pit and the potential for collapse pit lining has been recommended for soils in the North East. This should be reviewed by site to determine if full lining is required. All lined latrines should have a minimum of 1 meter of full lining from the superstructure slab at the top of the pit due to the sandy top soils that shift and cave during the rainy season. Pits lined for the entire depth of the pit can include a honeycomb scheme depicted below to allow some infiltration of liquids into the base and side walls of the pit if the water table is not reached by the bottom of the pit. A 100 mm cement foundation is included around the bricks at the bottom of the pit. Monitoring should confirm that the top lining is fully lined with fewer honeycomb layers if the pit is shallower than 2 meters (shallow depths not recommended). The area around the pits should then be backfilled (with sand where possible) and **compacted** to prevent collapse of the soil.

Minimum of 1 meter of full lining from the superstructure slab at the top of the pit

Compacted backfilled soil

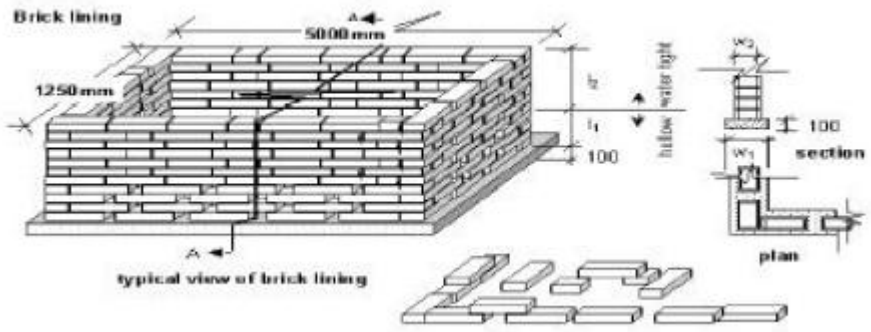


Figure 27: Brick laying schematic for pit illustrating honeycomb lining for bottom of lining, Source: Excreta Disposal in Emergencies, IFRC/Oxfam GB/UNHCR/UNICEF, 2004

The desludging chamber service slab should be separate from the superstructure slab so that they can be easily removed and replaced without damaging the superstructure slab. For camp settings or other settings where the design life is less than five years, the service slab should not be sealed to the superstructure slab. The service slab should be removable so that they can easily be replaced after desludging. Handles formed into this service slab during casting of the concrete should be formed using 8 mm or higher gauge reinforced bar. A seal can be added to secure the service slab after both slabs are dried for latrines in host communities with long-term design lives. This seal should not be in contact with the ventilation pipe to avoid damage to the pipe when breaking the seal. For the same reason the vent pipe should not go through the service slab. WASH partners should replace any service slabs that are broken during desludging to avoid open access to the fecal waste.

Desludging chamber service slab separate from the latrine slab to be removable and replaceable

Figure 28: Sealed service slab with vent pipe not properly separated from the service slab

Preformed plastic slabs for access constrained areas

Preformed plastic sanplats have been installed with minimal damage in some camp settings in Yobe and Borno. These preformed molds are recommended for access constrained areas where contractor monitoring for rebar and thickness is limited or where sand and gravel for mixing concrete are not available. Desludging chambers do not need to be installed with this option if access is available by removing the sanplat (See photo on the right below.), however, the sanplat must be installed properly once desludging is completed if desludging is done directly from the area under the squathole.

Figure 29: Preformed sanplat molds

Keyhole squat using a preformed mold

Holes a minimum of 30 cm from the superstructure wall

Squat holes should be designed so that they are wide enough to easily deposit excreta and small enough to ensure that users will not fall in. The keyhole squat design is used in Nigeria. Recommend dimensions are 160-170 mm in diameter and 300-400 mm in total length). A preformed mold should be used when filling the latrine slab to ensure the correct size is installed. WASH partners should either provide this mold or request to see it from implementing contractors. Smaller sized holes may be necessary for children. Holes should be a minimum of 30 cm from the superstructure wall to allow users to squat over the hole. A slight slope toward the hole allows liquids to drain into the pit. The photo on the left shows a squat hole constructed with a vent pipe as the form. The middle photo shows a squat hole located too close to the wall to use. The photo on the right is a keyhole constructed with a form.

Figure 30: Squat hole designs

Locks must be installed on the **inside** of the latrines to allow users security and privacy during use for all contexts. External locks may be included for host community designs to keep doors closed. Locks should not be added to the external side of the door in camp settings as this may reduce user access. A nail can be added outside to allow users to keep the door closed without limiting access by users for host communities. The photo on the left shows a latrine in a formal camp locked from the outside, limiting user access. The middle photo shows an internal lock. A simple eyelet and hook can be installed as a lock as well. The photo on the right shows a bent nail and sponge material for protection added by users in a host community. The nail can be twisted in place to keep the door closed when not in use without limiting user access. The self-closing spring hinge would illuminate the need for external appurtenances to keep the door closed.

Locks installed on the inside of the latrine stalls and not externally for camp settings

Figure 31: Latrine stall locks

Lighting is not currently available in most settings. In the absence of lighting flash torches can be provided in camp settings to allow users to access latrines during the night. This could reduce defecation around the latrines in the evenings as is currently seen in larger camp settings. Lighting also provides an added protection for women and girls that may travel unaccompanied to the latrines in the dark. Ideally lighting structures should be available around latrines for security and access at night.

All latrines must be physically separated by gender in informal and formal camp settings. For smaller camps where men and women segregate themselves to opposite sides of the camp during daylight hours the latrines and showers for women should be on the opposite side of the camp as the men's latrines and showers while maintaining a maximum distance of 50 m from the shelters for both genders. Latrines should be demarcated pictorially for each gender to avoid confusion for users.

Latrines physically separated by gender and demarcated pictorially for gender with a 1:3 ratio for men to women

Female, *mata, kamu* **Male, *maza, kongawa***

Figure 32: Pictorial, English, Hausa, and Kanuri latrine demarcations

Affected populations should be consulted through all stages of program implementation to determine the most appropriate designs for WASH infrastructure. Focus group discussions with different affected groups (disabled, elderly, women, men, girls, and boys) should inform designs.

WASH partners should review access and use of these facilities after construction is completed in consultation with affected groups to confirm appropriateness and inform adaptations.

Round II of the UNHCR vulnerability screening from March-April 2016 reported 2% of household members with a disability (6,921 of 327,379 household members) and an additional 2% elderly that were unable to take care of themselves (8,151)[16]. The disabled and elderly should be consulted directly to identify the most appropriate inclusive latrine design. In the absence of wheelchairs in camp settings alternative options for designing inclusive latrines may include rails, shorter stairs, or raised seats. Ramps may be most appropriate for the elderly and those with difficulty walking, however, they are expensive to build and should not be the first option unless consultations identify them as appropriate. If ramps are deemed the best option they should be built with a maximum slope of 5% (1:12), a width of 120-180 cm, and handrails at a height of 70-90 cm[17]. Excessive slopes may make the latrines more difficult to access.

Disabled and elderly consulted directly to identify the most appropriate inclusive latrine design

Figure 33: Latrines inaccessible by disabled and elderly include high steps (left), steeply sloped ramps (middle), and uncleared or steep areas (right)

Ramps not recommended unless consultations identify the need

For the latrine designs with an elevation of 0.45 m, the ramp should extend 5.4 m as shown below. Winding options that double back may be more appropriate based on space and siting constraints. Ramps should only be included if they are determined to be the most appropriate option based on consultation with disabled and elderly users.

Maximum slope of 5% (1:12) when ramps are used

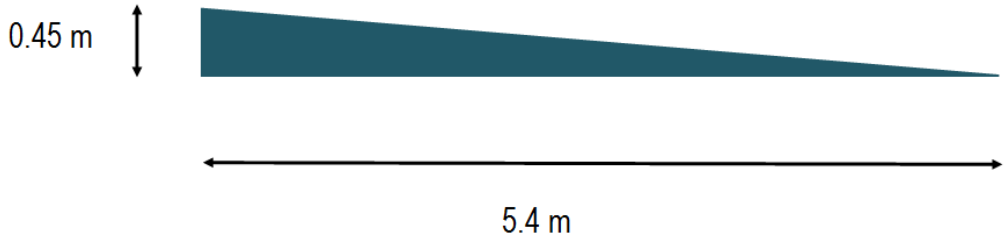
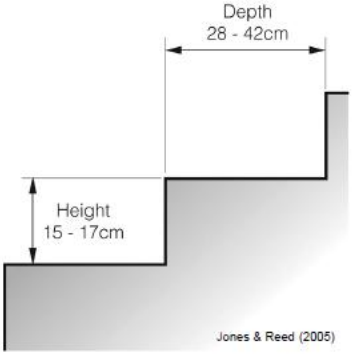


Figure 34: Scale for 1:12 ramp

For the informal and formal camp context in Nigeria more appropriate inclusive latrines for polio stricken disabled and the elderly with difficulty walking may include the adaptations below. The adaptations below are recommended based on the current context of disabled users.

[16] UNHCR North East Nigeria Vulnerability Screening Report, Round II, June 2016
[17] Making sustainable sanitation inclusive for persons with disabilities, GIZ, http://www.dcdd.nl/wp-content/uploads/2013/05/giz2011-sustainable-sanitation-and-disability.pdf

- Small steps that can be easily mounted by those with difficulty walking



- Hand rails along the stairs to aide stair mounting

Small steps, hand rails, raised seats, and support rails for elderly and disabled as alternatives to ramps

- Raised seats for those unable to squat

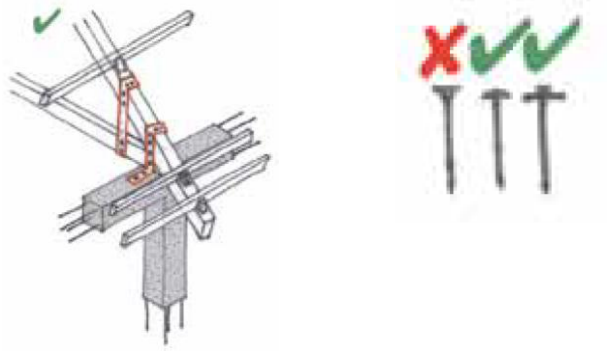
- Support rails inside the stall to assist with squatting or positioning over the raised seat

Figure 35: Inclusive latrine options, Source: Jones and Wilbur, Compendium of accessible WASH technologies, WEDC/WaterAid/Share, 2014

Strong wind conditions in Borno State due to flat unimpeded land and high winds may require additional wind resistance construction techniques. Wind is more of a challenge in camp settings and rural host communities where security walls and dense housing do not protect against horizontal wind flow. Hills or other natural formations are typically not available to site latrines in proximity to these barriers. Some guidance for strong winds includes the following (Source for images: IFRC Shelter Safety Handbook):

- Identify sheltered positions (security walls or other barriers to the wind)
- Construct latrines away from trees or other potential sources of debris (especially for latrines constructed with plastic sheeting)
- Minimize the overhang of the roof to a maximum of 20-30 cm
- Include hurricane strapping (*langa langa*) to connect frames and roof beams
- Monitor wood quality (Obeche preferred) and treat wood for termites
- Properly anchor the latrine frames into the concrete (0.5 m)
- Use roofing nails or screws with a wider convex shape to hold sheeting
- Determine the prevailing wind direction in open areas. The shorter side of the building should face the wind (opposition to odor reduction)
- Ensure roofing is properly nailed (roofing nails or screws, overlap, overhang, frequency of nails in beams)

Maximum overhang of 20-30 cm



Latrine frames anchored 50 cm

Roofing nails or screws

The Shelter Safety Handbook provides the following guidance for nailing roofing:

> *On the ridge and the eaves, galvanized sheets are nailed at the top of every single corrugation. On the laths, every other corrugation is nailed. The galvanized sheets should overhang 5 cm from the boards. One galvanized sheet is not enough to cover the entire roof slope; there should be a lateral overlap of two complete corrugations between two sheets. The overlap should be in the direction of the prevailing wind. Transversal overlaps should be avoided if possible. For a roof slope between 20 and 30 degrees, the overlap should be 15 cm. If the roof pitch is less than 30 degrees, the overlap should be at least 30 cm.*

Minimum overlap of roofing sheets of 30 cm

With a roof pitch of less than 30 degrees for the recommended latrine designs, the overlap of the roofing sheets should be at least 30 cm. The roofing sheets available in Nigeria are 90 cm wide, requiring 10 sheets for one roofing structure of five chambers.

WASH partners can utilize beneficiaries for all unskilled labor requirements for latrine construction, particularly latrine pit digging. When available, skilled labor can also be provided by beneficiaries. WASH partners can include provisions in service provider contracts stipulating beneficiary labor

requirements. Partners can further engage by identifying the most vulnerable for inclusion in cash for work opportunities in consultation with camp management structures.

Communal latrines should be avoided in host communities except in informal camps (more than 20 people or five families in a settlement). Latrine kits may be provided for household latrines in host communities and returnee contexts. Latrine kits may include a precast slab which should be distributed upon completion of pit digging. Superstructure materials may be included as well.

Communal latrines avoided in host communities

Latrine kits prioritized for host communities

Planning

Safe disposal of excreta must consider the full cycle of collection and disposal. Latrines provide a facility for collection and containment of excreta to prevent open defecation and exposure to fecal waste. Emptying, transport, and disposal must be considered in addition to containment.

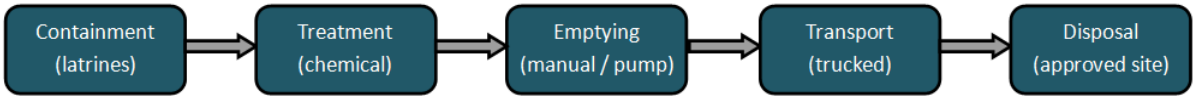


Figure 36: Excreta disposal

WASH partners must plan for all stages of disposal to safely dispose of excreta. Full treatment of fecal waste is not included as part of the emergency sanitation guidance. Initial treatment is only considered at the point of containment for emergency programs in Nigeria. The waste treated after this stage is not considered safe for human exposure.

Fully subsidized desludging of latrines in camp settings

Emptying of latrines can be done manually or mechanically. Mechanical desludging through pumping to tankers is recommended where possible. Planning for latrine design must include access to emptying chambers for a four inch diameter excavation pipe. Siting should include access for tankers to access the location. Program design should take into consideration desludging when planning options for child feces management, anal cleansing, solid waste management, and menstrual hygiene management (MHM) distributions to avoid dumping of solid wastes in the pits. In the case of blockage from MHM materials, solid waste, bottles from anal cleansing, and diapers manual removal may be required for separation of materials. Emptying chamber access sizes must be large enough for a person to access the chambers. Manual desludging of latrines is only recommended when latrines cannot be desludged mechanically (mainly due to access problem). Manual desludgers must have appropriate personal protective equipment to safely manage raw excreta.

Manual desludging of latrines only when latrines cannot be desludged mechanically

Fecal waste must be transported in a vessel that prevents human exposure during transport. WASH partners must plan and budget for desludging and transport of waste to approved sites. Manual desludging must be monitored to ensure sludge is transported safely and deposited in an approved dumping site.

Desludging time will be determined by the number of users, the accumulation rate in the pits, and the dimensions of the pit.

$V = N \times P \times R$
where
V= the effective volume of the pit (m^3)
N = the effective life of the pit (years)
P = the average number of people who use the pit each day
R = the estimated sludge accumulation rate for a single person (m^3 per year).[18]

[18] WHO, A guide to the development of on-site sanitation, 1992, http://www.who.int/water_sanitation_health/hygiene/envsan/onsitesan.pdf

Pit depth below ground should be a minimum of 2.0 m. Deeper pits are recommended when soil conditions permit to provide a longer design life. Assuming an accumulation rate of 0.06 m^3/person/year, 50 users for every latrine, 0.5 m of freeboard, 0.45 m of pit depth aboveground, a pit length of 1.5 m, and a pit width of 1.0 m for every chamber the pit filling times in the table below could be seen.

Minimum pit depth of 2 meters below ground level

Table 13: Potential desludging frequency based on pit depth for decomposing fecal waste

Pit depth (m)	Functional pit depth (m)	Filling time with no infiltration (months)	Filling time with infiltration (months)
1.6	1.47	9.3	11.6
1.8	1.67	10.5	13.1
2	1.87	11.7	14.6
2.2	2.07	12.9	16.1
2.4	2.27	14.1	17.6
2.6	2.47	15.3	19.1
2.8	2.67	16.5	20.6
3	2.87	17.7	22.1
3.2	3.07	18.9	23.6
3.4	3.27	20.1	25.1
3.6	3.47	21.3	26.6
3.8	3.67	22.5	28.1
4	3.87	23.7	29.6

Desludging included in operation plan for camp settings

0.06 m^3/person/year is a typical accumulation rate for dry conditions. Accumulation rates for wet latrines are lower due to the decomposition of the waste (0.02-0.04). Though anal cleansing creates conditions for wet latrines, desludging operators report latrine contents as dry with limited liquids. Due to the high number of users the time for decomposition is also limited. The dry accumulation rate was used in this example because of the reported dry nature of the latrines and the limited decomposition time. However, monitoring will provide a more accurate accumulation rate. The solids content seen in latrines used as bathing areas was observed to be considerably lower.

Short-term accumulation rates of 0.12 m^3/person/year for high use latrines with limited decomposition provide estimates for more frequent desludging. Decomposition is limited when the latrines are filled in less than one year. Potential times are illustrated in the table below.

Table 14: Potential desludging frequency based on pit depth for short-term accumulation

Pit depth (m)	Functional pit depth (m)	Filling time with no infiltration (months)	Filling time with infiltration (months)
1.6	1.55	4.7	5.8
1.8	1.75	5.3	6.6
2	1.95	5.9	7.3
2.2	2.15	6.5	8.1
2.4	2.35	7.1	8.8
2.6	2.55	7.7	9.6
2.8	2.75	8.3	10.3
3	2.95	8.9	11.1
3.2	3.15	9.5	11.8
3.4	3.35	10.1	12.6
3.6	3.55	10.7	13.3
3.8	3.75	11.3	14.1
4	3.95	11.9	14.8

Accumulation rates and fecal sludge contents vary widely by users and climate. Monitoring of pit filling times will provide a better estimate of the frequency of desludging. These rates are variable depending on the number of users. Wet latrines create an environment for more rapid decomposition of fecal waste and can reduce the volume of the solids. While anal cleansing with water is practiced widely in the area, desludging operators have reported the need to add water to pits in order to desludge them due to the dry nature of the contents.

In areas of low permeability combining the shower and latrine pits will increase the volume of liquid entering the pits and may increase desludging frequency. Percolation rates seen in Yobe are higher than those in Borno and may be most appropriate for combined bathing units and latrines. Desludging rates are based on truck trips and are the same for greywater and black water. If desludging of bathing areas is required, combining latrine and shower pits will decrease the solids level in the latrines, making mechanical desludging easier. This may result in increased odors in bathing units and should be designed in consultation with users.

Accumulation rates are much higher when the users deposit solid waste in the latrine pits. Plastic bottles used for anal cleansing and menstrual hygiene materials have been observed in the latrines. Distribution of reusable *butas* to replace disposable plastic bottles, waste collection, waste bins in female toilets, and education through hygiene promoters can reduce the disposal of these materials in the latrines by the users. Hygiene promotion should include messages to dissuade users from depositing solid materials in latrines.

Reusable butas for anal cleansing to reduce plastic bottle deposit in latrines

Siting of latrines should be considered in consultation with camp management and the Shelter sector. Latrines should be sufficiently far from shelters to prevent odors in living spaces, however, latrines should be no more than 50 meters from shelters. Long distances to shelters creates an unnecessary security risk for women and girls accessing the latrines.

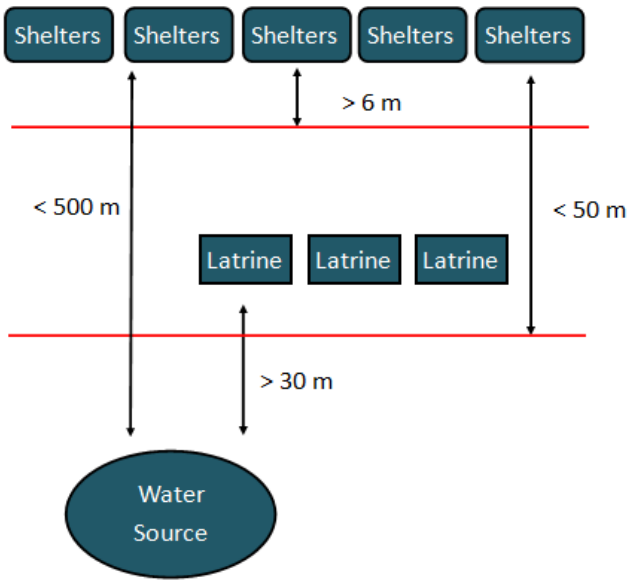


Figure 37: Siting for latrines

Siting in host communities for latrine distance sufficiently far from shelters may not be possible in space constrained areas in host communities. Latrines should be sited in consultation with users and landowners and in consideration of prevailing winds. Shelters should be upwind of latrines and downhill as much as possible. In all contexts sanitation facilities should not be sited less than 30 meters from water sources.

In addition to consultation regarding siting, landowners should be made aware of the type of sanitation facilities being installed on their land. The emergency latrine design or latrine kits are recommended for host community settings. Landowners may have preferences for more permanent facilities. Upgradeable latrines with foundations that can be used for more permanent toilets are recommended in lieu of installation of concrete structures. Water sealed toilets are not recommended, because the most vulnerable IDPs may not have previous experience using these facilities and due to limited access to water.

Landowners informed of type of sanitation facilities installed on their land

Operation and maintenance

Sanitation committees for maintaining latrines in formal and informal camp settings where household latrines are not possible should be identified prior to construction of latrines for communal camp latrines. Low technical design issues can be discussed with the committees so that they can provide feedback or complaints directly to partners regarding common construction issues such as minimum pit depth, brick lining, presence of rebar in slabs, or other visible issues. Committees can be selected based on vulnerability if stipend payments are instituted, however, committee members must be physically able to complete their roles for maintenance of the latrines. Committees must be designed based on the gender ratio of latrines in the camp so that female members are responsible for female designated latrines and male members are responsible for male designated latrines. When the gender ratio is unknown in new camp settings a 3:1 ratio of female and male committee members can be selected. This will maintain gender segregation for maintenance of sanitation facilities in the camp.

Sanitation committees in camps based on gender ratio of latrines in the camp (3:1) for maintenance

Committee members should have clear identification of the latrines they are responsible for. Sanitation committees are responsible for daily cleaning of the internal latrine superstructure in camps. Excreta outside of the latrine should be cleared and deposited into the latrine. Committee members can be provided with kits that include tools for cleaning the interior of the latrines and safely handling excreta outside of the facilities. If sanitation committees are selected on a rotational basis, their contact information should be available to confirm responsibilities are being met and selection is done transparently. Frequent rotation of sanitation committees is not recommended due to the training requirements for new members and the additional book-keeping required to make payments and confirm work completed for those receiving stipends. Stipends for sanitation committee members in camps should be reviewed and agreed upon within the WASH working groups.

Rotation of committee members minimized

For host communities households should be responsible for maintaining and cleaning latrines as much as possible without stipends or other forms of payment. Sanitation committees may be provided with kits that include tools for cleaning latrines for communal host community latrines. Communal latrines in host communities should be avoided for maintenance purposes and to avoid conflict with CLTS strategies.

No communal latrines in host communities

Desludging of formal and informal camp latrines should be done fully subsidized by partners until future review of the strategy. Regular monitoring of latrines will inform the frequency of desludging required. Latrines should be emptied upon filling to the 0.5 m freeboard level below the latrine slab (approximately ground level for the design provided above) to avoid splashing of users. The Ministry of Environment should be informed of latrine emptying needs in advance. WASH partners should plan to budget for private sector desludging when government services are not available. MoEnv may also provide monitoring for waste dumping in approved sites.

Latrines desludged upon filling to 0.5 meters freeboard

Figure 38: BOSEPA and private sector tankering trucks

Estimated cost for desludging of latrines: $0.37/person/year

Table 15: Sanitation committee kit per committee member for camps

Item	Unit	Quantity / committee member	Cost/Unit (naira)	Total cost (naira)	Total cost (USD)
Liquid detergent	gallon	1	1000	1000	$ 4.65
Toilet brush with stick, hard	piece	1	400	400	$ 1.86
Broom, rubber with stick handle	piece	1	400	400	$ 1.86
Gloves, rubber	pair	1	400	400	$ 1.86
Bucket with lid, HDPE, 20 L	piece	1	500	500	$ 2.33
Rainboots, rubber	pair	1	1200	1200	$ 5.58
Dust pan, plastic	piece	1	1000	1000	$ 4.65
Shovel	piece	1	800	800	$ 3.72
Total estimated cost: 5,700 naira ($26.51 USD) Committee member:1 Latrines responsible: 20 chambers Distribution frequency: once per year					

Monitoring

Monitoring for latrines should be conducted during all stages of construction, use, and decommissioning. WASH partners should consult beneficiaries to identify any challenges to utilization of the latrines. Consultation with sanitation committees should include review of any complaints for contractor quality and discussions regarding acceptance of use. A latrine construction checklist example is provided as an annex to this guidance. Monitoring of private sector service providers is a critical component for delivering quality services to affected populations.

Stronger monitoring of latrine construction

Feedback mechanisms should be in place for users to file complaints and concerns at all stages. These mechanisms should be transparent so that complaints can be filed against WASH partners, camp leaders, or sanitation committee members if necessary. Affected populations can also notify WASH partners of the need for pit emptying as needed if monitoring is not done with sufficient frequency.

Feedback mechanisms from affected populations

WASH partners should review the quality of materials before they are installed. Termites are a challenge in North East Nigeria. This is

Figure 39: Termite damage to latrine superstructure

exacerbated when the wood is of inferior quality and untreated. Wood used for frames and beams should be reviewed to ensure that it is durable and treated. The photo to the left from a collapsed latrine shows the deterioration of the wood due to termites. Obeche, mahogany, or other types of hardwood are recommended when using wood for frames and beams. Wood should be treated using oil products to reduce termite infestation. It is recommended that all partners regularly review materials used by private service providers if materials are not purchased directly by WASH partners.

WASH partners should monitor the following on weekly basis:

- Level of pit contents
- Cleanliness of latrines

WASH partners should monitor the following on a monthly basis:

- Number of functioning latrines
- Active sanitation committee members and any complaints

WASH partners should monitor the following as needed:

- Accessibility of latrines for disabled and elderly users
- Desludging records
- Sanitation committee members trained
- User complaints on latrine functionality

Handover and decommissioning

WASH partners must identify a partner that will maintain sanitation facilities and payments where applicable for sanitation committees prior to existing formal and informal camps. The partner will be responsible for regular desludging of latrines and decommissioning of latrines upon camp closure. In situations where camp populations decrease decommissioning of latrines should be done by the responsible WASH partner. For informal camps and host communities in rural areas this will include where populations have returned or exited the area and latrines are located more than 50 m from shelters.

Latrines decommissioned upon camp closure with compacted soil allowed to settle

Upon camp closure temporary latrine infrastructure should be decommissioned. In informal camps infrastructure may be handed over to the school or public facility in consultation with those responsible for managing those facilities. Temporary latrine superstructures should be removed. The pit should be backfilled with soil. The soil should be compacted and heaped to allow for settling. The area can be fenced off until the soil has settled. Consultation with landowners prior to constructing latrines in host communities should include discussion regarding handover of the latrines.

Monitoring wood quality and treating for termites

Hygiene

2x10L non-collapsible jerry cans + 20L bucket with lid per household
250 gram bathing soap/person/month
200 gram laundry soap/person/month
Suitable materials for menstrual hygiene management
100 persons/ bathing unit
Bathing units are physically separated and demarcated with lock on inside
1:3 male/female ratio for bathing units
2 L kettle for hand washing and anal cleansing per household
Handwashing stations with liquid soap at feeding centers, health facilities, and communal feeding areas
Ratio of female:male hygiene promoters is equal to IDPs in camps

Indicators:

- Number of initial hygiene kits distributed
- Number of replenishment hygiene kits distributed
- Number of cholera kits distributed
- Number of emergency bathing units constructed
- Number of hygiene promoters trained in key hygiene messages, cholera prevention, ORS preparation
- Number of people reached with hygiene messaging through household visits
- Number of hygiene promoters promoting key hygiene messages weekly disaggregated by sex
- Percentage of individuals who can list a minimum of three critical hand washing times
- Number of hygiene promoters providing cholera prevention messages weekly disaggregated by sex
- Percentage of individuals who can list a minimum of three key cholera messages
- Percentage of women and girls of menstruating age with sufficient sanitary materials and spaces to safely manage their menses with privacy and dignity

Operational principles and practices

Initial hygiene kits for first three months and annually

Replenishment kits provided every three months based on PDM

The harmonized initial hygiene kit list of items is shown below. Three types of kits are recommended based on the operating context (initial, replenishment, and cholera). The first is a more comprehensive kit that can be distributed annually based on feedback from post distribution monitoring (PDM). The second kit is a replenishment hygiene kit for bathing soap, laundry soap, and MHM materials. The frequency of distribution can be planned based on the standard of 250 g of bathing soap and 200 g of laundry soap for each affected person each month. Distributions for replenishment hygiene kits should be done every one to three months to avoid over-distributing and potential sale of hygiene items. PDM will determine whether quantities are sufficient or more than sufficient based on sale of items. Cholera kits may also be distributed that include POU chlorine residual water treatment tablets or solution and bathing soap during cholera outbreaks.

Table 16: Initial hygiene kit (for three months distributed annually)

Item	Unit	Quantity / HH	Cost / Unit (naira)	Total Cost (naira)	Total Cost (USD)
Jerrycan, 25 L, non-collapsible	Piece	1	600	600	$ 2.79
Jerrycan, 10 L, non-collapsible	Piece	1	400	400	$ 1.86
Bucket with lid, HDPE, 20 L	Piece	1	500	500	$ 2.33
Kettle with lid, plastic, sanitary cleansing, 2 L	Piece	1	150	150	$ 0.70
Torch light, rechargeable	Piece	1	350	350	$ 1.63
Child potty with lid	Piece	1	350	350	$ 1.63
Bathing soap, 250 grams	Bar	18	70	1260	$ 5.86
Laundry soap, 200 grams	Bar	18	50	900	$ 4.19
Rope	m	4	200	800	$ 3.72
Clothes pins	Pack of 5	1	100	100	$ 0.47
Female undergarments, medium size	Piece	4	500	2000	$ 9.30
Reusable sanitary pad set (2 holders, 3 winged pads, 2 straight pads)	set	2	2350	4700	$ 21.86
Total estimated cost: 12,110 naira ($56.33 USD) Duration: three months (soap) Household size: 6 Distribution frequency: once per year					

Table 17: Replenishment hygiene kit (three months after distribution of initial kits)

Item	Unit	Quantity / HH	Cost / Unit (naira)	Total Cost (naira)	Total Cost (USD)
Bathing soap, 250 grams	Bar	18	70	1260	$ 5.86
Laundry soap, 200 grams	Bar	18	50	900	$ 4.19
Total estimated cost: 2,160 naira ($10.05 USD) Duration: three months (to be reviewed with post distribution monitoring) Household size: 6 Distribution frequency: every three months (to be reviewed with post distribution monitoring)					

Table 18: Cholera kit option 1

Item	Unit	Quantity / HH	Cost / Unit (naira)	Total Cost (naira)	Total Cost (USD)
ORS packet					
Water Guard solution, 1.25% sodium hypochlorite (NaOCl) solution, 250 mL	Bottle (250 mL)	1	150	150	$ 0.70
Bathing soap, 250 grams	Bar	18	70	1260	$ 5.86
Total estimated cost: 1,410 naira ($6.56 USD) Duration: three months (to be reviewed with post distribution monitoring) Household size: 6 Distribution frequency: every three months (to be reviewed with post distribution monitoring)					

Table 19: Cholera kit option 2

Item	Unit	Quantity / HH	Cost / Unit (naira)	Total Cost (naira)	Total Cost (USD)
ORS packet					
Aquatab or Oasis, sodium dichloroisocyanurate (NaDCC) 67 mg tablets	Pack (50 tablets)	4	80	320	$ 1.49
Bathing soap, 250 grams	Bar	18	70	1260	$ 5.86
Total estimated cost: 1,580 naira ($7.35 USD) Duration: three months (to be reviewed with post distribution monitoring) Household size: 6 Distribution frequency: every three months (to be reviewed with post distribution monitoring)					

25 L jerrycans based on prevalence in area and 10 L jerrycans for transport by children

Non-collapsible jerrycans are recommended for medium and long-term use in accessible areas to limit replenishment requirements. Collapsible jerrycans may be necessary for transport and distribution to access constrained camps. The recommended hygiene kit includes a 25 L jerrycan and 10 L jerrycan (transport and storage). This exceeds the standard of two 10L jerrycans. 25L jerrycans were selected based on their prevalence in the region.

Cash transfers for hygiene NFIs are not recommended in formal camp settings where IDPs have restrictions for leaving and entering the camps. Some items are available in the larger camps in small markets. The table below is a sample of items available for purchase in Bakasi Camp. The prices listed were collected prior to the Nigerian currency float in June 2016.

Table 20: Hygiene items available commercially in Bakasi Camp, June 2016

Item description	Unit	Unit cost (naira)	Unit cost (USD)
Laundry soap, powdered, 25 g	bag	10	$ 0.05
Bathing soap, 120 g	bar	30	$ 0.14
Bathing soap, 240 g	bar	60	$ 0.28
Brand bathing soap, April brand, 60 g	bar	30	$ 0.14
Medicated soap, 150 g	bar	130	$ 0.60
Toothbrush	piece	50	$ 0.23
Toothpaste, small, 40 g	tube	50	$ 0.23
Toothpaste, large, 140 g	tube	200	$ 0.93
Disposable sanitary pads	pack of 8	200	$ 0.93
Diaper, disposable	piece	50	$ 0.23

Cash transfer options may be included in host community, returnee, and former host community settings. The feasibility and modalities of cash programming should be informed by market surveys to determine availability of materials, capacity of markets to absorb these programs, and any adverse effects on local supply chains. Formal camp settings are excluded due to the lack of movement by IDPs to access markets.

Ratio of female and male hygiene promoters equal to IDP population in camps

The ratio of female and male hygiene promoters should be equivalent to the IDP population targeted for hygiene promotion in camp settings. Female hygiene promoters should target female IDPs and should receive additional training in MHM. Male hygiene promoters should target male IDPs. All hygiene promoters should be aware of any household water treatment products being distributed; understand the dosage, preparation, and/or use of these products; and be able to demonstrate the dosage and preparation.

Bathing units physically separated by gender and demarcated pictorially by gender

Bathing units must be physically separated by gender in informal and formal camp settings. Bathing units should be demarcated pictorially for each gender to avoid confusion for users. When possible the bathing units should be separated from the latrines to avoid confusion with latrines and limit odors in the bathing units due to proximity to the latrines. In areas with low

permeability of soils grey water from the bathing units should be diverted away from shelters and bathing units. Soakaway pits should not be installed for bathing units with low permeability soils.

No soakaway pits for bathing units if low permeability soil

Figure 40: 1.5 L and 1.0 L ablution kettles (butas) used for hand washing and anal cleansing

The ablution kettles (*butas*) seen above are widely used and available in North East Nigeria. They are used for anal cleansing and hand washing. They are available in a variety of sizes. Transport should (See photo on the right.) include the lids attached for ease of distribution. Two liter containers provide one (1) liter for anal cleansing and one (1) liter for hand washing. The numbers on the *butas* do not indicate the volume contained. Hand washing using these vessels may be more accepted than separate hand washing stations. *Butas* also allow women to carry water into the latrines for menstrual hygiene management. Hygiene promotion would need to include hand washing messages tailored to this option if all users have access. Soap cannot be added directly to the water if *butas* are used for hand washing as ablution water cannot contain soap as dictated by religious norms for Muslim populations. This option should be reviewed during PDM to see if all users (boys, girls, men, and women) are able to use *butas* for hand washing without cross-contamination.

Butas used for ablution, hand washing, and anal cleansing

Hand washing stations should be installed at health facilities, nutrition centers, cholera treatment centers, and communal feeding areas. Semi-permanent stations such as the photo shown below can include security measures such as cementing the frames into the ground. Alternatively, more permanent stations or water points may be more appropriate for longer-term settlements.

Hand washing stations with chlorinated water at health facilities, nutrition centers, cholera centers, and feeding areas

Figure 41: Hand washing station and water point

Laundry slabs may be installed in camp settings. Consultations with beneficiaries should determine whether buckets are available and preferred for laundering clothes and menstrual cloths. All laundry areas should include drainage.

When household water treatment products are distributed hygiene promoters must be aware of the product, dose, mixing, and wait times for these products. See Table 11 in the water quality section above for the doses for each product. The recommended distribution for POU chlorine options is one (1) 250 mL bottle of Water Guard or four (4) packs of 67 mg NaDCC tablets (200 tablets) for a three month supply. Instructions should be distributed to users in the most commonly known local language and pictorially. Demonstrations should accompany distributions. When partners are distributing chlorine products in the same program area the same product and concentration should be used to avoid confusion of messaging for hygiene promoters and users.

Instructions for use of POU water treatment option in most commonly known local language

All hygiene promoters should be able to explain and demonstrate how to prepare oral rehydration solution (ORS). Instructions should be available in the most commonly known local language and pictorially for users and hygiene promoters. More details on ORS are included in the cholera section below.

Demonstrations of water treatment option dosing and times and ORS preparation during distributions

Hygiene promoters should be instructed in how to measure middle upper arm circumference (MUAC) and to direct caretakers of malnourished children to nutrition centers (See nutrition and food security section below).

MUAC measurement training for hygiene promoters

Planning

All hygiene promotion campaigns done in host communities should be planned with local leaders. These leaders should be informed of the messages that will be shared with their constituents and the strategy (i.e., cholera prevention). Hygiene promotion messages and information, education, and communications (IEC) materials should be targeted to address key behaviors based on the context. When cholera cases are reported messages should focus on key cholera prevention and response messages (See cholera section below.). When malnutrition rates are above critical levels WASH partners should focus on malnutrition related messages (See nutrition and food security section below.). All IEC materials for hygiene promotion should be in the most commonly used language for the area. This may not necessarily be Hausa or English.

Menstrual hygiene management materials should be determined based on consultation with female affected populations. WASH partners distributing hygiene materials should consult directly with women and girls to determine preferences and appropriateness of materials, disposal practices for disposable materials, protection risks for the method of distribution of MHM materials, and practices for washing and drying of reusable materials. Consultations for MHM materials can also inform hygiene promotion messages for safe management of menstruation.

MHM materials determined based on consultations with female affected populations

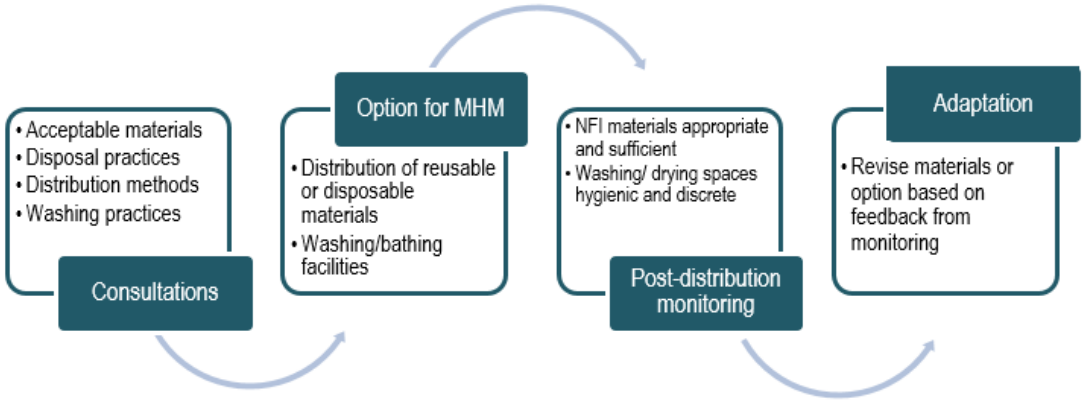


Figure 42: MHM planning

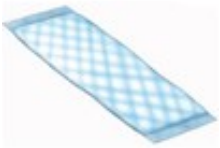
MHM planning should take into consideration the capacity to regularly distribute materials, availability of spaces for discrete washing and drying of reusable materials, solid waste

management, and desludging of materials. The table below includes some considerations for the MHM strategy selected.

Reusable cloths or sanitary pads with hygiene promotion for cleaning and drying of materials

At this time the recommended strategy for MHM distributions should include reusable materials based on prior use of cloths. For this strategy more consultation is required for washing and drying practices to include these needs in infrastructure designs. PDM should include an analysis of material use and practices for washing and drying to evaluate this strategy.

Table 21: Considerations for MHM strategy

Option	NFIs	Facilities	O&M	Hygiene messages
Disposable sanitary pads 	Pads distributed on a regular basis Undergarments for securing pads	Waste bins with lids inside latrines for discrete disposal of pads after use Final disposal or burning sites	Female sanitation workers to dispose of materials Operation of burning site or regular solid waste collection Removal of pads from pits during desludging	Messages to discourage users from depositing materials in the latrine
Reusable sanitary pads 	Appropriate cloth on semi-annual basis Rope and pins for drying Undergarments for securing cloths	Safe, hygienic, and discrete spaces for washing and drying materials Drainage facilities with grey water not visible from bathing units	Removal of cloths from pits during desludging	Messages to explain the health impacts of hygienic washing of MHM materials Messages to discourage users from depositing materials in the latrine

Consultations and PDM can also inform the most appropriate distribution methods for all NFI materials. When distribution of hygiene materials to all households is not possible, clear criteria for selection should be used. PDM should include questions to identify protection issues and identify solutions with the affected population and in consultation with the protection sector. Voucher systems or household identification may be put in place to ensure equity for household distributions where no selection criteria are in place.

Child potties for child feces management

Caregivers should be provided with materials to properly manage child feces. This may include cloths for reusable diapers, child potties, or disposable diapers. Disposable diapers are not encouraged when possible due to the waste management requirements and the clogging of latrines. The materials provided should be selected in consultation with mothers and other caregivers to determine the most appropriate option that will limit maintenance while allowing for safe management of child feces. Child potties are currently recommended for child feces management. More consultations with caregivers are needed to confirm that this method of child feces management is appropriate for all regions. Hygiene promotion should target the use of potties and final disposal of feces collected in the potties in the latrines in addition to hand washing after handling.

Monitoring

Post distribution monitoring informs adaptations for hygiene material distributions

Post distribution monitoring of hygiene kit materials should be done by all WASH partners distributing NFIs. WASH partners should identify the following:

- Are the materials being distributed culturally appropriate?
- Are there any items that households do not need?
- Are sufficient quantities being distributed?
- Are there specific issues or dislikes for the materials being distributed?
- Do the users understand the purpose and use of the materials?
- Are any items missing that should be included?
- Did all households receive the materials?
- Was the selection process transparent?
- Were the disabled and elderly able to receive the items with the distribution method in place?
- Did the beneficiaries have to wait for excessive times to receive the items?
- Did women and children have any security concerns during the distribution process?

Partners should observe the items in the household to see if they are present and being used correctly during PDM. Enumerators should observe beneficiary dosing of POU treatment products to confirm correct dosages are being applied. Household residual chlorine testing should be done to confirm correct dosing when applicable. Kit contents should be reviewed based on feedback from post-distribution monitoring. The kit contents should be reviewed once this feedback is consolidated by all partners distributing NFI materials.

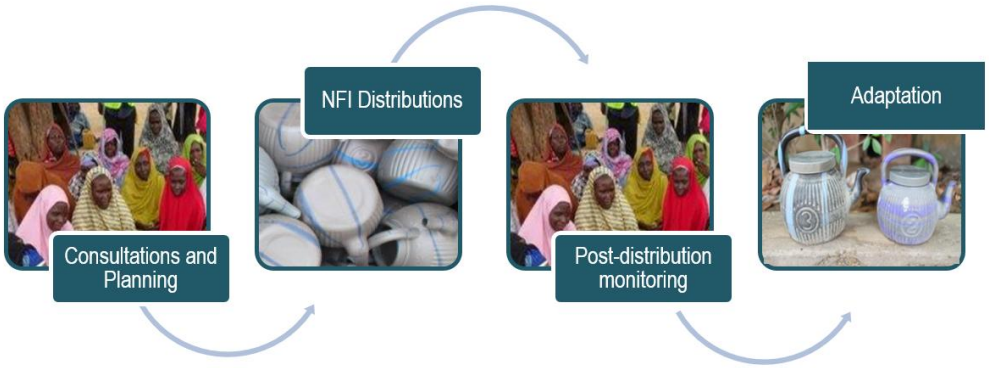


Figure 43: Post distribution monitoring

WASH partners should monitor the following on weekly basis:

- Kit distributions

WASH partners should monitor the following on a monthly basis:

- Number of hygiene promoters conducting weekly sessions

WASH partners should monitor the following as needed:

- Post-distribution monitoring as discussed above following distributions
- Accessibility of bathing units for disabled and elderly users
- Hygiene promoters trained
- Understanding of key hygiene and cholera prevention messages

Knowledge, attitudes, and practices surveys may be applicable for long-term recovery programs for returnees and former host communities.

Handover

WASH partners should coordinate within the sector and with CCCM when revising NFI distribution plans and any stipends for hygiene promoters.

Drainage and vector control

Drainage away from shelters sufficient to prevent risks to IDPs and neighboring affected populations at all water points, hand washing stations, and bathing units

Indicators

- Length of drainage infrastructure installed
- Length of drainage infrastructure improved
- Number of sites with drainage infrastructure installed
- Number of sites with water infrastructure drainage installed (water points, hand washing stations, bathing units, and laundry areas)

Operational principles and practices

With the seasonal rainfall primarily falling in the three months of June through August flooding is common in the north of the country. The map below highlights the recurrent flooding areas in North East Nigeria with the darker areas at higher recurrence.

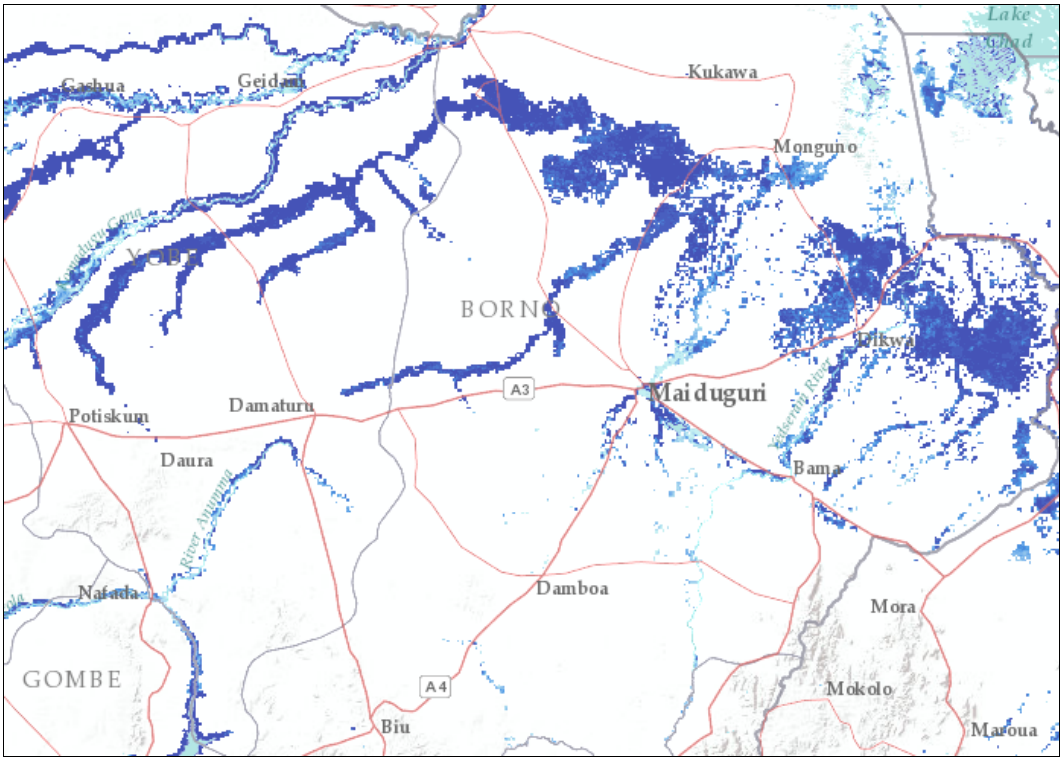


Figure 44: Flood recurrent areas in NE Nigeria, Source: International Water Management Institute, http://waterdata.iwmi.org/Applications/nigeria_Flood_Mapping/, captured on 26 July 2016

Impermeable soils and flat terrains contribute to the risk of forming stagnant waters that form breeding grounds for vectors and contaminated water sources that may spread waterborne diseases.

Irrigation ditches in camp settings

Planned settled areas should include irrigation ditches that can direct flood water outside of the settlement area. Cash for work schemes for irrigation channel digging should be evaluated. Rehabilitation of existing drainage infrastructure for host communities and returnee communities should be done in consultation with MoEnv. Special consideration can be given to drainage canals receiving water from water points rehabilitated in urban areas.

Figure 45: New irrigation channel in camp (left) and clogged channel in urban host community (right)

Water from water points, laundry areas, hand washing stations, and bathing units can be channeled to irrigation ditches to drain water outside of the settlement area.

Mitigation measures where formal drainage infrastructure is not possible

Where formal drainage systems are not possible for areas where settlements are already in place WASH partners should include mitigation measures for flooding, stagnant water, and muddy soils. Partners should drain stagnant water pools with dewatering pumps or fill areas where water has formed with soil. Chlorination of stagnant pools is not recommended.

Figure 46: Stagnant water from rainfall (left) and water point (right)

Draining of water or backfilling stagnant water with soil

Elevated WASH infrastructure

Latrines, bathing units, water points, and shelters should be elevated to allow access. The current designs for bathing units and latrines are elevated 0.45 meters above ground using stairs to enter the facilities. Water point access should be elevated sufficiently to drain water away and prevent mud formations surrounding the collection area. The elevation slope should not exceed 1:12 for disabled and elderly access. A concrete apron or pathway can divert water away from the high use area directly surrounding the water points.

Where soil conditions allow, soakaway pits can collect and drain water. See the planning section below for indications where soakaway pits are not recommended. Soakaway pits, where applicable, should include a cover to prevent deposit and collection of refuse. In low permeability soils diversion of water is more feasible.

Maintain drainage through clearing of debris

Waste management committees should target natural and formal drainage facilities to clear these areas of refuse on a regular basis.

Camp management partners may include raised pathways for pedestrian crossings and backfill soil to create slopes.

Any fumigation campaigns should be done in consultation with health authorities after evaluating the risks from vectors and the risks from any chemicals used for fumigation.

Planning

WASH partners planning to use soakaway pits for water points, laundry areas, and bathing units should conduct a percolation test to determine the feasibility of these drainage options. Soakaway pits should not be used in areas with low permeability soils. Siting should include a review of neighboring areas to ensure that irrigation ditches directing water away from shelters and water infrastructure do not pose a risk to neighboring shelters. Siting should also include a review of any elevation gradients and access by residents. Channels crossing through pedestrian traffic areas may require crossings suitable for children, the elderly, and individuals with disabilities to cross.

No soakaway pits with impermeable soils

Operation and maintenance

Drainage ditches must be continuously clear of solid waste to prevent breeding areas for vectors and blockage of water through the channels. Sanitation committees should include regular removal of waste from drainage ditches.

Monitoring

Post distribution monitoring should be conducted if partners distribute mosquito nets as part of their vector control strategy.

WASH partners should monitoring the following on a weekly basis:

- Functionality of drainage from laundry areas, hand washing stations, water points, and bathing units
- Clogging of irrigation ditches with solid waste or soil erosion

WASH partners should monitor the following as needed:

- Stagnant water pools from rainfall events

Handover

Handover of drainage infrastructure should be done in coordination with the CCCM sector, including IOM and NEMA or SEMA as applicable, in formal camp settings. This includes any stipends for waste management committees or sanitation committees responsible for clearing irrigation ditches. In host communities and informal camp settings this should be done in coordination with MoEnv.

Waste management

Roll-on roll-off bins available for camp settings
Biweekly removal of waste from roll-on roll-off bins
Communal waste areas not more than 100 m from shelters
Volume of communal bins to allow for 100 L per 10 families
Daily emptying of communal bins through waste management committees
Burn and burial sites where removal not possible

Indicators

- Volume of communal waste bins provided
- Number of sites with solid waste being removed biweekly
- Sites with feces or unmanaged solid waste visibly present

Operational principles and practices

Figure 47: Incinerator

Waste bins provided at the household or localized level in formal and informal camps should be of durable quality with a minimum life span of one year. Waste management committees should be encouraged to remove the waste from the bins to the centralized disposal areas daily (minimum biweekly). The centralized disposal areas should be cleared biweekly. If collection from municipal services is not possible, burn and burial sites should be identified for biweekly burning. Incinerators may provide additional security for health facilities disposing of medical waste when available on site.

Waste management committees may be provided with kits that include safety gear and tools for transporting waste. With proper training waste management committees may also be responsible for burning waste in communal pit areas. Stipends for waste management committees in camps should correspond with monitoring of specified areas. Stipends should not be paid for waste management committees in host communities. Cash for work schemes may include removal of solid waste from drainage areas or clearing of neighborhoods for periodic campaigns.

No stipends for waste management committees in host communities unless periodic campaign

Table 22: Waste management committee kits for one member

Item	Unit	Quantity / member	Cost/Unit (naira)	Total cost (naira)	Total cost (USD)
Respirator mask	piece	6	70	420	$ 1.95
Broom, rubber with stick handle	piece	1	400	400	$ 1.86
Gloves, heavy duty	pair	1	500	500	$ 2.33
Solid waste bin, 120 L	piece	17	1500	25500	$ 118.60
Shovel	piece	1	800	800	$ 3.72
Rake	piece	1	1200	1200	$ 5.58
Pick axe	piece	1	2500	2500	$ 11.63
Wheelbarrow	piece	1	7000	7000	$ 32.56
Total estimated cost: 38,320 naira ($178 USD) Duration: 1 year (excluding tools) Population served: 1,000 Context: camps					

Roll on/ roll off bins in formal and informal camps in densely populated areas should be requested from MoEnv for regular removal of solid waste from these sites. Private sector services are also available. Disposal of solid waste should only be done in approved dumping sites.

Planning

Waste management planning should be done in consultation with the affected populations. Planning for removal or burial of waste in host communities should be done in consultation with MoEnv to identify the capacity for government services to remove waste if removal is planned.

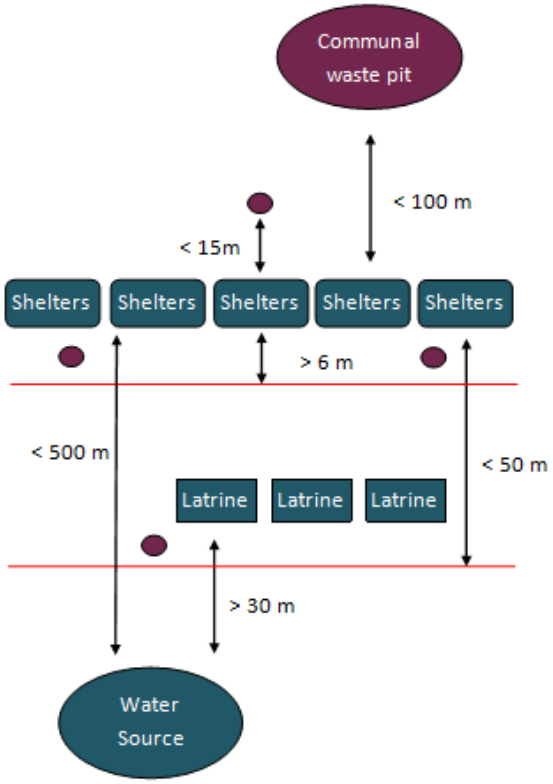


Figure 48: Siting for waste management

Waste bins should be close to the shelters with communal collection areas no more than 100 m from shelters. If MHM strategies include disposable sanitary pads, waste bins with lids should be available **inside the female latrines** so that women and girls can dispose of them with privacy.

Operation and maintenance

Waste management committees, where applicable, should remove solid waste from bins and collect waste disposed in other areas. Particular attention should be paid to irrigation ditches.

Monitoring

Regular monitoring through observation of the environmental sanitation situation is recommended to determine the effectiveness of waste management strategies.

WASH partners should monitor the following on a weekly basis:

- Emptying of waste bins

WASH partners should monitor the following on a monthly basis:

- Environmental sanitation conditions

Handover

Handover of waste management services should be done in coordination with the CCCM sector, including IOM and NEMA or SEMA as applicable, in formal camp settings. This includes any stipends for waste management committees or sanitation committees responsible for clearing irrigation ditches, removal of waste from bins, or burning of waste. In host communities and informal camp settings this should be done in coordination with MoEnv.

Nutrition and food security

Indicators:

- Number of nutritional centers provided with a functional WASH minimum package
- Number of patients admitted for SAM treatment receiving a WASH hygiene kit (See hygiene section above.) with key hygiene messages/behaviors counselled to parents/caregivers

In 2014, Global Acute Malnutrition (GAM) and Severe Acute Malnutrition (SAM) were reported above critical levels (15 percent for GAM and 2 percent for SAM[4]) in Jigawa, Bauchi, and Yobe States. Borno, Jigawa, Katsina, Sokoto and Yobe were above the warning threshold for GAM (10< GAM<15)[19] in 2015. The table below details a snapshot of the SAM and MAM prevalence.

Table 23: Prevalence of acute malnutrition according to MUAC in children 6 to 59 months by background characteristics; Source: NBS/UNICEF National Nutrition and Health Survey, 2014

State	Total n	GAM (MUAC<12.5 and/or oedema)	MAM (MUAC<12.5 >= 11.5, no oedema)	SAM (MUAC<11.5 and/or oedema)
Adamawa	439	3.4 [2,1, 5.5]	2.1 [1.0, 4.1]	1.4 [0.7, 2.8]
Bauchi	778	6.9 [5.0, 9.6]	5.1 [3.6, 7.3]	1.8 [1.0, 3.1]
Gombe	669	6 [4.3, 8.2]	4.8 [3.4, 6.6]	1.2 [0.7, 2.1]
Borno	625	6.4 [4.3, 9.5]	5.3 [3.5, 8.0]	1.1 [0.6, 2.1]
Taraba	457	4.6 [2.8, 7.4]	3.3 [1.9, 5.6]	1.3 [0.5, 3.4]
Yobe	663	7.2 [4.8, 10.7]	5.6 [3.7, 8.3]	1.7 [0.8, 3.3]

Malnourished children are extremely vulnerable. Increased diarrheal incidence due to a lack of sanitation, hygiene, and water exacerbate the ability of individuals to absorb nutrients. Due to their increased vulnerability, SAM rates are a key threshold indicator for WASH interventions (critical for SAM above 2%). As a strategy to target these vulnerable groups WASH partners can provide a minimum package of water, sanitation, and hygiene materials for nutrition feeding centers. The package is defined in the table below. The strategy of prioritizing mothers/caretakers for malnourished children targets hygiene messages with counselling for the individual responsible for managing hygiene for the infant or child. By providing hygiene kits to these caretakers when they visit nutrition centers, WASH partners can provide hygiene materials to the vulnerable children and incentivize caretakers to bring children in for treatment.

[19] NBS/UNICEF National Nutrition and Health Survey, 2014

Table 24: Minimum WASH package in nutrition centers adapted from Sahel WASH and Nutrition working group strategy, 2012

Theme	Indicators	Examples of activities
Access to safe drinking water	• 40 L/patient/day (including water for the accompanying person)[20] • Drinking water has 0.2-0.7 mg/L residual chlorine[21] • No toilets within at least 30 m of the water points	• Chlorination of clear water (NTU<20) by solution with HTH, Aquatab or bleach • Treatment of turbid water (NTU>20) with sachets of PUR, chlorination after filtering (candle filters, sand or charcoal) or after flocculation treatment with aluminum sulphate • Installation of water systems with wells or boreholes equipped with handpumps, or connection to a supply system, exceptionally water trucking (always considering the exit strategy) • Installation of protected water storage

Hygiene	• Soap in all installations
	• Handwashing units with chlorinated water at 0.05%
	• 50 people maximum /bathing unit /day
	• Private bathing units with separation by gender
	• Showers lit by night
	• Washing lines and drying areas in use
	• Visible posters and daily hygiene promotion sessions
		• Maintenance of hand washing stations with fresh chlorinated water/soap
		• Construction of showers with separation by gender and drainage
		• Washing lines and dish-drying areas constructed
		• Hygiene promotion of key practices:
		  ○ Handwashing with soap and running water after using the toilet, before preparing food, after changing a baby's nappy and before eating or feeding a child;
		  ○ Maintenance and cleaning of latrines, ensuring an absence of feces in all installations and around houses with no latrines;
		  ○ Demonstration of technique for treatment and protection of household drinking water.
		• Distribution of household hygiene kits to mothers leaving the nutrition center or by mobile team[22].

Sanitation	• 25 people max / latrine / day • Latrine waiting time < 5 min • Latrines clean with no feces, flies or odors • Private latrines with separation by gender • Latrines lit by night • Toilet area with potties for small children	• Construction of pit latrines with separation by gender and handwashing stations • Latrines lit by night and cleaned daily with a chlorine solution (0.2%) • Construction of a toilet area with potties for small children • Waste pits, dustbins, medical waste bins, incinerators, drainage channels: weekly cleaning and maintenance

In order to integrate WASH with Nutrition programs to better serve the affected populations, hygiene promoters can support identification of vulnerable children by performing measurements for malnutrition during hygiene promotion campaigns. Hygiene promoters can be trained in measuring the MUAC for all children under five in their targeted households. Hygiene promoters can then direct the caretakers of malnourished children to a nutrition feeding center. Trainings should be done in coordination with the nutrition sector to promote accurate measurements.

Health

Indicators:

- Number of health centers provided with a functional WASH minimum package

Diarrheal incidence and cholera cases are additional threshold indicators for the WASH sector. Increases in diarrheal incidence and outbreaks of cholera typically show correlations with poor WASH conditions in populations. It is also an indication of vulnerability. WASH interventions should be prioritized in these areas to prevent the spread of these diseases to other populations. WASH partners should provide a minimum WASH package for health facilities in prioritized areas in addition to nutrition centers.

[20] Revised from the 45-90 L/patient/day in the Sahel strategy for emergency programs

[21] Reduced from 0.3-1.0 mg/L residual chlorine in the Sahel strategy based on taste perceptions and in alignment with chlorination for household water quality standard for emergency programs

[22] Initial hygiene kits described above that include child potties

Table 25: Minimum WASH package for health facilities for emergency programs

Theme	Indicators	Examples of activities
Access to safe drinking water	• 40 L/patient/day for inpatients • 5 L/patient/day for outpatients • Drinking water has 0.2-0.7 mg/L residual chlorine • No toilets within at least 30 m of the water points	• Chlorination of clear water (NTU<20) by solution with HTH, Aquatab or bleach • Treatment of turbid water (NTU>20) with sachets of PUR, chlorination after filtering (candle filters, sand or charcoal) or after flocculation treatment with aluminum sulphate • Installation of water systems with wells or boreholes equipped with handpumps, or connection to a supply system, exceptionally water trucking (always considering the exit strategy) • Installation of protected water storage
Hygiene	• Soap in all installations • Handwashing units with chlorinated water at 0.05% • Washing lines and drying areas in use • Visible posters and daily hygiene promotion sessions	• Maintenance of hand washing stations with fresh chlorinated water/soap • Washing lines and dish-drying areas constructed
Sanitation	• 1 latrine for every 20 beds or 50 outpatients • Latrine waiting time < 5 min • Latrines clean with no feces, flies or odors • Private latrines with separation by gender • Latrines lit by night • Toilet area with potties for small children	• Construction of pit latrines with separation by gender and handwashing stations • Latrines lit by night and cleaned daily with a chlorine solution (0.2%) • Construction of a toilet area with potties for small children • Waste pits, dustbins, medical waste bins, incinerators, drainage channels: weekly cleaning and maintenance

Cholera

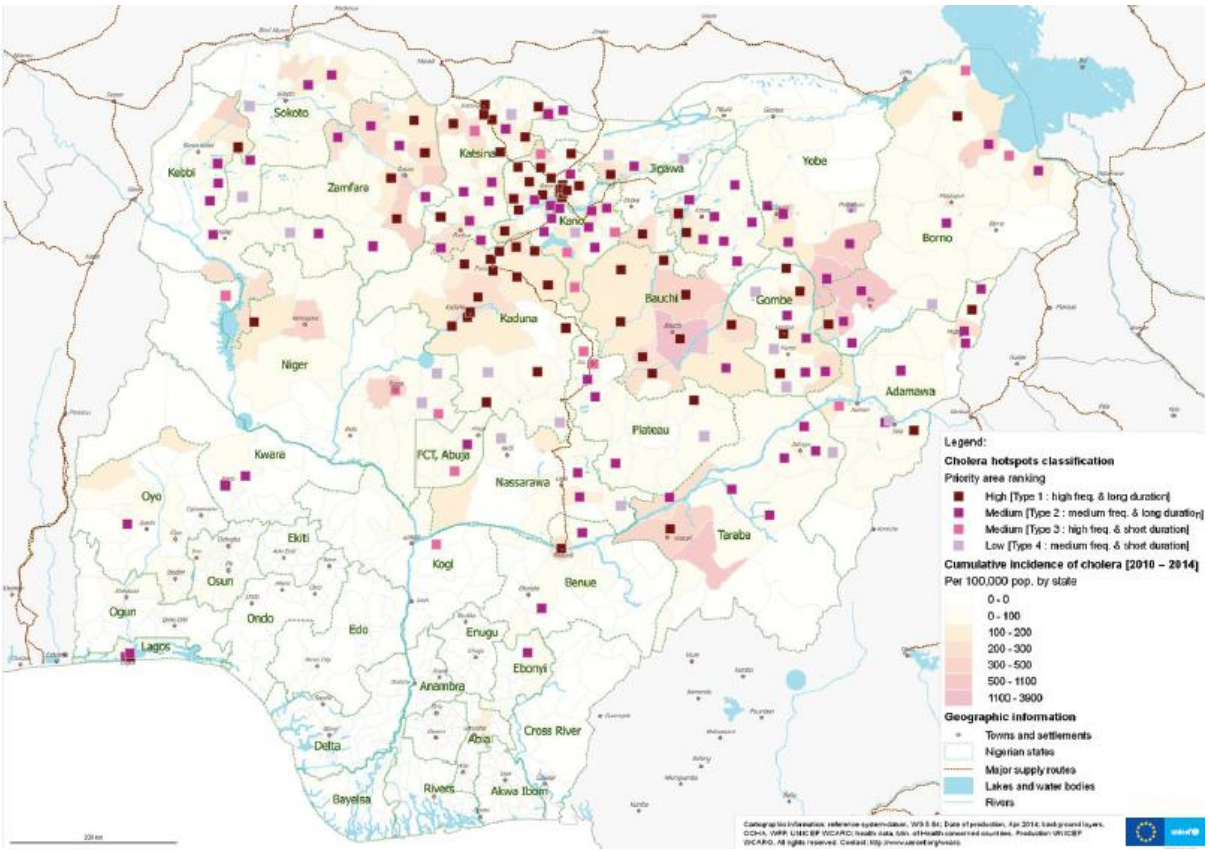


Figure 49: Cholera hot spots in Nigeria, Source: UNICEF/European Union Cholera epidemiology and response factsheet Nigeria

Each state has its own cholera preparedness and response plan. The guidance below is intended to support those plans.

> *Cholera is an acute intestinal infection caused by ingestion of food or water contaminated with the bacterium Vibrio cholerae. It has a short incubation period, from less than one day to five days, and produces an enterotoxin that causes a copious, painless, watery diarrhoea that can quickly lead to severe dehydration and death if treatment is not promptly given. Vomiting also occurs in most patients.*[23]

Common transmission methods

- Drinking contaminated water from an unsafe source
- Drinking water contaminated from an unclean storage or transport vessel
- Eating contaminated foods (not washed or handled safely)
- Contact with cholera patients (caring for and deceased) and their feces or vomit

Key WASH activities

- Provision of safe water supply sufficient for drinking, hand washing, bathing, and preparing food for at risk populations
- Provision of sanitation facilities to isolate and safely dispose of feces for at risk populations
- Provision of soap, and hand washing stations for at risk populations
- Provision of WASH packages for health facilities and cholera treatment centers (CTCs)
- Provision of cholera kits that include soap, ORS packets, and household chlorine water treatment products[24] for families of cholera patients
- Disinfection of latrines with chlorine solution

[23] WHO, Cholera, http://www.who.int/topics/cholera/en/

[24] Household chlorine water treatment products are provided when chlorination of the water point is not possible.

- Key hygiene promotion messaging that includes cholera messages and ORS preparation procedures
- Chlorination of water sources to prevent transport and storage contamination from July through November to correspond to the cholera season

Construction of CTCs and other cholera treatment infrastructure and establishment of cholera case testing and reporting should be done in consultation with Health sector partners. The first four activities are described in the guidance above. The key messages for cholera and additional details for chlorination are below.

Key messages

- Cholera is a disease that causes watery diarrhea that can cause death from dehydration within hours if not treated
- Go to a health facility immediately if you have watery diarrhea and/or vomiting and start rehydration with ORS during transit to the health facility
- Drink safe water (chlorinated or boiled)
- Wash your hands after using the bathroom, before eating or preparing food, before breastfeeding, and after cleaning a baby's feces
- Wash your hands after touching the feces, clothes, or vomit of individuals with cholera

In the absence of packaged ORS, it can be prepared at home by mixing

- 1 liter safe/treated water
- 6 teaspoons of sugar
- ½ teaspoon of salt

In addition to ORS, zinc is recommended for children under five. For children below six months of age, add zinc 10 mg daily for two weeks. For children from six months to twelve years, add zinc 20 mg daily for two weeks[25].

Chlorination

Chlorination of water at the source or water point is recommended for at risk, vulnerable populations. Different water sources will have a different chlorine demand. In order to obtain the desired residual chlorine the dosage of chlorine added to the tank must include the chlorine demand and the residual chlorine.

Chlorine dose = chlorine demand + residual chlorine

In order to determine the chlorine demand samples should be tested at the tap in iteration after adding higher doses of 1% chlorine solution until the desired residual is obtained. It is not sufficient to only calculate the residual chlorine as the chlorine dose. Some steps for batch chlorination of water storage tanks includes

- Prepare stock solutions of 1% chlorine
- Jar testing to determine chlorine demand
- Calculation of chlorine dosing volume
- Residual testing

Details for these steps are below.

Preparation of 1% chlorine stock solution

The table below illustrates some approximate measures for preparing 1% chlorine solution.

Table 26: Preparation of 1 L of 1% chlorine solution, Source: Davis and Lambert, Engineering in Emergencies, 2002

Chlorine source	Available chlorine (%)	Quantity required	Approximate measure
High Test Hypochlorite (HTH) granules	70	14 g	1 heaped tablespoon
Bleaching powder	34	30 g	2 heaped tablespoons

[25] WHO, Prevention and control of cholera outbreaks: WHO policy and recommendations, http://www.who.int/cholera/technical/prevention/control/en/index4.html,

Chlorine source	Available chlorine (%)	Quantity required	Approximate measure
Stabilized tropical bleach	25	40 g	3 heaped tablespoons
Liquid laundry bleach	5	200 mL	14 tablespoons

Jar testing

Once the stock solution is prepared, jar testing will determine the amount of chlorine required to meet the chlorine demand and provide the desired residual.

1. Fill four buckets with 20 L of water from the water point being tested
2. Add increasing amounts of stock solution to each bucket

Figure 50: Examples of jar testing buckets with increasing volumes of stock solution

3. Stir each bucket for 30 seconds
4. Wait 30 minutes to allow sufficient contact time with chlorine
5. Measure the residual chlorine levels in each bucket
6. Select the bucket (solution) that provides a chlorine residual between 0.5 and 1.0 mg/L
7. Repeat the process with higher doses if none of the buckets have sufficient chlorine residual

Determining chlorine dosing

For batch chlorination the volume of 1% solution required would be the volume determined in the method above multiplied by the volume of storage being chlorinated. As an example if the third bucket above provided the desired chlorine the following would be calculated for a 5,000 L storage tank:

1% chlorine solution (L) = (2 mL / 20 L) x 5,000 L storage x (1 L / 1,000 mL) = 5 L

If the tanks are filled and dosed twice per day the volume of solution required each day would be 10 L.

Residual testing

Chlorine residual testing should be done daily for the first week and then weekly following the first week for the duration of the rainy season and/or cholera outbreaks.

WASH partners should identify safe storage and mixing areas and provide equipment for staff or volunteers to safely mix chlorine solutions. Due to the corrosive nature of liquid and powdered chlorine all staff or volunteers responsible for mixing and dosing water supplies must be trained in the safe handling of chlorine. Chlorine should be stored in a dry area where only individuals authorized to handle chlorine have access.

Disinfection

The tables below are examples of chlorine concentrations for disinfection purposes.

Table 27: Preparation of disinfection concentrations for chlorine

Concentration	Purpose	Preparation
0.05%	Disinfecting utensils used by patients Hand washing after touching patients or their vomit/feces	1 tablespoon of 70% HTH in 20 L of water 14 tablespoons of in 20 L of water with 5% sodium hypochlorite 50 mL of 5% sodium hypochlorite solution in 20 L of water
0.2%	Disinfecting latrines used by cholera patients Disinfecting areas where patients vomit or defecate	1 tablespoon of 70% HTH in 5 L of water 20 tablespoons of 5% sodium hypochlorite solution in 5 L of water

Recommended Resources

Nigerian Standard for Drinking Water Quality, 2007, Standards Organisation of Nigeria

Code of Practice for Water Well Construction in Nigeria, Federal Government of Nigeria National Water Resources Institute, Standards Organisation of Nigeria, 2010

The Sphere Handbook: *Humanitarian Charter and Minimum Standards in Humanitarian Response*, 2011, http://www.sphereproject.org/handbook/

WHO Guidelines for Drinking-water Quality, Fourth Edition, 2011, http://apps.who.int/iris/bitstream/10665/44584/1/9789241548151_eng.pdf

WHO/WEDC Technical Notes on Drinking Water, Sanitation, and Hygiene in Emergencies #13, Planning for excreta disposal in emergencies, http://www.who.int/water_sanitation_health/publications/2011/WHO_TN_13_Planning_for_excreta_disposal_in_emergencies.pdf?ua=1

WHO, A Guide to the Development of On-Site Sanitation, 1992, http://www.who.int/water_sanitation_health/hygiene/envsan/onsitesan.pdf

Davis and Lambert, Engineering in Emergencies, A practical guide for relief workers, 2002

WHO Guidelines for Cholera Control, 1993, http://apps.who.int/iris/bitstream/10665/36837/1/924154449X.pdf

UNICEF Cholera Toolkit, http://www.unicef.org/cholera/index_71222.html

Annexes

Annex 1: Guidance summary

WATER SUPPLY			
Option	**Considerations**	**Contexts**	**Costs**
Water trucking	• Households must have access to collection containers prior to distribution	• Immediate response conditions (less than 5 L/person/day available) • Periods of high turbidity	• 7,000 naira/ 10,000 L for local urban trip ($33 USD)
Installation of solar powered borewells	• Training for maintenance • Reduced running costs • Protection of electrical boxes • Installation of flow meter • Drilling logs provided to RUWASSA/ SMOWR	• Medium to long-term host communities and camp settings for populations greater than 1,000 • Informal camp settings for populations greater than 1,000	• 2,500 naira/meter drilling • 11,800,000 naira for 170 m well with 200 m reticulation ($12 USD) • 50,000 naira/panel ($233 USD) • 9,000,000 naira for 24,000L x 9 m ($50,000 USD)
Installation of generator powered borewells	• Training for maintenance • Fueling costs • Tariff structures for long-term use • Installation of flow meter • Drilling logs provided to RUWASSA/ SMOWR	• Immediate response conditions in formal and informal camps • Rapid upgrade of wells for provision to larger populations	• 70,000 naira/3,500 watt generator ($326 USD) • 4,300,000 naira for single stroke powered borehole ($23,000 USD) • 23,300,000 naira for diesel generator powered borehole ($126,000 USD)
Connections to existing reticulation lines	• Must plan for increased demand on existing infrastructure through additional supply • Request approval from SMOWR	• Host community context where lines exist	• 500,000 naira/ 200 m network with stands ($2,326 USD)
Upgrading handpumps to mechanized pumping (solar or generator)	• Determined based on increased demand • Installation of flow meters	• Host communities, camps, access constrained camps for populations greater than 1,000	• 2,000,000 naira ($9,302 USD)
Repair of handpumps	• Determined based on prioritization of increased demand	• Host communities in rural areas for populations less than 1,000 • Informal camps in rural areas for populations less than 1,000	
Installation of handpumps	• Determined based on prioritization of increased demand • Drilling logs provided to RUWASSA/ SMOWR	• Host communities in rural areas for populations less than 1,000 • Informal camps in rural areas for populations less than 1,000	• 750,000-850,000 naira for 50 m ($3,488-$3,721 USD)

WATER SUPPLY			
Option	**Considerations**	**Contexts**	**Costs**
All options	• IDPs have access to water points • Planning quantities and storage based on population with additional volume for health facilities, feeding centers, and cholera centers • Storage tanks in parallel for maintenance • Access ladders for elevated storage tanks • Protect wells with concrete apron demarcated with depth, yield, date, and organization • Super chlorinate source to 100 mg/L and purge immediately after installation of new water infrastructure • Conduct sanitary surveys for new water infrastructure • WASHCOMs established and trained • Fully subsidized delivery and operation and maintenance for water for camp settings • No subsidies for operation and maintenance of water infrastructure in host communities[26]		

WATER QUALITY			
Option	**Considerations**	**Contexts**	**Costs (USD)**
Initial water quality testing	• Nigerian Standard for Drinking Water Quality • Conducted once unless life-threatening concerns are present	• Installation of new water supply infrastructure for medium to long-term use in all contexts	• 20,000 naira ($93 USD)
Source water chlorination (see below for options)	• Chlorine demand determined through jar testing • Turbidity less than 5 NTU • Safe chlorine storage facilities • Personal protective equipment for chlorine mixers • Regular chlorine residual monitoring • Training of WASHCOMs for chlorine handling • Batch vs chlorinator options	• Host communities, informal and formal camps, and access constrained camps from July to November	
Point of use (POU) water treatment (see below for options)	• Chlorine residual option from July to November • Training for hygiene promoters based on option selected • Provision of pictorial and local language instructions for use (in addition to hygiene promotion) • Conduct post distribution monitoring to determine proper utilization of treatment option	• Informal and formal camp settings when source chlorination not possible or disrupted • Access constrained camp settings when source chlorination monitoring not possible	
Regular monitoring for fecal coliforms, turbidity, and chlorine residual	• Sterile sample containers	• Host communities, informal and formal camps	

[26] Subsidy strategies for operation and maintenance of water infrastructure should be discussed more thoroughly with technical working groups to define practices that will not conflict with sustainability of WASHCOMs or assistance to vulnerable populations. Financing for rural water schemes prior to the emergency included an expectation for a high user contribution. Vulnerability levels for IDPs in host communities should also be considered in this strategy.

SANITATION			
Option	**Considerations**	**Contexts**	**Costs**
Cross ventilation pit latrine with slab	• Additional aeration for warm temperatures • Improved latrine type • Emptying chamber with separate access slab	• Formal and informal camps	532,000 naira / block of five chambers ($2,474 USD)
VIP latrine	• VIP exceeds pre-emergency latrines • Additional siting requirements • Emptying chamber with separate access slab • Improved latrine type	• Formal and informal camps with strong monitoring capacity for execution	
Unlined pit latrine with preformed slab	• Desludging is difficult • Short life span • Potential collapse or soil infiltration • Improved latrine type	• Immediate emergency response • Access constrained areas where sand and gravel are difficult to obtain	
Latrine kit	• Preformed slab and superstructure materials • Provisional upon completion of pit digging • Household level	• IDPs in host communities, returnees	
Prefabricated toilets	• Must be removed after end of first phase • Frequent desludging requirements	• Immediate emergency response in camps	
Concrete slab	• Confirm sufficient rebar scheme • Emptying chamber with separate access slab • Preformed molds used for squathole	• Formal and informal camps for medium to long-term use • Permanent health facilities, feeding centers, and schools for former host communities and returnee communities • Long-term facilities hosting IDPs such as schools and health clinics	
Precast concrete slab	• Potential for additional quality control • Transportation constraints • Preformed molds used for squathole	• IDPs in host communities, returnees	
Preformed plastic slab	• Lightweight for transport • Shorter life span than concrete	• Access constrained camps • Immediate emergency response	• 16,000 naira ($74 USD)
Wood superstructure	• Treat wood for termites • Environmental considerations	• Not recommended in areas where termites are prevalent	
Metal sheeting superstructure	• Confirm thickness of sheeting	• All emergency contexts	• 7,500 naira/bundle ($35 USD)

SANITATION			
Option	**Considerations**	**Contexts**	**Costs**
Brick superstructures	• Not recommended for emergency context	• Permanent health facilities, feeding centers, and schools for former host communities and returnee communities • Long-term facilities hosting IDPs such as schools and health clinics	
Communal latrines	• Not appropriate for ongoing CLTS programs	• Formal and informal camps • Access constrained camps	
CLTS	• Rural development strategy in Nigeria • Must consider timing and need for rebuilding of shelters and livelihoods	• Returnee, returnee communities, and former host communities • Recovery • Not recommended for emergency programs	
All options	• **Priority for cross ventilation lined pit latrines in formal and informal camps and access constrained camps when possible** • **Priority for household latrine kits in host communities and for returnees** • Minimum pit depth of 2 m below ground level where groundwater level permits • Communal latrines avoided except in formal and informal camps • Honeycomb lining for liquids infiltration with minimum 1 m of full lining at the top when possible (sufficient depth above groundwater) • Compacted soil backfilled around pit lining • Locks on the inside of the latrines and no locks on the outside of the latrines • Frames anchored 0.5 m into substructure or concrete • Latrines physically separated and demarcated pictorially by gender • Latrines physically separated from bathing units • Inclusive latrines determined by consultations with disabled and elderly • Provision for potties for child feces management • Regular monitoring and desludging of communal latrines once reaching 0.5 m freeboard • Fully subsidized desludging in all camp settings • No manual desludging when mechanical desludging possible • Dumping of sludge in approved sites • Siting of latrines in consultation with camp management in camps • Siting of latrines in consultation with land owners in host communities • Waste bins inside latrines if disposable MHM option is in place • Sanitation committees responsible for latrine maintenance comprised based on the gender ratio of latrines with responsibilities for cleaning assigned and designated by gender in formal and informal camps and access constrained camps • Latrines decommissioned upon camp closure • Squathole cover provided unless VIP latrine		

HYGIENE			
Option	**Considerations**	**Contexts**	**Costs**
Initial hygiene kit distributions	• PDM results from previous distributions • Coordination with NFI and protection sectors	• Blanket distributions for formal and informal camps • Targeted distributions for SAM caretakers in access constrained areas • Potential distributions for IDPs in host communities and returnee communities[27]	$56/household/year

[27] More information is needed on criteria for NFI distributions and distinguishing between IDPs and formerly residing host community members. Beneficiary selection and distribution methods should be reviewed with the protection sector.

HYGIENE			
Option	**Considerations**	**Contexts**	**Costs**
Replenishment hygiene kit distributions	• Predictable frequency • Frequency determined by previous use and regularity • Bathing and laundry soap and MHM materials	• Formal and informal camps and access constrained camps	$10/household/ three months
Cash programming for WASH hygiene items	• Market surveys • IDP potential for mobility and access to markets	• Informal camps, host communities, and returnees	Basket based on NFI costs above
Hygiene promotion through hygiene promoters	• Cholera messaging and ORS preparation • Key hygiene messages • Use of POU water treatment if distributed • Measuring MUAC for nutrition prioritization (See nutrition and food security section) • MHM focus based on option provided • Hand washing with *butas* • Use of potties if distributed • Targeted promotion by gender	• All contexts	
Hygiene promotion through IEC materials	• Most commonly used language • Pictures when possible • Targeted to communal facilities	• All contexts	
Hand washing stations	• Identify individuals responsible for regular refilling • Drainage from stations • Secured structures to avoid removal	• Communal feeding areas, health facilities, and nutrition centers in all contexts • Latrines in schools for returnee context	
Hand washing with *butas*	• Targeted to the household level • Requires review during post distribution monitoring	• All contexts	• 150 naira for 2 L *buta* per household ($0.70 USD)
Bathing units	• See latrine construction considerations above • Units physically separated and demarcated pictorially by gender • Latrines physically separated from bathing units • Inclusive bating units determined by consultations with disabled and elderly • Water diverted from units to irrigation channels • Locks on inside • Gentle slope to drain • Privacy for washing of menstrual cloths	• Formal and informal camps	• 231,200 naira for 5 chamber block ($1,075 USD)

HYGIENE			
Option	**Considerations**	**Contexts**	**Costs**
MHM	• Consultation with female beneficiaries • Disposal infrastructure and O&M for disposal strategies • Washing and drying strategies • Hygiene messages targeted for strategy	• All contexts	
All options	• Post distribution monitoring for all NFI options • Coordination with local government structures for all hygiene promotion and cholera prevention campaigns prior to commencing		

DRAINAGE AND VECTOR CONTROL			
Option	**Considerations**	**Contexts**	**Costs**
Piped irrigation channels	• Waste management to prevent clogging of pipes • Connected to bathing units, water points, and hand washing stations • Planned in coordination with camp management prior to settling • Sloping gradient	• Camps	
Trench irrigation ditches	• Waste management to prevent clogging of ditches • Soil conditions that may collapse • Planned in coordination with camp management prior to settling • Sloping gradient • Access to cross in pedestrian siting	• Camps	
Dredging of drainage canals	• Potential for cash for work schemes • Waste management committee responsibilities	• Host communities, particularly around rehabilitated water points • Camps for existing irrigation ditches regularly cleared	
Filling of static water pools	• Potential for cash for work schemes	• Camps	
Soakaway pits	• Percolation tests • Not appropriate for low permeability soils	• Water infrastructure only with permeable soils	
Fumigation	• Evaluation of any chemicals used for potential risk to residents • Evaluation of potential vectors	• Potentially in camps[28]	
	• Determination of drainage option preferred prior to settling to allow for site planning		

[28] More information is needed on the vectors and chemicals used for a recommendation on fumigation.

WASTE MANAGEMENT			
Option	**Considerations**	**Contexts**	**Costs**
Communal or household waste bins	• Durability for high use • Collection strategy • Bins inside latrines for disposal MHM option	• Camps	
Roll on/roll off bins	• Capacity of municipal services • Siting • Frequency and predictability of removal	• Formal and informal camps	
Communal waste pits	• Burn and burial or removal • Removal strategy • Siting • Frequency and predictability of removal	• All contexts	
Waste management committees	• Potential for payment in camp settings • No payment in host communities apart from specific labor campaigns (dredging) • Defined responsibilities for frequency of collection, burning, and dredging • Safety gear	• Formal and informal camps • Voluntary in host communities	
	• Consultation with MoEnv to determine capacity for removal options		

Annex 2: Selection of Nigerian water quality standards

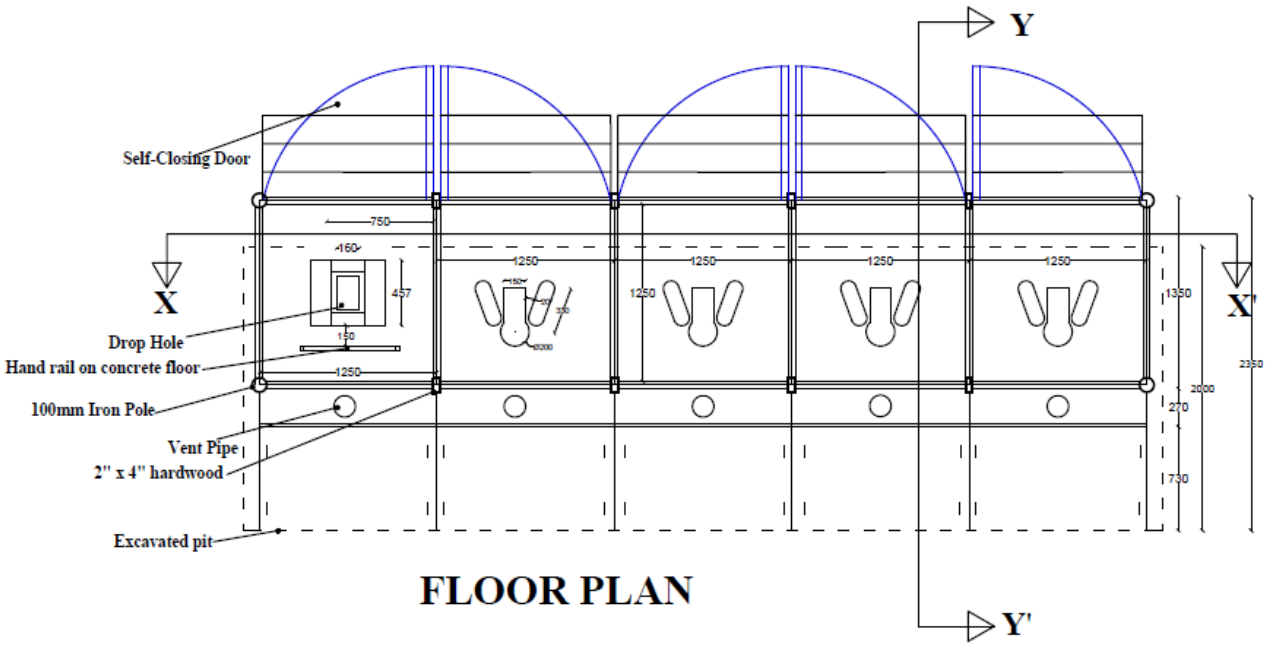
Table 28: Selection of Nigerian water quality standards, Source: 2007 Nigerian Standard for Drinking Water Quality (excluding notes)

Parameter	Unit	Maximum Permitted Levels	Notes (added by author)
Color	TCU	15	No adverse health effects
Odor		Unobjectionable	No adverse health effects
Taste		Unobjectionable	No adverse health effects
Temperature	Celsius	Ambient	Clay pot storage option for elevated temperatures
Turbidity	NTU	5	Filtering may be required
Aluminum (Al)	mg/L	0.2	To be monitored if aluminum chemicals are used for treatment
Arsenic (As)	mg/L	0.01	Alternate water source for long-term use
Chloride (Cl)	mg/L	250	No WHO guideline
Chromium (Cr^{6+})	mg/L	0.05	Coagulation treatment
Conductivity	µS/cm	1000	
Copper (Cu^{+2})	mg/L	1	
Fluoride (F^{-})	mg/L	1.5	Alternate water source for long-term use
Hardness (as $CaCO_3$)	mg/L	150	No adverse health effects, no WHO guideline
Iron (Fe^{+2})	mg/L	0.3	No adverse health effects, no WHO guideline
Lead (Pb)	mg/L	0.01	
Magnesium (Mg^{+2})	mg/L	0.2	
Nitrate (NO_3)	mg/L	50	Indicator of fecal contamination
Nitrite (NO_2)	mg/L	0.2	Indicator of fecal contamination
pH		6.5-8.5	Affects operability of treatment
Sodium (Na)	mg/L	200	No WHO guideline
Sulphate (SO_4)	mg/L	100	No WHO guideline
Total Dissolved Solids	mg/L	500	No WHO guideline
Total coliform	cfu/mL	10	0 cfu/100 mL for emergency context for regular monitoring
Thermo tolerant coliform or E.coli	cfu/100 mL	0	
Total Organic Carbon	mg/L	5	
Free residual chlorine	mg/L	0.2-0.25	Increased for emergency context in regular monitoring

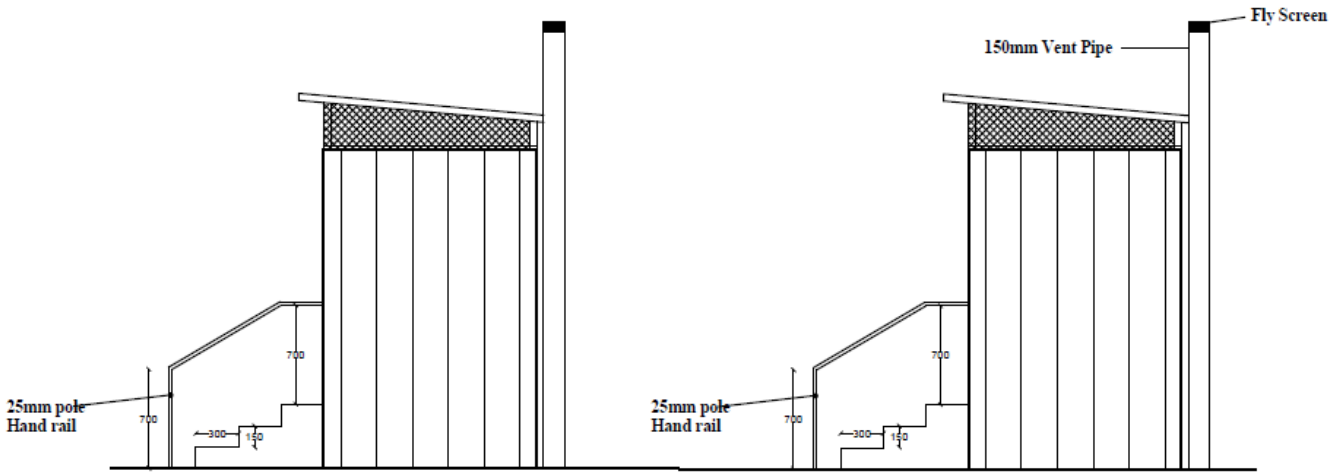
Annex 3: Emergency latrine BOQs (5 compartments)

SN	DESCRIPTION	UNIT	QUANTTY	RATE	TOTAL (naira)	TOTAL (USD)
1	Preliminaries					
A	Initial mobilization and final demobilization of equipment, labor and materials for contractors base office to site		1	10,000	10,000	$ 54.05
	Total of section 1 carried to summary				10,000	$ 54.05
2	Excavation and earthworks					
A	Clearing of site	M^2	40	120	4,800	$ 25.95
B	Excavate latrine pit to a depth of 2.5 m	M^3	42	600	25,200	$ 136.22
C	Excavate trench to receive concrete in foundation depth	M^3	2	700	1,400	$ 7.57
D	Backfill and ram foundation spread and remove surplus excavated materials	M^3	25	400	10,000	$ 54.05
E	Provide anti termite treatment to surfaces of excavation (where applicable)	M^2	42	200	8,400	$ 45.41
	Total of section 2 carried to summary				69,800	$ 377.30
3	Sub structure					
	Concrete works					
	Plain in situ concrete (concrete mix 1:2:4 – 20mm aggregate) in:					
A	Foundation (footing)	M^3	3.9	24,000	93,600	$ 505.95
B	Floor (65 mm) thick as in the drawings	M^3	0.2	24,000	4,800	$ 25.95
	Reinforced concrete (1:2:4- 20mm aggregate) in:					
C	Precast concrete pit cover slabs (1250 x 1250 x 65 mm) (5 nos)	M^3	0.5	25,000	12,695	$ 68.62
D	Precast concrete vent pipe slabs (1250 x 250 x 65 mm) (5 nos)	M^3	0.1	25,000	2,539	$ 13.72
E	Precast concrete service slabs (1250 x 500 x 65 mm) (5 nos)	M^3	0.2	25,000	5,078	$ 27.45
	Sawn form work to:					
F	Sides of slab	M	18	500	9,000	$ 48.65
G	Soffits of concrete slab	M	8	1,000	8,000	$ 43.24
	Hollow sandcrete block work bedded and jointed in cement and sand mortar (mix 1:6)					
H	225mm wall for pit lining	M^2	61	2,900	176,900	$ 956.22
I	100 mm PVC vent pipes	Piece	5	1500	7,500	$ 40.54
	Total of section 3 carried to summary				320,113	$ 1,730.34
4	Superstructure(zinc)					
	Zinc roofing sheet laid at 150 mm and lap and 2 corrugation side laps nailed to:					
A	Walls	M^2	82	850	69,700	$ 376.76
B	Roof	M^2	9.1	850	7,735	$ 41.81
C	Doors	Piece	5	850	4,250	$ 22.97
	Carpentry and joinery					
	Treated sawn hardwood					
D	75mm x 50mm purlin	M	152	120	18,240	$ 98.59
E	75mm x 50mm rafter		25	120	3,000	$ 16.22
	Handrails and support rails					
F	Steel pole, 25 mm bar	Bar	1	3000	3,000	$ 16.22
	Total of section 4 carried to summary				105,925	$ 572.57
	SUMMARY				NAIRA	USD
1	Section 1 Preliminaries				10,000	$ 54.05
2	Section 2 Excavation				69,800	$ 377.30
3	Section 3 Substructure				320,113	$ 1,730.34
4	Section 4 Superstructure				105,925	$ 572.57
	Total for 1 block of 5 compartments emergency latrine				**505,838**	**$ 2,734.26**

Annex 4: Emergency latrine designs

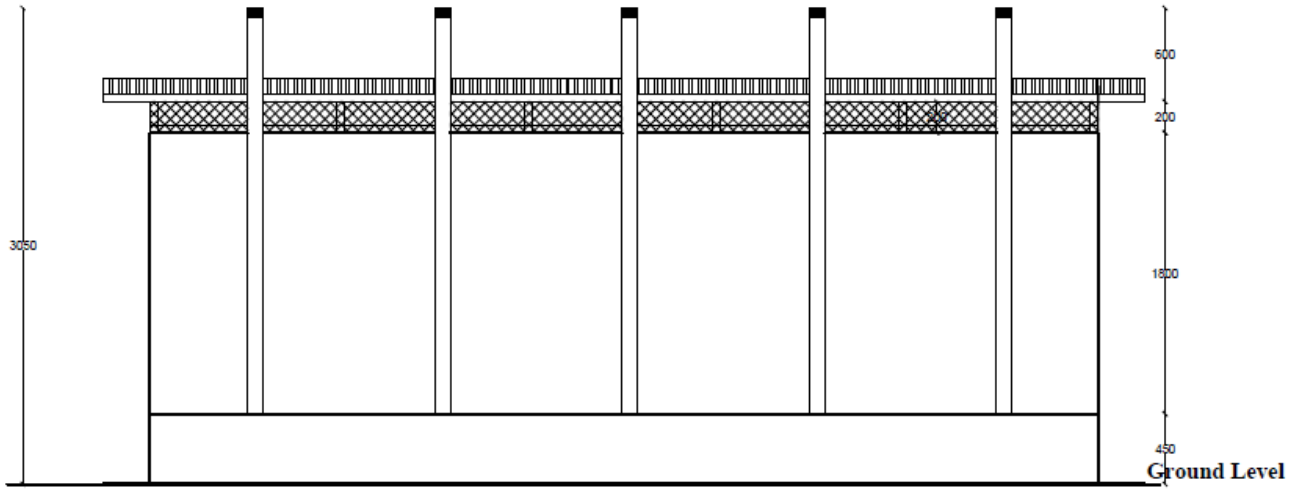


FLOOR PLAN

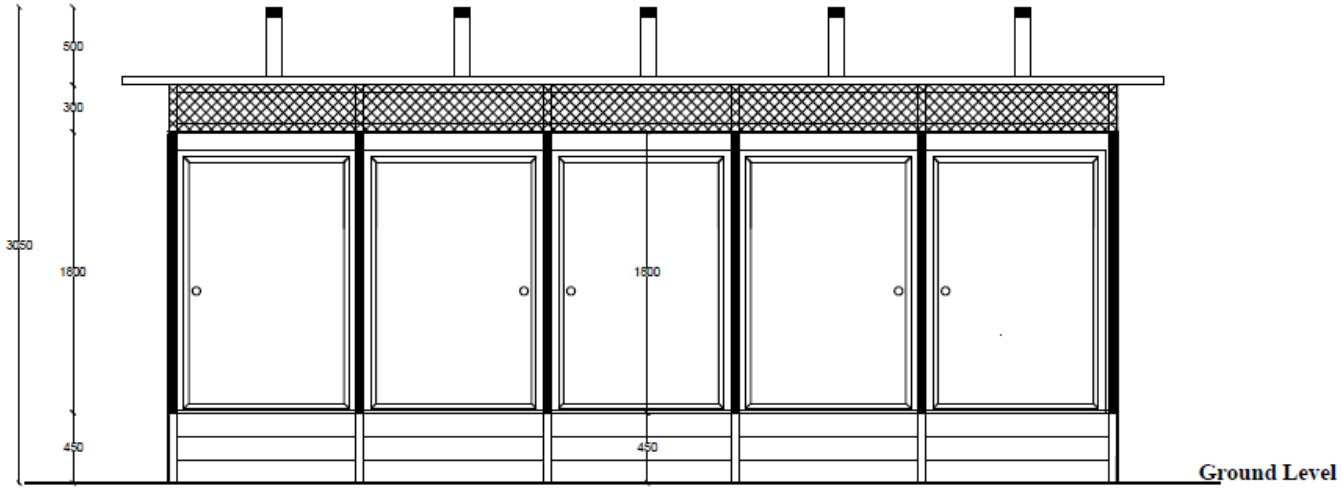


Right View

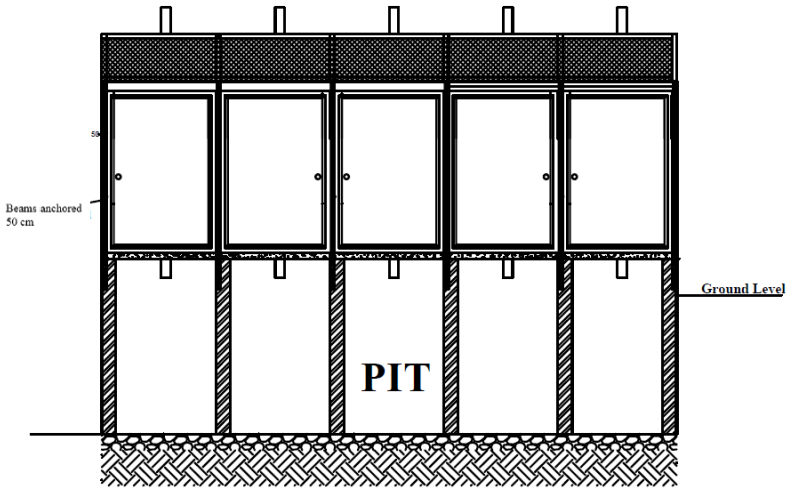
Left View



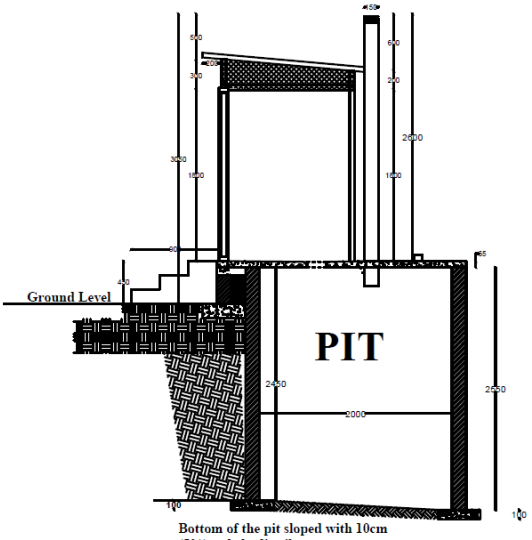
Back View



Front View



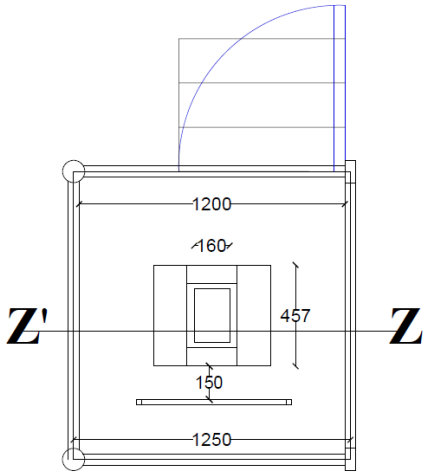
Section X-X'

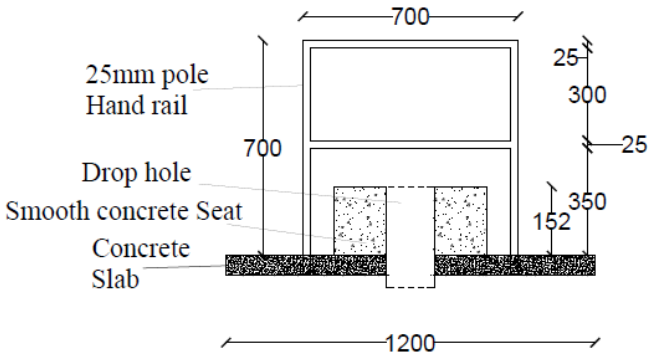


Bottom of the pit sloped with 10cm (5%) to help distribute excreta evenly and fill the pit efficiently

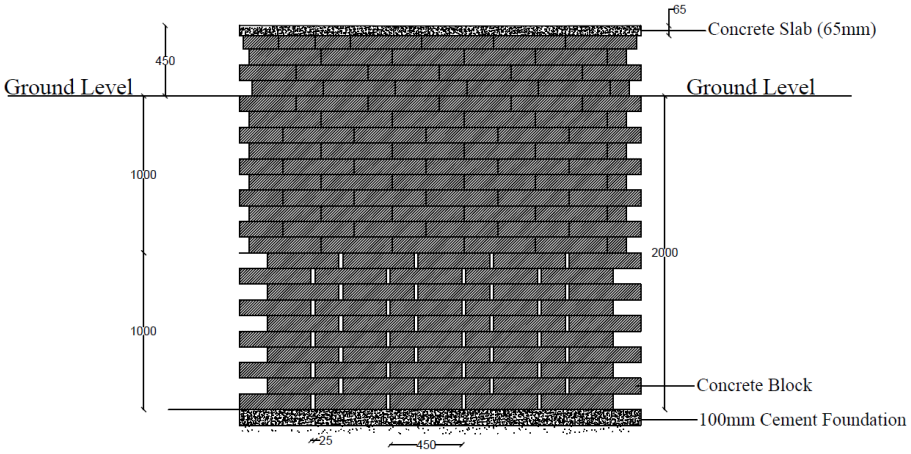
Section Y-Y'

Detail of Disabled Compartment



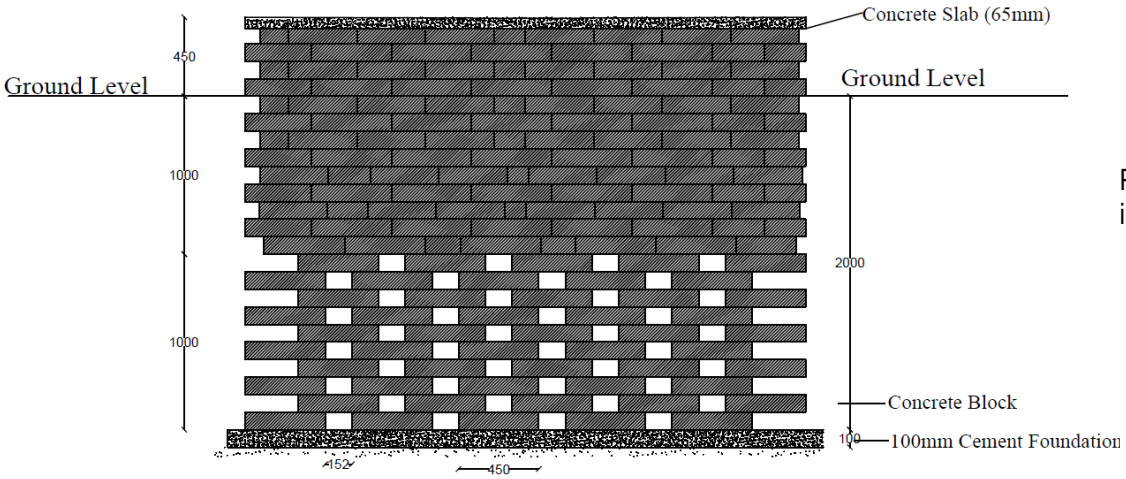


Section Z-Z'



Pit lining without infiltration

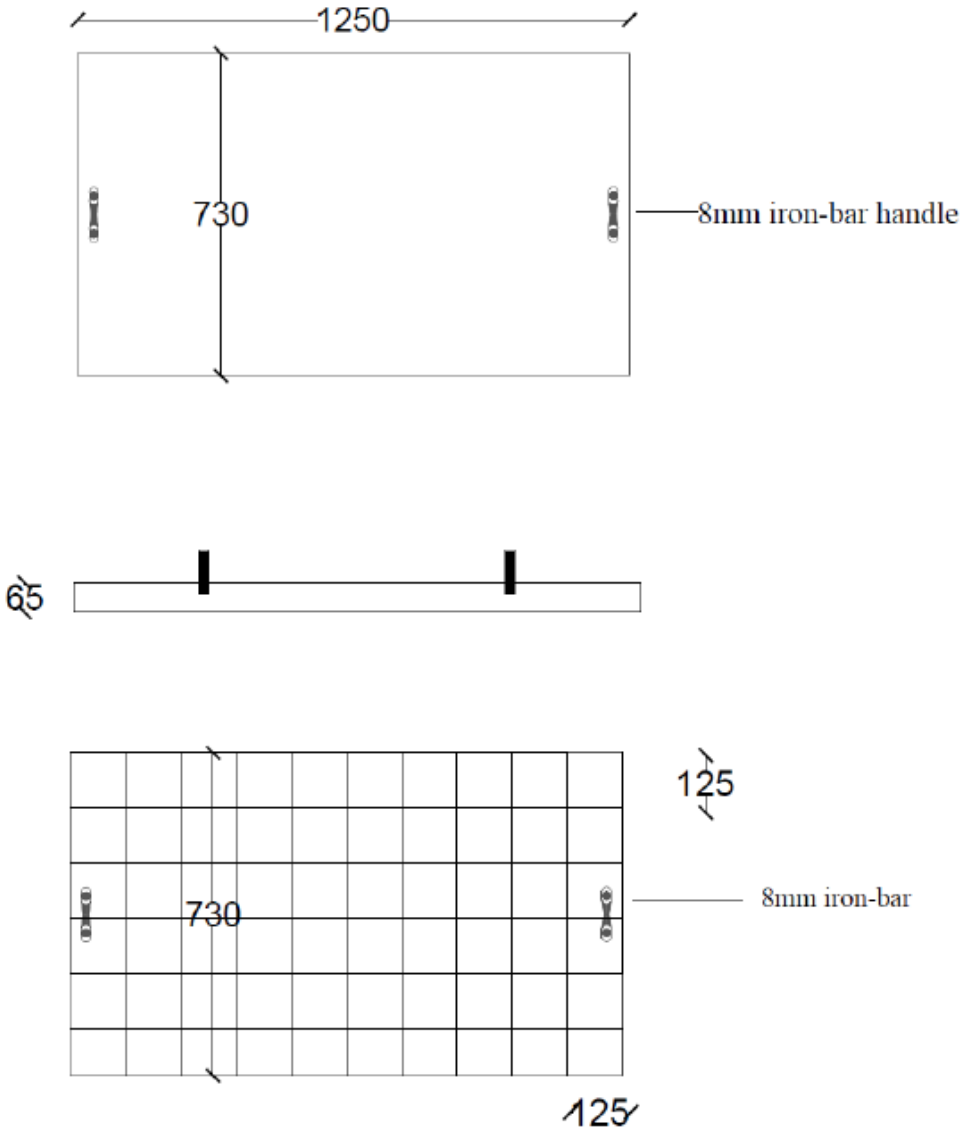
Pit Lining Detail



Pit lining with infiltration

Pit Lining Detail

Service Slab Detail



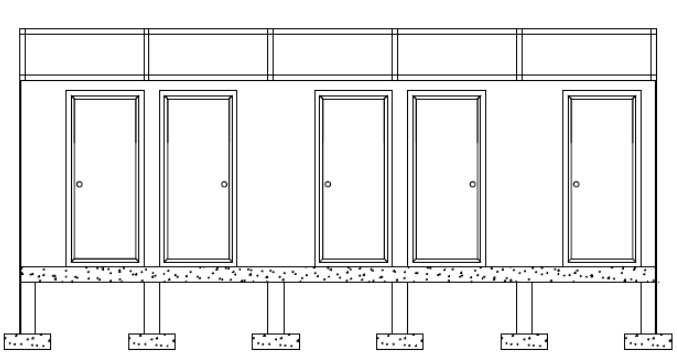
Annex 5: Emergency bathing unit BOQs

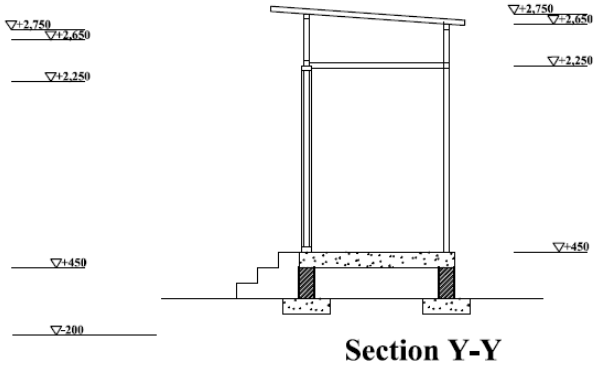
S/N	Description	Unit	Quantity	Unit Cost (naira)	Total Cost (naira)	Total Cost (USD)
1	Excavation and Earth work					
A	Clearing of site	M^2	15	120	1,800.00	$ 9.73
B	Excavate pit for the latrine to a maximum depth not exceeding 2m	M^3	9	2,200.00	19,800.00	$ 107.03
C	Excavate trench to receive concrete in foundation depth not exceeding 700mm starting from the stripped level	M^3	1	750	750	$ 4.05
D	Backfill and ram pit around metal drum spread and remove surplus excavated materials from site	M^3	5	500	2,500.00	$ 13.51
	Total of Section 1 Carried to Summary				24,850.00	$ 134.32
2	Sub-Structure					
	Concrete Works:					
	Plain In-situ concrete (concrete mix – 1:2:4 – 20mm aggregate) in					
E	Floor (100mm thick) as in the drawings	M^3	0.2	25,000.00	5,000.00	$ 27.03
	Reinforced concrete (1:2:4 – 20mm aggregate) in					
F	Precast Concrete pit cover slabs 285x1420x100mm thick (12nos)	M^3	0.9	25,000.00	22,500.00	$ 121.62
	Sawn Formwork to					
G	Sides of slab	M^2	8	1,000.00	8,000.00	$ 43.24
	Block Work					
	Hollow Sandcrete block work bedded and jointed in cement and sand mortar (mix 1:6)					
H	150mm wall	M^2	8	1,500.00	12,000.00	$ 64.86
	Total of Section 2 Carried to Summary				47,500.00	$ 256.76
3	WALLING					
A	Zinc sheet walling vertically nailed	M^2	82	850	69,700.00	$ 376.76
	Carpentry and Joinery					
	Treated Sawn Hardwood					
B	50mm x 50mm Timber	M	152	200	30,400.00	$ 164.32
C	100mm x 50mm Timber	M	10	350	3,500.00	$ 18.92
	Wrought Hardwood					
D	75mm x 50mm Timber	M	155	300	46,500.00	$ 251.35
	Total of Section 3 Carried to Summary				150,100.00	$ 811.35
4	Doors,					
G	Purpose made Zinc fabricated door sizes 750mm x 1200mm high installed complete with hinges, staples, padlocks and keys	No	5	850	4,250.00	$ 22.97
	Total of Section 4 Carried to Summary				4,250.00	$ 22.97
5	Finishes					
	25mm thick cement and sand (1:6) floor screed on					
H	Bed	M^2	10	450	4,500.00	$ 24.32
	Total of Section 5 Carry to Summary				4,500.00	$ 24.32
	SUMMARY FOR SHOWER ROOM					
A	Section 1 Excavation				24,850.00	$ 134.32
B	Section 2 Sub-Structure				47,500.00	$ 256.76

S/N	Description	Unit	Quantity	Unit Cost (naira)	Total Cost (naira)	Total Cost (USD)
C	Section 3 Walling				150,100.00	$ 811.35
D	Section 4 Doors				4,250.00	$ 22.97
E	Section 5 Finishes				4,500.00	$ 24.32
	TOTAL FOR 1 BLOCK OF SHOWER ROOM				**231,200.00**	**$ 1,249.73**

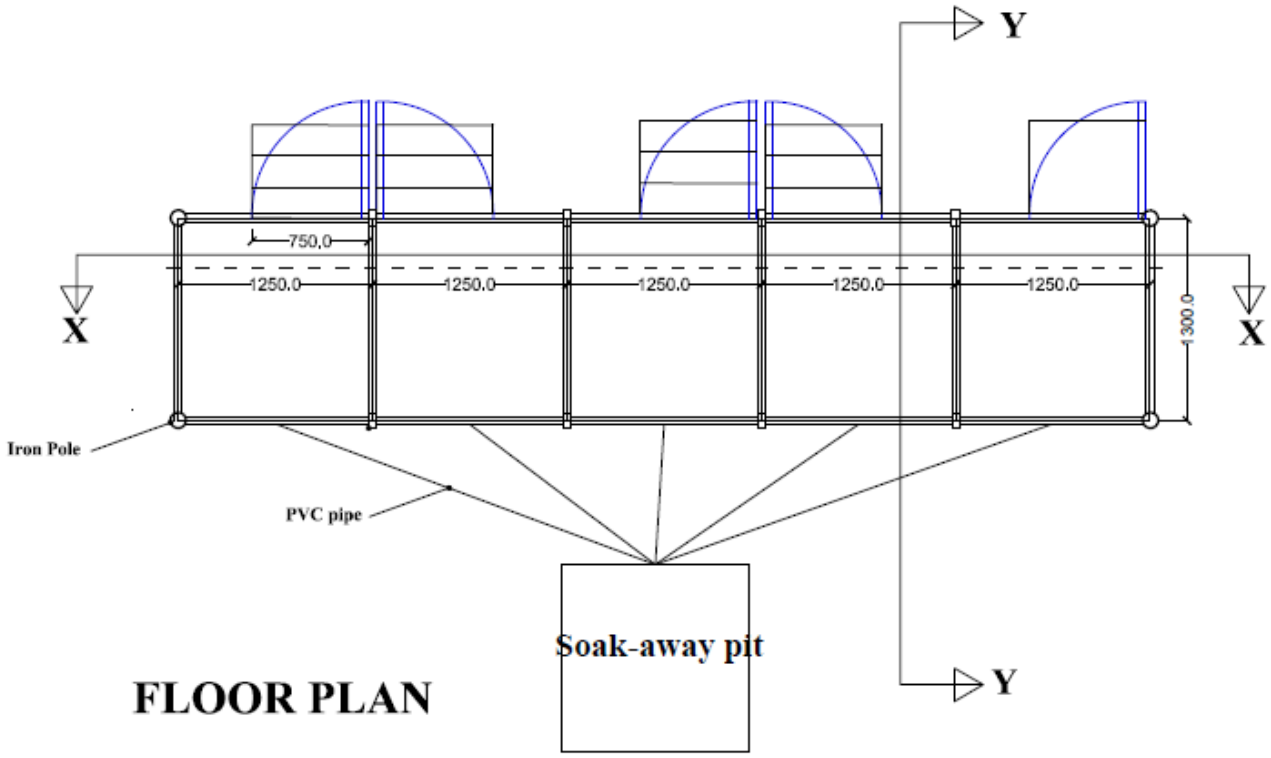
Annex 6: Emergency bathing unit designs

Bathing Facilities (5 rooms)

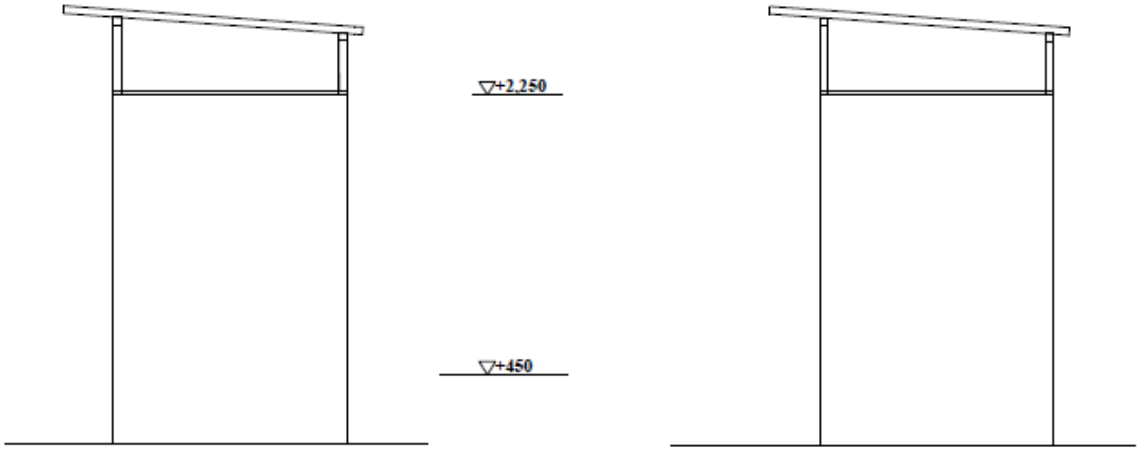




Bathing Facilities (5 rooms)



FLOOR PLAN



Right View

Left View

Annex 7: Solar powered borewell installation (170 m depth, 3 L/s yield)

No	Description	Unit	Quantity	Unit cost (naira)	Total cost (naira)	Total cost (USD)
1	Hydrogeological/geophysical investigation	test	1	100000	100000	$ 541
2	Mobilization of equipment and staff and demobilization of equipment after completion	no	1	200000	200000	$ 1,081
3	Setting up of equipment for drilling and clearing of site after completion	no	1	150000	150000	$ 811
4	Drilling at suitable diameter to install 6 and 5/8" diameter API casing	length	300	8000	2400000	$ 12,973
5	Grain size/sieve analysis	m^3	1	50000	50000	$ 270
6	Installation of steel API 6 and 5/8 casing	length	264	8000	2112000	$ 11,416
7	Installation of 6 and 5/8 stainless steel Johnson screen (42 bars)	length	24	40000	960000	$ 5,189
8	Cleaning and development	no	1	150000	150000	$ 811
9	Gravel packing	m^3	1	20000	20000	$ 108
10	Step draw pumping test/constant discharge test	test	1	100000	100000	$ 541
11	Cement grouting and concrete platform ground well head	m^3	1	50000	50000	$ 270
12	Provide and install well head with opening for pipe connection and pump cable	no	1	50000	50000	$ 270
13	Installation of 5.5 hp solar submersible pump complete with accessories	no	1	2000000	2000000	$ 10,811
14	Installation of rising main pipe 3"	no	90	30000	2700000	$ 14,595
15	20,000 L PVC tank on 6 m steel stand	piece	1	110000	110000	$ 595
16	200 m water network with array of taps	length	1	546000	546000	$ 2,951
17	Water quality analysis (physical, chemical, and bacteriological)	test	2	20000	40000	$ 216
18	Final report	report	1	10000	10000	$ 54
					Naira	USD
	Total cost				**11,748,000**	**$ 63,503**

Annex 8: Installation of new handpump (sedimentary formation)

SN	DESCRIPTION	UNIT	QUANTITY	UNIT COST (naira)	TOTAL COST (naira)	TOTAL COST (USD)
1	Conduct geophysical survey (field work, interpretation and report) for the location of borehole at a suitable site	LS	1	50,000	50,000	$ 270
2	Project mobilization and demobilization of equipment and personnel to and from site form contractor's base office	LS	1	50,000	50,000	$ 270
3	Inter sites mobilization and demobilization of equipment and personnel	LS	1	30,000	30,000	$ 162
4	Drilling of borehole in sedimentary formation	M	70	4,000	280,000	$ 1,514
5	Installation of 110mm diameter uPVC casings (threaded ends) of 10 bar pressure rating	M	61	1,000	61,000	$ 330
6	Installation of 110mm diameter uPVC screens (threaded ends) of 10 bar pressure rating; slot size 0.5-1.0mm (factory slotted)	M	9	1,500	13,500	$ 73
7	Supply and place river gravel/sharp sand for gravel packing	LS	1	25,000	25,000	$ 135
8	Borehole development with air compressor till water is clear, clean and silt free and disinfect	LS	1	50,000	50,000	$ 270
9	Conduct borehole pumping test (constant discharge/recharge) for not less than 3 hours	LS	1	30,000	30,000	$ 162
10	Conduct water quality analysis (physical, chemical and bacteriological)	LS	1	20,000	20,000	$ 108
11	Provide and place cement grout down to 5 m from surface to protect borehole from contamination	LS	1	25,000	25,000	$ 135
12	Construct platform on borehole using standard shutters, mix of 1:2:4	LS	1	50,000	50,000	$ 270
13	Install to designed depth 1 hand pump and risers	LS	1	75,000	75,000	$ 405
14	Provide 5 copies of spiral bound report of work with a soft copy on CD	COPY	5	3,000	15,000	$ 81
					Naira	USD
	TOTAL				**739,500**	**$ 3,997**

Annex 9: Cost estimations for various water infrastructure installation options[29]

Description of Scheme	Persons served	Project cost (naira)	Project cost (USD)
Hand dug well fitted with hand pump	250	523,500	$ 2,830
Hand pump borehole	250	902,300	$ 4,877
Hand pump borehole for flood prone areas	250	962,300	$ 5,202
Hand pump with animal trough	250	962,300	$ 5,202
Hand pump borehole with treatment (Iron removal)	250	1,302,300	$ 7,039
Hand washing facility with force lift hand pump	250	952,300	$ 5,148
Single stroke engine (*Tif-Tif*) powered borehole	1000	4,284,310	$ 23,158
Small unit solar powered motorized borehole	750	3,094,000	$ 16,724
Diesel generator powered motorized borehole	2500	23,269,250	$ 125,780
Solar powered 24000L x 12 m motorized borehole	4000	9,785,900	$ 52,897
Solar powered 24000L x 9 m motorized borehole	4000	9,060,900	$ 48,978
Solar powered 12000L x 12 m motorized borehole	2000	6,695,900	$ 36,194
Solar powered 12000L x 9 m motorized borehole	2000	6,550,900	$ 35,410
Solar powered 24000L x 12 m motorized borehole with primary and secondary treatment units - aeration, sedimentation and disinfection	2000	13,586,000	$ 73,438
Solar powered 24000L x 12m motorized borehole with primary and secondary treatment units - aeration, sedimentation and disinfection	2000	10,556,000	$ 57,059
Solar powered 24000L x 9m motorized borehole with primary and secondary treatment units - aeration, sedimentation and disinfection	2500	13,441,000	$ 72,654
Solar powered 12000L x 9m motorized borehole with primary and secondary treatment units - aeration, sedimentation, and disinfection	2000	13,441,000	$ 72,654
ND solar powered 24000L x 12m motorized borehole with primary and secondary treatment units - aeration, sedimentation, and disinfection	4000	11,306,000	$ 61,114
ND solar powered 12000L x 12m motorized borehole with primary and secondary treatment units - aeration, sedimentation, and disinfection	2000	9,626,000	$ 52,032
ND solar powered 24000L x 9m motorized borehole with primary and secondary treatment units - aeration, sedimentation, and disinfection	4000	11,161,000	$ 60,330
ND solar powered 12000L x 9m motorized borehole with primary and secondary treatment units - aeration, sedimentation, and disinfection	2000	9,481,000	$ 51,249
ND solar powered 24000L x 12m motorized borehole with biological treatment units - micron filter and UV	2500	8,440,900	$ 45,626
ND solar powered 12000L x 12m motorized borehole with biological treatment units - micron filter and UV	2000	6,760,900	$ 36,545
ND solar powered 24000L x 9m motorized borehole with biological treatment units - micron filter and UV	4000	8,223,900	$ 44,454
ND solar powered 12000L x 9m motorized borehole with biological treatment units - micron filter and UV	2000	6,543,900	$ 35,372
Spring source development (reinforced concrete tank with concrete cover)	2000	5,978,900	$ 32,318

[29] Source: Adapted from Source Water Ltd report, Summary of WASH package feasibility study report in 28 LGAs of 14 states, contracted by UNICEF Nigeria and funded by the European Union, 2014

Annex 10: Water infrastructure design examples[30]

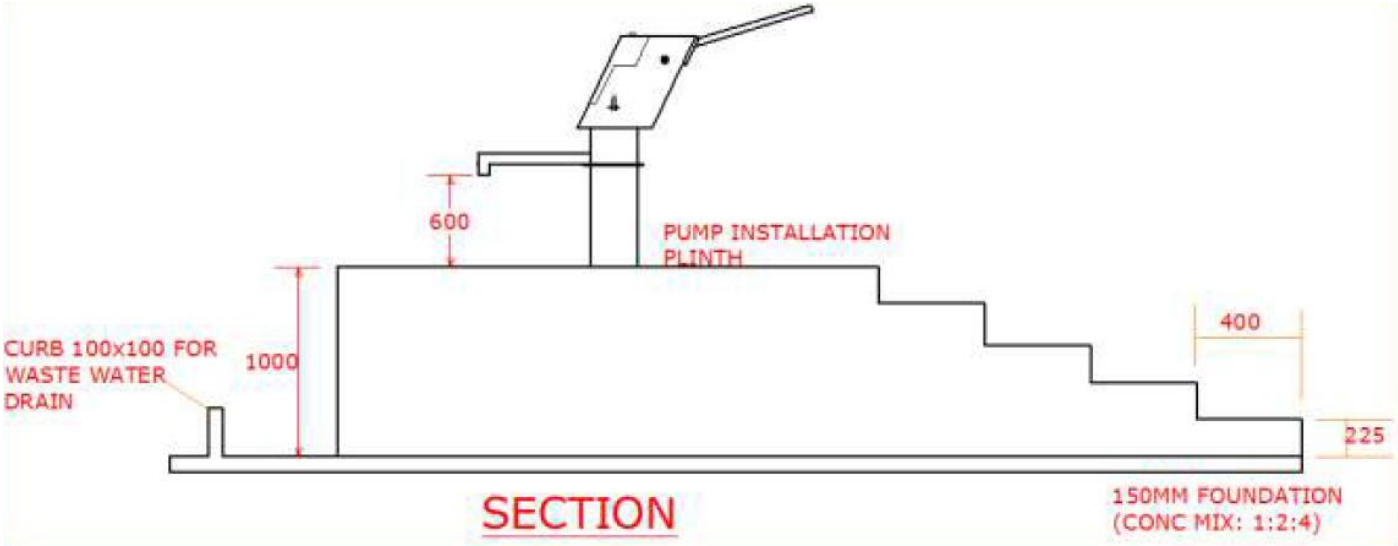


Figure 51: Elevated handpump platform for flood-plain areas

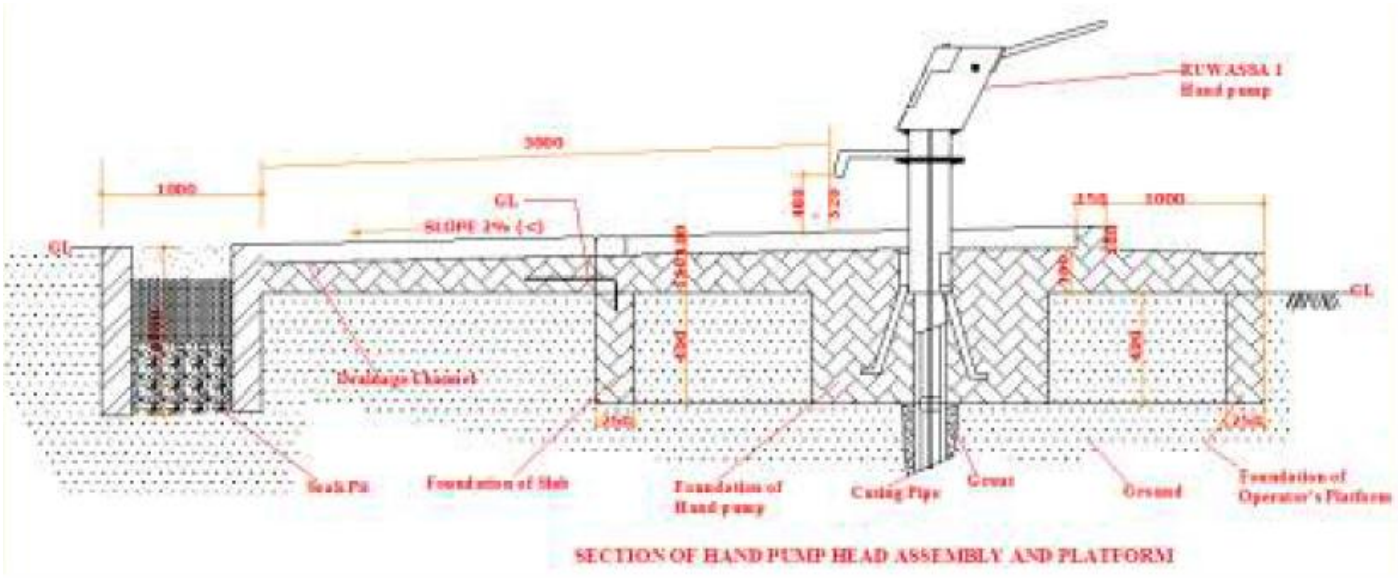


Figure 52: Handpump platform with soakaway pit

[30] Source: Adapted from Source Water Ltd report, Summary of WASH package feasibility study report in 28 LGAs of 14 states, contracted by UNICEF Nigeria and funded by the European Union, 2014

Figure 53: 24,000 L PVC tanks on 12 m stanchion

Head requirement (m)	Flow/day (Lit)	Recommended pump type	System Wattage (Min)	No. of 85W panels (Min)	Design type
40	12,000	SQF 2.5-2/3A-10	650	8	A
40	24,000	SQF 2.5-2/3A-10	1650	20	B
60	12,000	SQF 2.5-2	1,000	12	C
60	24,000	SQF 2.5-2	2,000	24	D
80	12,000	SQF 2.5-2	1,150	14	E
80	24,000	SQF 2.5-2	3,200	40	F
100	12,000	SQF 2.5-2	1,650	20	G
120	12,000	SQF 1.2-3	2,550	30	H
140	11,000	SQF 1.2-3	2,550	30	I
160	11,000	SQF 1.2-3	3,200	40	J

Table 29: Pump and wattage sizing guide for solar systems

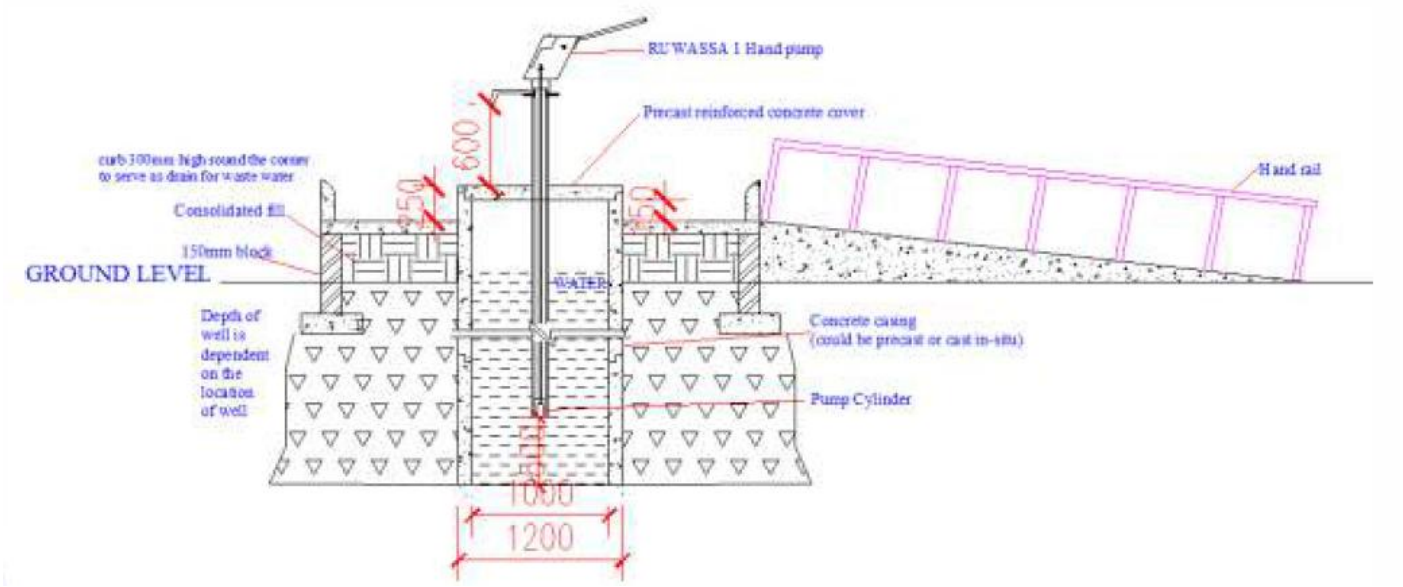


Figure 54: Hand dug well fitted with handpump

Annex 11: Regular WASH monitoring

Regular WASH Monitoring	
Functionality of water taps	• How many taps are broken that require replacement?
Flow rates of water from taps	• Measure the time required to fill a jerrycan of known volume at various water points
Hand pump functionality	• Confirm that water is available through observation
Volume of emergency water provided	• Review water meters
Queue time	• Record the time required from the end of the queue to fill a water container for a sample of users
Number of individuals accessing the water points	• Inquire with camp management for the number of IDPs in the camp • Are community members accessing the water points?
Hours of tap operation	• Ask WASHCOMs what the current hours of operation are • Confirm operation hours through observation and inquiring with users
Functionality of generators	• Observe generators on site • Are generators working? • Is lubricant available for generators?
Fuel consumption for generators	• Review purchase logs for fuel • Confirm generator operation hours with WASHCOMs
Functionality of solar panels and inverters	• Observe pump functionality during peak sun hours
Transmissibility of solar panels	• Observe levels of dust and debris on solar panels
Functionality of WASHCOMs	• Review meeting minutes and finance logs • Are WASHCOM responsibilities being completed?
Chlorine residual levels at the point of delivery	• Pooltesters at the water tap (0.5-1.0 mg FRC/L)
Turbidity of water at the point of delivery	• Turbidity test with water from the water tap using clear container
Fecal coliforms at the point of delivery	• Water sample taken from tap in sterilized container
Chlorine residual levels for a sample of households	• Pooltester sample taken from household storage containers (0.2-0.7 mg FRC/L)
Fecal coliforms for a sample of households	• Sample taken in sterilized container from household storage containers
Water quality testing for Nigerian Standard for Drinking	• Water sample taken from tap in sterilized container analyzed at NAFDAC or other approved laboratory at the time of the pump installation
Functioning latrines	• Observe latrines to ensure superstructures are intact and provide privacy for users • Observe pit content depth • Does the latrine require desludging? • Are users discarding solid waste materials in the pit (i.e., sanitary pads, bottles, or other solid waste)?
Inclusive latrine facilities available	• Consult with disabled populations to identify preferences and any challenges with the latrine facilities • Are the latrines accessible by disabled and elderly users?
Sites being desludged regularly	• Maintain regular logs of desludging frequencies, latrines serviced, and populations served
Sanitation workers trained and actively maintaining latrines disaggregated by sex	• Maintain lists of active sanitation committee members trained, disaggregated by sex • Consult sanitation committee members to identify challenges or issues • Observe latrine cleanliness • Is feces visibly present inside or outside of the latrine?
Functionality of bathing units	• Are superstructures of bathing units intact, physically separated by gender, and providing sufficient privacy? • Is water draining away from the bathing units and shelters?

Regular WASH Monitoring	
NFIs	• Do households have water storage and transport containers in the household? • Do households have soap available? • Do households have a buta available?
Health facilities	• Is hand washing station in place? • Does the health facility have chlorinated water available on site? • Does the health facility have latrines on site?
Drainage infrastructure	• Are soakaway pits full or clogged? • Is water able to drain from water points, laundry areas, hand washing stations, and bathing units?
Clogging of irrigation ditches	• Are irrigation ditches filling with solid waste or soil?
Stagnant pools	• Are any stagnant pools visible that require filling?
Environmental sanitation	• Is feces or solid waste visibly present in the communal areas?
Hygiene promotion	• Do hygiene promoters understand the correct dosage for any POU chlorine products being distributed? • Do hygiene promoters know how to prepare ORS? • Do hygiene promoters understand the purpose of all NFIs? • Do hygiene promoters know key cholera and hygiene messages? • Review hygiene promoter logs for frequency of sessions or household visits

Annex 12: Emergency latrine construction checklist

Latrine Construction Checklist

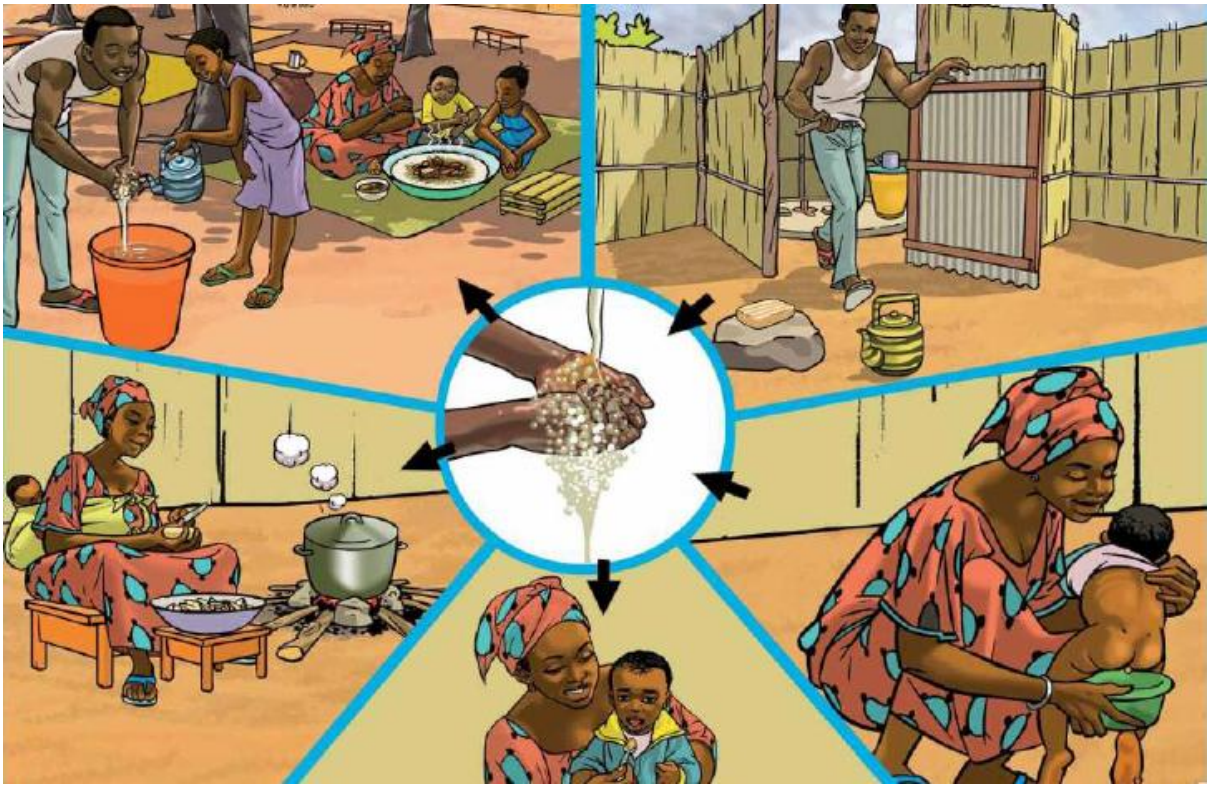
Reviewer: _____

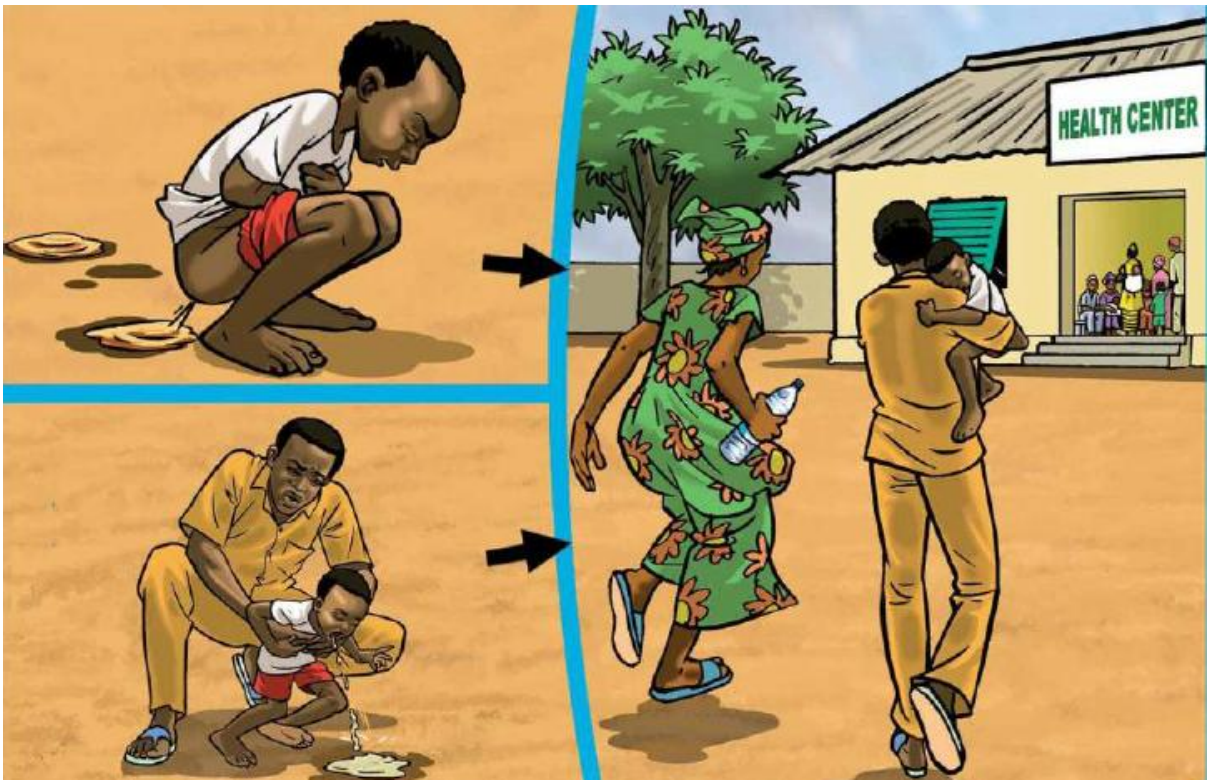
Date: _____

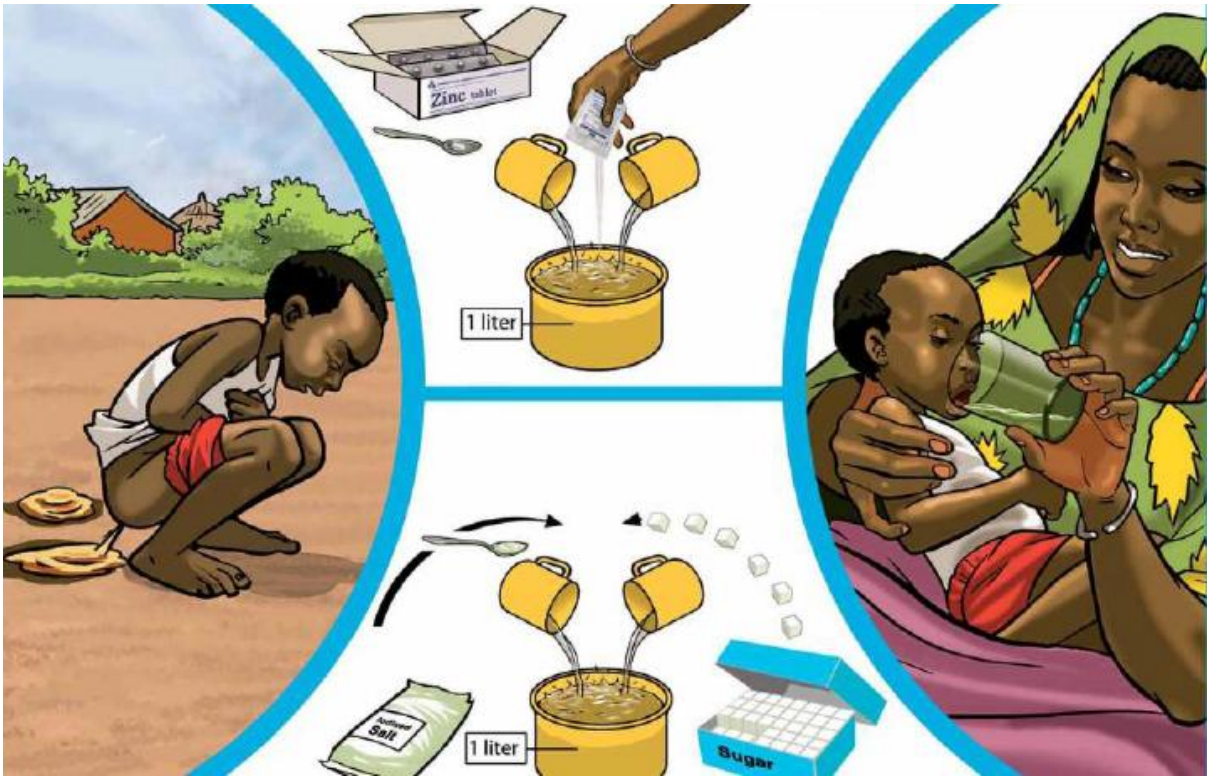
Siting	
Latrines are sited more than 6 m from shelters	
Latrines are sited less than 50 meters from shelters	
Latrines are sited more than 30 m from water sources	
Prevailing wind faces back of latrine (high wind areas)	
Site latrines along walls if possible to reduce wind exposure	
Excavation	
Pit depth measured to a minimum of 2 meters below ground level	
Pit lining	
100 mm concrete foundation for brick lining	
Brickwork for pit lining is fully lined for the top 1 meter of the pit	
Latrine slab	
Latrine slab for compartment is a minimum of 65 mm with 8 mm reinforced bar placed every 125 mm	
Latrine slab is not connected to service slab	
Concrete is cast using the keyhole form	
Slab length extends full length of pit lining bricks (end of the bricks)	
Frames are anchored 50 cm into the concrete	
Sufficient space is available to place sheeting between vent pipe slab and latrine slab	
Ventilation pipe slab	
Ventilation pipe slab is not connected to latrine slab or service slab	
Slab leaves sufficient spacing for installation of ventilation pipe (>100 mm) at each compartment	
Sufficient space is available to place sheeting between vent pipe slab and latrine slab	
Concrete	
Sufficient water is on site for concrete mixing	
Concrete is mixed at 1:2:4	
Service slab	
Service slab for compartment is a minimum of 65 mm with 8 mm reinforced bar placed every 125 mm	
Service slab is not connected to ventilation pipe slab or latrine slab	
8 mm reinforced bar handles are placed on both sides of the slab	
Stairs	
Stairs are no taller than 15 cm	
Stairs have a minimum depth of 30 cm	
Frames	
Wood is hardwood and termite treated	
Frames are constructed with individual pieces (not pieced together)	
Frames extend 2.1 meters in the front and 2.0 meters in the back past slab	
Protruding nails are bent back	
Roof beams are connected to frames with strapping (*langa langa*)	
Superstructure walls	
Sheeting has a minimum thickness of 0.8 mm	
Sheeting is lapped two corrugations	
Galvanized nails are used for securing sheeting	

Roofing or convex nails are used for securing sheeting	
Protruding nails are bent back	
Walls have no openings between joints	
Ventilation pipe is outside of superstructure walls	
Doors have lockable wooden frames	
Roofing	
Overlap of sheets is a minimum of 30 cm	
Sheets are nailed on the ridges and eaves on every corrugation	
Sheets are nailed on the laths on every other corrugation	
Roofing or convex nails or screws are used to secure the roofing sheets	
Sheeting extends 20-30 cm from the frame (no more than 30 cm) on the front and back	
Roof is no more than 30 cm higher than the walls in the front and no more than 20 cm in the back	
Ventilation pipe	
Ventilation pipe is installed extending 50 cm below the slab	
Ventilation pipe extends 50 cm past the tallest roof height (60 cm past lower height)	
Ventilation pipe is sealed into the ventilation pipe slab with concrete	
Ventilation pipe is secured to top of the frames using strapping around pipe	
Handrails and supports	
Handrail is installed at a height of 70 cm above the ground and stairs on one chamber	
Handrail is secured into the ground using concrete if necessary at back side of keyhole	
Handrail is secured into the top of the stairs	
Support rail is secured to the latrine slab using concrete on one chamber	
Bricks are placed around keyhole opening and covered with smooth concrete on one chamber	
Finishing	
Service slab is placed on the service entry opening (not sealed)	
Locks are installed on inside of latrine	
Self-closing coil hinge is connected to doors	
Soil is backfilled around pit lining and rammed (compacted) at regular intervals	
Site is cleared of debris or excess soil	

Annex 13: Key cholera messages







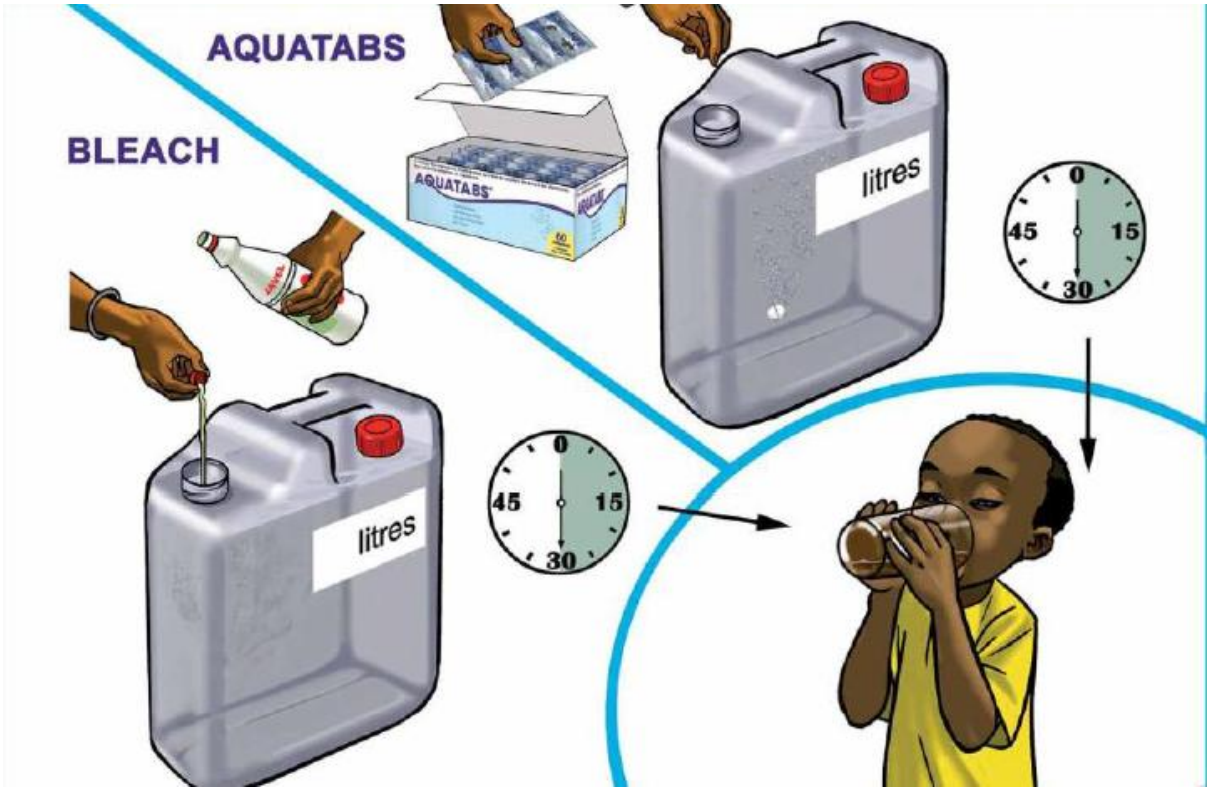


Figure 55: Cholera messaging, Source: UNICEF, Protecting ourselves from cholera

Annex 14: Batch chlorination

Preparation of 1% chlorine stock solution
1L of 1% chlorine solution = 14 g HTH (70% available chlorine) = approximately 1 heaped teaspoon

Jar testing
Once the stock solution is prepared, jar testing will determine the amount of chlorine required to meet the chlorine demand and provide the desired residual.

1. Fill four buckets with 20 L of water from the water point being tested
2. Add increasing amounts of stock solution to each bucket

3. Stir each bucket for 30 seconds
4. Wait 30 minutes to allow sufficient contact time with chlorine
5. Measure the residual chlorine levels in each bucket
6. Select the bucket (solution) that provides a chlorine residual between 0.5 and 1.0 mg/L
7. Repeat the process with higher doses if none of the buckets have sufficient chlorine residual

Determining chlorine dosing
For batch chlorination the volume of 1% solution required would be the volume determined in the method above multiplied by the volume of storage being chlorinated. As an example if the third bucket above provided the desired chlorine the following would be calculated for a 5,000 L storage tank:

1% chlorine solution (L) = (2 mL / 20 L) x 5,000 L storage x (1 L / 1,000 mL) = 5 L

If the tanks are filled and dosed twice per day the volume of solution required each day would be 10 L.

Residual testing
Chlorine residual testing should be done daily for the first week and then weekly following the first week for the duration of the rainy season and/or cholera outbreaks.

Identify safe storage and mixing areas and provide equipment for staff or volunteers to safely mix chlorine solutions. Due to the corrosive nature of liquid and powdered chlorine all staff or volunteers responsible for mixing and dosing water supplies must be trained in the safe handling of chlorine. Chlorine should be stored in a dry area where only individuals authorized to handle chlorine have access.

Annex 15: Percolation tests

Percolation tests can provide a quick estimation of infiltration rates to plan for latrine pit filling times and to determine the feasibility for soakaway pits for greywater (shower and laundry facilities). Due to the variable soil strata percolation test depths should correspond to the anticipated soakaway pit or latrine pit depth.

Step 1: Dig steps at different depths (See photo below as an example.)

Figure 56: Percolation test step digging, Source: MSF Nigeria

Step 2: Dig square holes into the different steps (300 mm x 300 mm x 300 mm)

Step 3: Insert 6 inch nails or other markers 75 mm above the bottom of the hole and 75 mm below the top of the hole, leaving 150 mm between the two markers

Step 4: Fill the holes with clear water and allow to drain by infiltrating the soil (overnight for slow rates)

Step 5: After the holes have drained, fill them with clear water

Step 6: Measure the time to drain from the first nail to the second nail

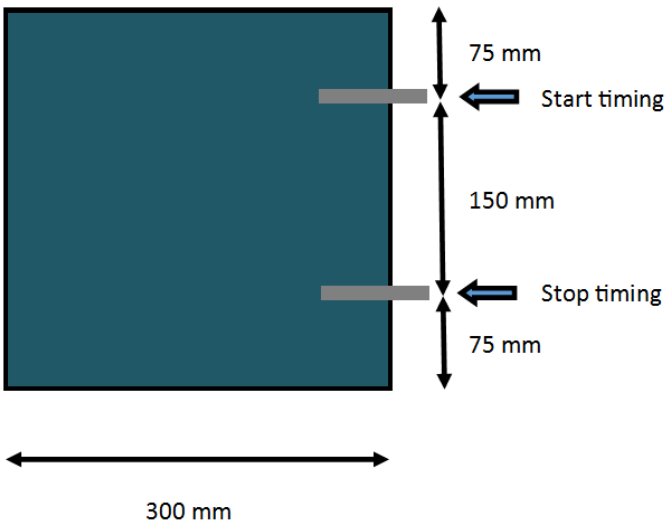


Figure 57: Percolation test example

Step 7: Repeat Steps 1 through Step 6 three times to determine the average time

Annex 16: Minimum WASH standards

Harmonized Minimum Standards for the Nigeria WASH Sector Emergency Response (August 2016)		
Life-Saving	**Recovery**	**Comments**
Target Groups: Formal IDP camps Informal IDP camps Access constrained IDP camps Hosted IDPs (host communities) Access constrained hosted IDPs (host communities) Transit returnee camps	**Target Groups:** Returnees Returnee communities Former host communities	
WATER QUANTITY		
15 L/p/d 250 maximum people per tap or faucet [4] 500 people per handpump 400 people per single user protected well 500 m maximum distance from the water point 1,500 L storage tank for every 400 people in camps 60 L/p/d per patient for cholera centers 30 L/p/d for inpatients in feeding centers 5 L/p/d for outpatients in health facilities 40 L/p/d for inpatients in health facilities	30 L/p/d 120 maximum people per tap or faucet [5] 500 people per handpump 400 people per single user protected well 500 m maximum distance from the water point 60 L/p/d per patient for cholera centers 30 L/p/d for inpatients in feeding centers 5 L/p/d for outpatients in health facilities 40 L/p/d for inpatients in health facilities 4 L/p/d per student in schools	Drinking, bathing/personal hygiene, clothes washing, and cooking 120 considering provision for only four hours per day [6] Storage calculated based on pump capacity or water trucking frequency, population served, hours of operation, and number of functioning taps Drinking, hand washing, and anal cleansing
WATER QUALITY		
Household water quality monitoring 0.5 mg free residual chlorine/L 0 fecal coliforms/100 mL at point of delivery Maximum 5 NTU Chemical water quality analysis meeting 2007 Nigerian Standard for Drinking Water Quality	Not to exceed 0.25 mg free residual chlorine/L excepting cholera outbreaks 0 fecal coliforms/100ml at point of delivery Maximum 5 NTU Chemical water quality analysis meeting 2007 Nigerian Standard for Drinking Water Quality	0.25 is national standard, treated piped water, rainy season Low risk of fecal contamination; minimize post-delivery contamination Initial source testing not to be repeated if standards are met [7], for medium to long-term infrastructure, see guidance for emergency considerations and parameters excluding source for emergency water
SANITATION		

Harmonized Minimum Standards for the Nigeria WASH Sector Emergency Response (August 2016)

50 persons/latrine Distance of latrines minimum 30 m from any water source Distance of latrines less than 50 m from shelters Distance of latrines more than 6 m from shelters Lock on inside of stall 1:3 male/female ratio, physically separated and demarcated where household latrine not possible 1 latrine/household in host communities (latrine kit) Provision for child feces collection and disposal Provision for disabled toilet based on population of disabled users Ratio of male/female sanitation committee members is equal to latrines (1:3 male/female ratio) 25 persons/latrine in feeding centers Latrines in health clinics (1 per 20 beds or 50 outpatients) in camps	Distance of latrines minimum 30 m from any water source 1 latrine per household Latrines in feeding centers (1 per 20 adults, 1 per 10 children) Latrines in health clinics (1 per 10 beds or 20 outpatients) Latrines in public market (1 per 20 stalls) Latrine in school (1 per 30 girls or female staff, and 1 toilet per 60 boys or male staff)	Communal latrines for camp settings only As relevant depending on water source and type of latrines No external locks on latrines in camps unless household level Communal latrines for camp settings only Host community and returnee contexts Based on consultation with disabled and elderly users Communal latrines for camp settings only See guidance for WASH package in nutrition centers 1 per 10 beds or 20 outpatients in host community health facilities Consider relevance with any ongoing CLTS programs
HYGIENE		
NFIs 2x10L non-collapsible jerry cans + 20L bucket with lid per household [8], [10] 250 gram bathing soap/person/month 200 gram laundry soap/person/month Suitable materials for menstrual hygiene management	**NFIs** 2x10L non-collapsible jerry cans + 20L bucket with lid per household [8], [10]	**NFIs** Collapsible for hard to access areas, one jerrycan for transport, one jerrycan for storage, and one bucket for washing [9], [10] Refer to harmonized kits and guidance document Refer to harmonized kits and guidance document Based on consultation with affected females
Bathing Units 100 persons/ bathing unit Bathing units are physically separated and demarcated with lock on inside 1:3 male/female ratio	**Bathing Units**	**Bathing Units**
Handwashing 2 L kettle for hand washing and anal cleansing per household Handwashing stations with liquid soap at feeding centers, health facilities, and communal feeding areas	**Handwashing** Handwashing stations with liquid soap at feeding centers and health facilities	**Handwashing**

Harmonized Minimum Standards for the Nigeria WASH Sector Emergency Response (August 2016)

Hygiene Awareness Ratio of female:male hygiene promoters is equal to IDPs in camps	**Hygiene Awareness**	**Hygiene Awareness** Hygiene promotion targeted by gender in camps
SOLID WASTE MANAGEMENT		
Roll-on roll-off bins available for camp settings Biweekly removal of waste from roll-on roll-off bins Communal waste areas not more than 100 m from shelters Volume of communal bins to allow for 100 L per 10 families Daily emptying of communal bins through waste management committees Burn and burial sites where removal not possible	 Burn and burial sites where removal not possible	Coordination with MoEnv Coordination with MoEnv
DRAINAGE		
Drainage away from shelters sufficient to prevent risks to IDPs and neighboring affected populations at all water points, hand washing stations, and bathing units	Rehabilitation/extension/upgrading of drainage network	
VECTOR CONTROL		
Filling of static water pools in camps with soil		Formal and informal camp settings

[1] 43,200 L/day/borewell; 2 L/s x 6 hours sunlight/day for small solar powered borewell = 2,880 people per borewell
[2] 86,400 L/day/borewell; 4 L/s x 6 hours sunlight/day for solar powered borewell = 5,760 people per borewell
[3] 129,600 L/day/borewell; 6 L/s x 6 hours sunlight/day for solar powered borewell = 8,600 people per borewell
[4] 0.125 L/s/tap; 8 hrs of water supplied x 15 lts/pers/day = 240 people per tap
[5] 0.125 L/s/tap; 8 hrs of water supplied x 30 lts/pers/day = 120 people per tap
[6]: 0.125 L/s/tap; 4 hrs of water supplied x 15 lts/pers/day = 120 people per tap
[7]: Water quality testing recommendations are based on assumption of groundwater sources and should be reviewed and revised for surface water use
[8]; Considering that the life span of non-collapsible jerrycan is one year
[9]: Considering that the life span of collapsible jerrycan (if used) is 3 months
[10]: Harmonized hygiene kit includes one 25L non-collapsible jerry can and one 10L non-collapsible jerry can which exceeds the standard

Annex 17: Emergency WASH thresholds

Emergency WASH Prioritization Criteria Indicators for Nigeria (August 2016)							Alert level				
Category	No	Theme	Indicators	Tools	Description	Value	1	2	3	4	5
Thresholds for Emergency Response	1.1	Health	Diarrhea rates among children under 5 in the last two weeks	Household survey, clinic reports	(%) [number of children under 5 years old who have diarrhea (including bloody) within 2 weeks (14 days) prior to the survey] / [total number of children in households surveyed]	0%	<=10%	>10%	>20%	>25%	>35%
	1.2		Cholera rates	Health clinic reports, CTC reports	[number of cholera cases reported in the previous week per LGA]	0	0	>0	>10	>20	>30
	2.1	Density	Population increase due to displacement	DTM, rapid assessments, population statistics	(ratio) [number of IDPs in camp or ward for urban areas and camp or village in rural areas] / [number of existing households in camp or ward for urban areas and camp or village for rural areas]	0	<=0.1	>0.1	>0.2	>0.3	>0.5
	2.2		Population of IDPs	DTM, rapid assessments, population statistics	[number of IDPs in formal and informal camp]; informal camp defined as settlement of more than 20 IDPs or five families	0	<=100	>100	>500	>1000	>5000
	3.1	Nutrition	Global acute malnutrition rates	Emergency Nutrition sector	(%) [number of SAM cases reported by camp, ward, or village] + [number of MAM cases reported by camp, ward, or village] / [total number of children per camp, ward, or village]; SAM defined as middle upper arm circumference (MUAC) <11.5 cm or oedema; MAM defined as MUAC <12.5 cm and >11.5 cm	0%	<5%	>=5%	>8%	>10%	>15%
	3.2		Severe acute malnutrition rates	Emergency Nutrition sector	(%) [number of SAM cases reported by camp, ward, or village] / [total number of children per camp, ward, or village]; SAM defined as MUAC <11.5 cm or oedema	0.00%	<0.5%	>0.5%	1%	1.5%	2%
WASH Prioritizatio	4.1	Water	Percentage of households using a source of improved drinking water with easy access by distance	Household survey, engineering reports	(%) [number households using a source of improved drinking water within less than 500 m or 30 minutes walking distance] / [total number of households surveyed]; e.g., handpump, borewell, treated surface water	100%	>40%	>30%	>20%	>10%	<=10%

Emergency WASH Prioritization Criteria Indicators for Nigeria (August 2016)							Alert level				
			(<500 m) and time (<30 minutes) to a protected water resource								
	4.2		Average number of liters of water used per person per day	Regular WASH monitoring	(L/p/d) [total volume of storage at source] x [number of times these tanks are filled per day] / [number of individuals utilizing the water source]	30	>30	>15	>10	>5	<5
	4.3		Average number of liters of water used per person per day	Household survey	(L/p/d) [total capacity of the containers used to transport water from the source to the home] x [number of times these containers are filled per day] / [number of individuals in the household surveyed]	30	>30	>15	>10	>5	<5
	4.4		Average number of liters of water used per person per day	Water meters	(L/p/d) [average volume of water provided in one day] / [number of users accessing the water source]	30	>30	>15	>10	>5	<5
	5.1	Sanitation	Percentage of households with access to an improved sanitation facility	Household survey	(%) [number of households who access a hygienic latrine] / [total number of households surveyed]; e.g., simple pit or VIP latrine; hygienic latrine: excreta contained with no bad smell, no flies / cockroaches, no fecal matter on the ground	100%	>50%	>40%	>30%	>20%	<20%
	5.2		Percentage of households with access to latrines	Household survey, engineering reports	(%) [number of households with access to a latrine] / [total number of households surveyed]; Hygienic latrine and non-hygienic latrine	100%	>50%	>25%	>15%	>5%	<=5%
	5.3		Number of users per functioning latrine	Population statics, construction reports, regular monitoring reports	(ratio) [number of individuals] / [number of usable latrine chambers]	20	<=20	>20	>35	>50	>100
	6.1	Hygiene / Environmental	Percentage of households with soap or ash for hand washing	Household survey, hygiene kit distribution reports	(%) [number of households with soap or ash for hand washing] / [total household]	100%	>40%	>30%	>20%	>10%	<=10%

Emergency WASH Prioritization Criteria Indicators for Nigeria (August 2016)							Alert level				
	6.2		Percentage of individuals who can list a minimum of three critical hand washing times	Household survey	(%) [number of individuals that list at least 3 critical hand washing times] / [total number of individuals surveyed]; Critical times: After using the toilet or latrine and / or after cleaning or changing diapers, before eating, before breast feeding, before preparing food	100%	>=90%	<90%	<60%	<30%	<10%
	6.3		Site with no feces or unmanaged solid waste visibly present	Observation	(scale of 1-5 with 1 no feces or unmanaged solid waste visible, 2 clean with no visible feces but minimal unmanaged solid waste, 3 somewhat clean with no visible feces but some unmanaged solid waste, 4 dirty with unmanaged waste and/or feces visible, and 5 very dirty with significant health risk posed by unmanaged waste and/or feces); site defined as a neighborhood or camp or sub-population of 1,000 people	1	1	2	3	4	5

Annex 18: Emergency WASH indicators

Emergency WASH Sector Indicators for Nigeria (August 2016)					
Theme	**Threshold Link**	**Partner Monitoring Indicator**	**5W**	**Tools**	**Description**
WASH and Nutrition		Number of nutritional centers provided with a functional WASH minimum package	Y	Nutrition center reports, regular WASH monitoring	[number of nutritional centers with a functional WASH minimum package]; Minimum package includes safe drinking water with chlorine residual measured between 0.2 and 0.7 mg/L, disinfecting hand washing and food utensils, hygienic and secure defecation, key hygiene messages/behavior counselling
		Number of patients admitted for SAM treatment receiving a WASH hygiene kit with key hygiene messages/behaviors counselled to parents/care givers	Y	Nutrition center reports, regular WASH monitoring	[number of patients receiving a WASH hygiene kit with key hygiene messages/behaviors counselled to parents/care givers]
Health		Number of health centers provided with a functional WASH minimum package	Y	Health center reports, regular WASH monitoring	[number of health centers with a functional WASH minimum package]; Minimum package includes safe drinking water with chlorine residual measured between 0.2 and 0.7 mg/L and hygienic and secure defecation
Water	4.1	Number of people benefitting from emergency safe water supply	Y	Engineering report	[number of people utilizing emergency safe water supply]; maximum population served with handpump is 500; maximum population served with flow rate of 2 L/s is 2,900; maximum population served with flow rate of 4 L/s is 5,800; maximum population served with flow rate of 6 L/s is 8,600
	4.2	Average number of liters of water used per person per day	N	Regular WASH monitoring	(L/p/d) [total volume of storage at source] x [number of times these tanks are filled per day] / [number of individuals utilizing the water source]
	4.3	Average number of liters of water used per person per day	N	Household survey	(L/p/d) [total capacity of the containers used to transport water from the source to the home] x [number of times these containers are filled per day] / [number of individuals in the household surveyed]
	4.4	Average number of liters of water used per person per day	N	Water meters	(L/p/d) [average volume of water provided in one day] / [number of users accessing the water source]
		Number of borewells constructed with handpump	Y	Engineering report	[number of borewells constructed with a handpump installed]
		Number of borewells rehabilitated with handpump	Y	Engineering report	[number of borewells rehabilitated with a handpump installed]
		Number of borewells rehabilitated with mechanized or solar pumping	Y	Engineering report	[number of borewells rehabilitated with a mechanized or solar pump installed]; provide flow rate of water pumped after 30 minutes of use

Emergency WASH Sector Indicators for Nigeria (August 2016)

Theme	Threshold Link	Partner Monitoring Indicator	5W	Tools	Description
		Number of borewells constructed with solar or mechanized pumping	Y	Engineering report	[number of borewells constructed with solar or mechanized pump installed]; provide flow rate of water pumped after 30 minutes of use
		Number of water schemes rehabilitated	Y	Engineering report	[number of water schemes rehabilitated]
		Number of water schemes constructed	Y	Engineering report	[number of water schemes constructed]
		Number of protected wells constructed	Y	Engineering report	[number of protected wells constructed]
		Number of protected wells rehabilitated	Y	Engineering report	[number of protected wells rehabilitated]
		Number of WASHCOM members established and trained in the operation, maintenance, and management of water supply infrastructure	Y	Training reports	[number of water committee/WASHCOMs trained in the operation, maintenance, and management of water supply infrastructure]
	4.4	Volume of emergency water provided to affected populations	Y	Water meters	(L/d) [average volume of water provided in one day]; e.g., water trucking, mechanized or solar borewell, handpump
		Percentage of households with chlorinated water	N	Household chlorination testing, regular WASH monitoring	% [number of households with free residual chlorine between 0.2 mg/L and 0.7 mg/L measured at household] / [total number of households measured]
		Percentage of chlorinated water points with safe water	N	Regular WASH monitoring	(%) [number of water points with free residual chlorine between 0.5 mg/L and 1.0 mg/L and 0 fecal coliforms per 100 mL of water at the point of delivery] / [number of water points tested]
		Average waiting time at water points	N	Regular WASH monitoring	(min) [average [user time in queue] + [time required to fill container] for ten users]]
Sanitation		Number of emergency latrines constructed	Y	Engineering report	[number of latrine chambers constructed in host community and camps for IDPs]; Chamber defined as one drop hole for utilization of one user at a time
	5.2	Number of individuals with access to emergency latrines	Y	Engineering report	[number of individuals with access to an emergency latrine]; maximum 50 x [number of latrine chambers constructed in host community and camps for IDPs]
		Number of latrines constructed in public places	Y	Engineering report	[number of latrine chambers constructed in schools, health facilities, and public markets]

Emergency WASH Sector Indicators for Nigeria (August 2016)

Theme	Threshold Link	Partner Monitoring Indicator	5W	Tools	Description
		Number of inclusive latrine facilities constructed	N	Engineering report, regular WASH monitoring	[number of usable inclusive latrine chambers]; e.g., including handrails, support beams, raised platforms, or ramps for disabled, elderly, or access challenged
	5.3	Number of users per functioning latrine	N	Population statics, construction reports, regular monitoring reports	(ratio) [number of individuals] / [number of usable latrine chambers]
		Number of latrines desludged	Y	Regular WASH monitoring, removal payment records	[number of emergency latrine chambers emptied and safely disposed in an approved site]
		Number of sanitation workers trained and actively maintaining latrines disaggregated by sex	Y	Training reports, regular WASH monitoring, stipend reports as applicable	[number of sanitation workers trained and daily cleaning assigned latrine chambers]
Hygiene	6.1	Number of basic hygiene kits distributed	Y	Distribution reports, post distribution monitoring	[number of basic hygiene kits distributed]; Kit: kettle, water storage and transport containers, bathing soap, laundry soap, and MHM materials
		Number of replenishment hygiene kits distributed	Y	Distribution reports, post distribution monitoring	[number of replenishment kits with soap distributed]
		Number of cholera kits distributed	N	Distribution reports, post distribution monitoring	[number of cholera kits distributed during the rainy season or during periods of outbreaks]
		Number of emergency bathing units constructed	Y	Engineering report	[number of emergency bathing unit chambers constructed in a host community or camp for IDPs]; Chamber defined as one private area with door for utilization of an individual user
		Number of inclusive bathing facilities constructed	N	Engineering report, regular WASH monitoring	[number of usable inclusive bathing unit chambers]; e.g., including handrails, support beams, raised platforms, or ramps for disabled, elderly, or access challenged

Emergency WASH Sector Indicators for Nigeria (August 2016)					
Theme	**Threshold Link**	**Partner Monitoring Indicator**	**5W**	**Tools**	**Description**
		Number of hygiene promoters trained in key hygiene messages, cholera prevention, ORS preparation	Y	Training reports	[number of hygiene promoters trained in key hygiene messages, cholera prevention, and ORS preparation]
		Number of people reached with hygiene messaging through household visits	Y	Stipend reports if applicable	[number of hygiene promoters] x [number of households visiting each week] x [number of weeks]
		Number of hygiene promoters promoting key hygiene messages weekly disaggregated by sex	N	Stipend reports if applicable	[number of female and male hygiene promoters conducting weekly hygiene promotion sessions]
	6.2	Percentage of individuals who can list a minimum of three critical hand washing times	N	Household survey	(%) [number of individuals that list at least 3 critical hand washing times] / [total number of individuals surveyed]; Critical times: After using the toilet or latrine and / or after cleaning or changing diapers, before eating, before breast feeding, before preparing food
		Number of hygiene promoters providing cholera prevention messages weekly disaggregated by sex	N	Stipend reports if applicable	[number of female and male hygiene promoters conducting weekly cholera prevention sessions during the rainy/cholera season]
		Percentage of individuals who can list a minimum of three key cholera messages	N	Household survey	(%) [number of individuals that list at least 3 key cholera prevention strategies] / [total number of individuals surveyed]; messages: drinking treated water, going to a health facilities when symptoms are seen, hand washing at critical times
		Percentage of women and girls of menstruating age with sufficient sanitary materials and spaces to safely manage their menses with privacy and dignity	N	Post distribution monitoring	(%) [number of women and girls of menstruating age who report that they have sufficient sanitary materials to absorb their menses and a place to wash and dry their reusable cloths or a place to dispose of their disposable cloths other than the latrine pit] / [total number of women interviewed during post distribution monitoring]
Waste management		Volume of communal waste bins provided	Y	Distribution reports, post distribution monitoring	(m^3) [volume of waste bin] x [number of bins provided]
		Number of sites with solid waste being removed biweekly	Y	Regular WASH monitoring	[number of sites with solid waste being removed off site biweekly]; Site defined as a neighborhood or camp or sub-population of 1,000 people
	6.3	Site with no feces or unmanaged solid waste visibly present	Y	Observation	(scale of 1-5 with 1 no feces or unmanaged solid waste visible, 2 clean with no visible feces but minimal unmanaged solid waste, 3 somewhat clean with no visible feces but some unmanaged solid waste, 4 dirty with unmanaged waste and/or feces visible, and 5 very dirty with significant health risk posed by unmanaged waste and/or feces); site defined as a neighborhood or camp or sub-population of 1,000 people

Emergency WASH Sector Indicators for Nigeria (August 2016)

Theme	Threshold Link	Partner Monitoring Indicator	5W	Tools	Description
Drainage		Length of drainage infrastructure installed	Y		(meter); [total length of irrigation channels in camps or drainage canals in neighborhoods installed]
		Length of drainage infrastructure improved	Y		(meter); [total length of irrigation channels in camps or drainage canals in neighborhoods rehabilitated or dredged]
		Number of sites with with drainage infrastructure installed	N		[number of sites with drainage installed for flooding]; e.g., soakaway pits, water diversion canals, and irrigation channels; site defined as a neighborhood or camp or sub-population of 1,000 people
		Number of sites with water infrastructure drainage installed (water points, hand washing stations, bathing units, and laundry areas)	N		[number of sites with drainage installed for all water points, hand washing stations, bathing units, and laundry areas constructed]; e.g., soakaway pits, water diversion canals, and irrigation channels; site defined as a neighborhood or camp or sub-population of 1,000 people
Coordination		Number of states with capacity to coordinate, plan, and implement emergency WASH interventions	N		HRP
		Number of effective WASH in emergency coordination forums at state level	N		HRP
		Number of states with capacity building plan under implementation	N		HRP
		Number of states with up to date emergency preparedness and response plans	N		HRP

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