REPUBLIC OF THE GAMBIA

MINISTRY OF HEALTH

UNITED NATIONS CHILDREN'S FUND IN THE GAMBIA

Mobile Data Collection and GIS Mapping of WASH Facilities and ODF communities in the Gambia

National WASH Database

Database description, specifications & Instruction for data capture

October 2021

Contents

List of Acronyms

GIS	GEOGRAPHICAL INFORMATION SYSTEM
MHO	MINISTRY OF HEALTH
UNICEF	UNITED NATIONS CHILDREN'S FUND IN THE GAMBIA
MOE	MINISTRY OF EDUCATION
MoFWR	Ministry of Fisheries and Water Resources
CLTS	community Led Total Sanitation
RPPHO	Regional Principal Public Health Officers

1. Introduction

This document describes in detail the Geo-database for WASH facilities data survey in The Gambia, based on the existing survey data had been held during August – September 2021, by the regional teams of MoH, led by the RPPHO – regional principal public health officers, with a crew of 90 surveyors working in the field teams, surveying full census household and public facilities survey. This database includes layers and data of WASH facilities in households and other specific facilities, like schools, health care facilities and places of prey. The Geo-database structure and content has been built according to the project TOR published by UNICEF and MOH, and contains spatial data layers, tables, pre prepared maps and non GIS data.

The WASH Geo-database structure and content contains one major point shapefile layer that contain the survey point data from all the surveyors and teams. The database developed as a national Geo-database and as an input for future to come map production and printing, at any scale and shape in the country. The layer in the database has been built by data field survey methods, by surveyors working in the different regions and districts.

The structure and format of the database can be easily used also in server and web-based database solutions such as Microsoft MSQL, Oracle, or transformation to PostgreGIS and others . All data can be used with common open source GIS software and database servers, such as WPDx open source web site required at this TOR and an accessible ATLAS data portal . The database structure has been developed in a way that makes it scalable and more layers and feature can be added into the different feature data elements as they become available. All layers can be viewed and layout in a high scale.

The database content has been prepared according to the WASH data capture principals that has been delivered.

This document outlines the database structure, the features structure and the details and specifications of the data. For each feature, an attribute of the source, year of capture and type (If applicable) have been given, in addition to another relevant attribute. The capture year reference to the acquisition year of the data or a part of it. The source is the origin of the data.

2. Projection and reference system

All layers in the database are transformed to fit the WGS 84 CRS, COMPLEX UTM Zone 28N. The projection is based on a Transverse Mercator projection.

Distance units: Meters.

3. Geodatabase content

The Geodatabase contains shapefile layers, structured as a QGIS open source GIS software, a key component of the survey data system. The layer contains survey data point features and attribute data (i.e. point Type, name and so on).

Table 1 shows an overview of the layer and features that contain the WASH survey data. The structure of the table is based on the Geodatabase structure used in the survey, according to the criteria division of datasets.

Table 1: Survey data database structure and content:

Subject	layer	Geometry Type	Descreption
Boundaries	Regional_boundary	Polygon	Regional boundary
Boundaries	District_boundary	Polygon	District boundaries
Survey Data	Survey_Data	Point	All survey data points
Locations	Locations	Point	All villages and communities

The following chapter describes each layer in detail.

The document specifies the metadata on each feature and the basic and important attribute of it. Additional attributes from the source were kept in most cases in data that were received from a custodian organization for future needs.

4. A detailed description of the database

This chapter is a description of each feature that included in the database according to the structure. The details include metadata information on each feature such as its description, source, the scale of capture, year update, and more. In addition, the main data attributes are shown.

4.1. Boundaries dataset

The boundaries feature layers store all data related to administrative boundaries i.e. district and regional boundaries. This survey data has been collected and summarized to fit each boundary unit, according to the data in it's inner communities.

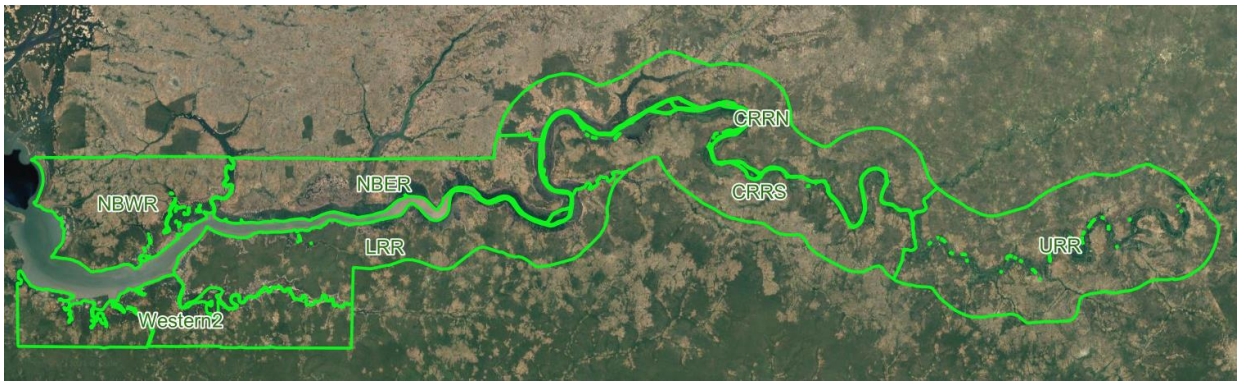
Regions boundary

Description:	A polygon layer containing the Regions boundary of The Gambia. The national boundary layer is based on the data received from Moh and corresponds to other administrative borders.
Layer:	Regions_Boundary
Type:	Polygon
Lineage:	The layer is aligned to boundaries and other layers (where applicable) so that they coincide when displayed on top of each other.
The scale of capture:	N/A.
Coverage:	The layer covers the whole of The Gambia
Positional accuracy:	N/A.
Completeness:	All of The Gambia, exept Western 1 region, from Foni and east.
Year update:	N/A.
Attribute(s):	

Num	Attribute	Type	Details
1	GAM_ADM3	Text	Admin name of region
2	PeopleN	Numeric	Population in region
3	Toilet	Numeric	Per. of HH that use toilet
4	No_toilet	Numeric	Per. of HH that do not use toilet
5	sharedT	Numeric	Per. of HH that have shared toilet
6	flushT	Numeric	Per. of HH that use flush toilet
7	Pit_T	Numeric	Per. of HH that use pit toilet
8	Vip_T	Numeric	Per. of HH that use vip toilet
9	OtherT	Numeric	Per. of HH that use other toilet type
10	Handwash	Numeric	Per. of HH that practice handwash use
11	No_handwash	Numeric	Per. of HH that do not practice handwash use
12	WS_pipe	Numeric	Per. of HH with pipe water supply
13	WS_well	Numeric	Per. of HH with well water supply
14	Pay_wat	Numeric	Per. of HH Py for water
15	Time2WS	Numeric	Time (Min.) to locate and bring water

16	Dist2WS	Numeric	Distance (Meter) to nearest water source
17	Female_ws	Numeric	Per. of HH that the female brings water
18	Make_WS	Numeric	Per. of HH that the male brings water
19	Own_well	Numeric	Per. of HH that have water from own well
20	WS_inhouse	Numeric	Per. of HH that have water inhouse
21	Wtreatment	Numeric	Per. of HH that do water treatment

Regions Layer View:



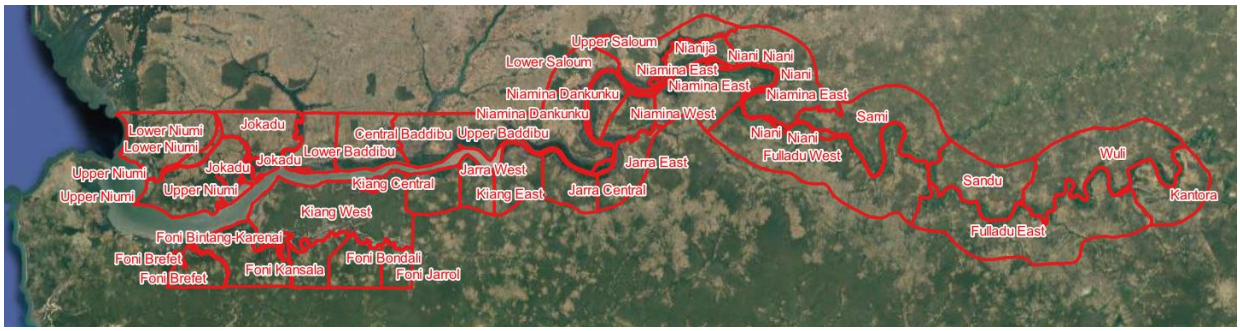
Districts boundary

Description:	A polygon layer containing the district boundary of The Gambia. The national boundary layer is based on the data received from Moh and corresponds to other administrative borders.
Layer:	District_Boundary
Type:	Polygon
Lineage:	The layer is aligned to boundaries and other layers (where applicable) so that they coincide when displayed on top of each other.
The scale of capture:	N/A.
Coverage:	The layer covers the whole of The Gambia
Positional accuracy:	N/A.
Completeness:	All of The Gambia
Year update:	N/A.
Attribute(s):	

Num	Attribute	Type	Details
	ID	TEXT	ID number
	LBL	TEXT	Label field
	ADM0	TEXT	Country name
	ADM1	TEXT	Region name
	ADM2	TEXT	District name
	ADM3	TEXT	Region name short
	STL_0	TEXT	227

Num	Attribute	Type	Details
	STL_1	TEXT	Region code
	STL_2	TEXT	District code
	DISTRICT	TEXT	District name
	CASES_N	NUMERIC	Pop number
	Toilet	Numeric	Per. of HH that use toilet
	No_toilet	Numeric	Per. of HH that do not use toilet
	sharedT	Numeric	Per. of HH that have shared toilet
	ODF	Numeric	Per. of HH that are ODF
	EXPANSIVE	Numeric	Per. of HH that don't have toilet because it is expansive
	NO_MATERIAL	Numeric	Per. of HH that don't have toilet because they don't have materials
	NO_KNOWLEDGE	Numeric	Per. of HH that don't have toilet because they don't know how to build
	DON'T WANT TOILET	Numeric	Per. of HH that don't have toilet because they don't want it
	OTHER	Numeric	Per. of HH that don't have toilet because other reasons
	flushT	Numeric	Per. of HH that use flush toilet
	Pit_T	Numeric	Per. of HH that use pit toilet
	Vip_T	Numeric	Per. of HH that use vip toilet
	OtherT	Numeric	Per. of HH that use other toilet type
	Handwash	Numeric	Per. of HH that practice handwash use
	No_handwash	Numeric	Per. of HH that do not practice handwash use
	WS_pipe	Numeric	Per. of HH with pipe water supply
	WS_well	Numeric	Per. of HH with well water supply
	PACKED	Numeric	Per. of HH with packed water supply
	Pay_wat	Numeric	Per. of HH Pay for water
	NOT_PAY	Numeric	Per. of HH not paying for water
	Time2WS	Numeric	Time (Min.) to locate and bring water
	Dist2WS	Numeric	Distance (Meter) to nearest water source
	Female_ws	Numeric	Per. of HH that the female brings water
	Make_WS	Numeric	Per. of HH that the male brings water
	GIRL	Numeric	Per. of HH that the female child brings water
	BOY	Numeric	Per. of HH that the male child brings water
	Own_well	Numeric	Per. of HH that have water from own well
	WS_inhouse	Numeric	Per. of HH that have water inhouse
	Wtreatment	Numeric	Per. of HH that do water treatment
	NO_TREATMENT	Numeric	Per. of HH that do not do water treatment
	SOMETIMES	Numeric	Per. of HH that do water treatment just sometimes

Districts Layer View:



4.2. Survey data

The Survey feature dataset stores the layers related to the WASH survey, i.e. data points of all regions and districts, devided by defined categories as Type, Use of Toilets, etc. Currently, the dataset contains the following layers:

Survey_Data

Description: The Survey_Data layer is a point layer that marks the location of a surveyed point in rural area and locations. The point located within the contour line of the building, as seen in aerial image photo in the surveyor tablet. Locations that had been surveyed are Households, Schools, Health care Facilities and Places of Prey.

Layer: Survey_Data

Type: Point

Lineage: The Survey_Data layer is located inside Regions and Districts areas and was compiled to net within them. All points outside these areas were concluded from based on data that was collected from a field survey operation.

Source: The Survey_Data layer is based on data that was collected from a field survey operation, with a Google Map Aerial image as a reference basemap for identification purposes.

Coverage: Cover all of The Gambia area, the completeness of the points is not certain

Positional accuracy: Approximately 10 meters

Completeness: Complete

Year update: 2021

Attribute(s):

Num	Attribute	Type	Details
1	GAM_ADM3	Text	Admin name of region
2	PeopleN	Numeric	Population in region
3	Toilet	Numeric	Per. of HH that use toilet
4	No_toilet	Numeric	Per. of HH that do not use toilet
5	sharedT	Numeric	Per. of HH that have shared toilet
6	flushT	Numeric	Per. of HH that use flush toilet
7	Pit_T	Numeric	Per. of HH that use pit toilet
8	Vip_T	Numeric	Per. of HH that use vip toilet
9	OtherT	Numeric	Per. of HH that use other toilet type
10	Handwash	Numeric	Per. of HH that practice handwash use
11	No_handwash	Numeric	Per. of HH that do not practice handwash use
12	WS_pipe	Numeric	Per. of HH with pipe water supply
13	WS_well	Numeric	Per. of HH with well water supply
14	Pay_wat	Numeric	Per. of HH Pay for water
15	Time2WS	Numeric	Time (Min.) to locate and bring water
16	Dist2WS	Numeric	Distance (Meter) to nearest water source
17	Female_ws	Numeric	Per. of HH that the female brings water
18	Make_WS	Numeric	Per. of HH that the male brings water
19	Own_well	Numeric	Per. of HH that have water from own well
20	WS_inhouse	Numeric	Per. of HH that have water inhouse
21	Wtreatment	Numeric	Per. of HH that do water treatment

Attributes table details:

Attribute	Type	Length	Domain: Code + Descreption	Details
Type	text	50	10 – Household 11 - school 12 - Health care facility 13 - Place of pray 14 - Market 15 - Other	Type of entity: household or public entity
Name	text	100		Name of entity – only if public entity
UseToilet	text	10	1 - Yes 2 – No 3 - Share	Is there any toilet use in entity
ToiletType	text	50	A - Flush B - Pit latrine C- VIP Latrine	What kind of toilet used in entity
NoToilet	text	100	10 - Too expansive 11 - No materials 12 - Don't know how to build 13 - Don't want toilet 14 - Other	If there is no toilet, explain why
Handwash	text	50	1 - Yes 2 - No	Is there any place in the house to wash hands
WaterSc	text	100	30 - Pipe 31 - Well 32 - Spring 33 - Packaged water 34 - Other	What is the main source for the household drinking water
WaterPy	text	50	1 - Yes 2 - No	Are you paying for drinking water
TimeAm	Short number	10		What is the amount of time, in minutes, that it takes to bring your drinking water
Distance	Short number	10		What is the distance, in meters, for your drinking water source
Location	text	50	40 - Own dwelling 41 - Own yard 42 - Elsewhere	What is the location of your drinking water source
WhoCollect	text	50	50 - Adult female 51 - Adult male 52 - Female child 53 - Male child 54 - Other	Who is the person that mainly collects the house drinking water

Attribute	Type	Length	Domain: Code + Descreption	Details
Treatment	text	50	1 - Yes 2 - No 3 - Sometimes	Do you treat the drinking water at home (boil, filtering, etc.)

Survey Data Layer View:

4.3 Locations

The Locations layer, related to the WASH survey data, is a point layer of all locations in The Gambia – rural area only, meaning all villages and communities locations.

This layer was needed in order to attach every survey data point into a specific location as a village or a community.

The locations layer is based on the Water Charity locations layer and was completed manually by the consultants with material from the OSM Open source places layer.

Survey_Data

Description:	The Survey_Data layer is a point layer that marks the location of a surveyed point in rural area and locations. The point located within the contour line of the building, as seen in aerial image photo in the surveyor tablet. Locations that had been surveyed are Households, Schools, Health care Facilities and Places of Prey.
Layer:	Survey_Data
Type:	Point
Lineage:	The Survey_Data layer is located inside Regions and Districts areas and was compiled to net within them. All points outside these areas were concluded from based on data that was collected from a field survey operation.

Source: The Survey_Data layer is based on data that was collected from a field survey operation, with a Google Map Aerial image as a reference basemap for identification purposes.

Coverage: Cover all of The Gambia area, the completeness of the points is not certain

Positional accuracy: Approximately 10 meters

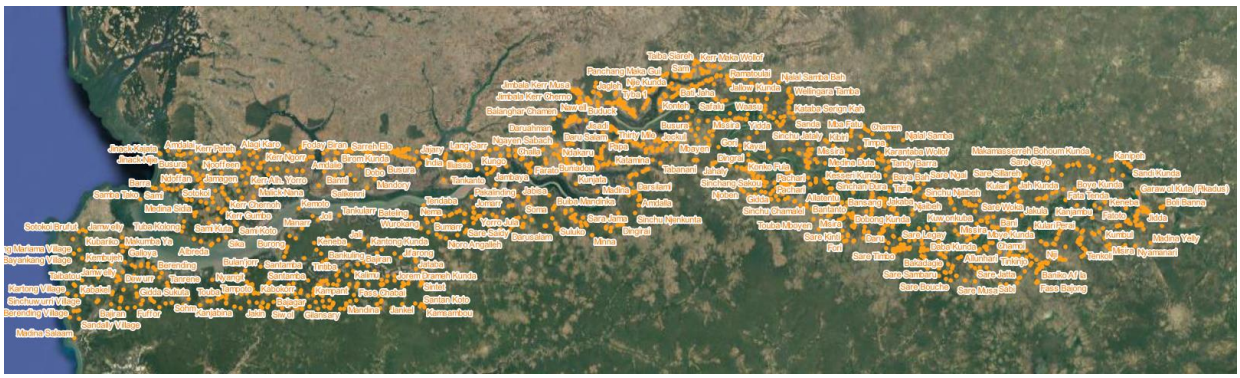
Completeness: Complete

Year update: 2021

Attribute(s):

Num	Attribute	Type	Details
1	GAM_ADM3	Text	Admin name of region
2	PeopleN	Numeric	Population in region
3	Toilet	Numeric	Per. of HH that use toilet
4	No_toilet	Numeric	Per. of HH that do not use toilet
5	sharedT	Numeric	Per. of HH that have shared toilet
6	flushT	Numeric	Per. of HH that use flush toilet
7	Pit_T	Numeric	Per. of HH that use pit toilet
8	Vip_T	Numeric	Per. of HH that use vip toilet
9	OtherT	Numeric	Per. of HH that use other toilet type
10	Handwash	Numeric	Per. of HH that practice handwash use
11	No_handwash	Numeric	Per. of HH that do not practice handwash use
12	WS_pipe	Numeric	Per. of HH with pipe water supply
13	WS_well	Numeric	Per. of HH with well water supply
14	Pay_wat	Numeric	Per. of HH Pay for water
15	Time2WS	Numeric	Time (Min.) to locate and bring water
16	Dist2WS	Numeric	Distance (Meter) to nearest water source
17	Female_ws	Numeric	Per. of HH that the female brings water
18	Make_WS	Numeric	Per. of HH that the male brings water
19	Own_well	Numeric	Per. of HH that have water from own well
20	WS_inhouse	Numeric	Per. of HH that have water inhouse
21	Wtreatment	Numeric	Per. of HH that do water treatment

Locations Layer View:



5. Topology rules

This chapter is a description of all the Topology rules that had been implemented within the Geodata layers, according to the structure and role of each layer. The rules are shaped according to all common QA/QC methods and meet the regular demands of topology behavior. All topology tests were checked upon delivery of all data and materials.

Point rules

These point rules apply to the survey data point layer and for the Locations point layer:

Rule	Description
Must Be Covered By Boundary Of	Requires that points fall on the boundaries of area features. This is useful because a survey point can not exist outside the boundery of the administrative unit.
Must Be Properly Inside Polygons	Requires that points fall within area features. This is useful when the point features are related to polygons, such as survey point to the administrative unit.

Polygon rules

These polygon rules apply to the Administrative boundaries units, i.e. the Regions layer and Districts layer, which are Government data.

Rule	Description
Must Not Overlap	Requires that the interior of polygons in the layer don't overlap. The polygons can share edges or vertices. This rule is used when an area cannot belong to two or more polygons. It is useful for modeling administrative boundaries, such as regions and districts and in the future even city boundaries.
Must Not Have Gaps	Requires that polygons not have voids within themselves or between adjacent polygons. Polygons can share edges, vertices, or interior areas. Polygons can also be completely disconnected. This rule is used to ensure the consistency of the administrative boundaries layers.
Must Not Overlap With	Requires that the interior of polygons in one feature class must not overlap with the interior of polygons in another feature class. Polygons of the two feature classes can share edges or vertices or be completely disjointed. This rule is used when an area cannot belong to two separate feature classes. It is useful for combining two mutually exclusive systems of area classification, such as zoning and water-body type, where areas defined within the zoning class cannot also be defined in the water body class and vice versa.
Must be Covered by Feature Class Of	Requires that a polygon in one feature class must share all its area with polygons in another feature class. An area in the first feature class that is not covered by polygons from the other feature class is an error. This rule is used when an area of one type, such as a state, should be completely covered by areas of another type, such as counties.

Rule	Description
Must Cover Each Other	Requires that the polygons of one feature class must share all of their area with the polygons of another feature class. Polygons may share edges or vertices. Any area defined in either feature class that is not shared with the other is an error. This rule is used when two systems of classification are used for the same geographic area and any given point defined in one system must also be defined in the other. One such case occurs with nested hierarchical datasets, such as census blocks and block groups or small watersheds and large drainage basins. The rule can also be applied to nonhierarchically related polygon feature classes, such as soil type and slope class.
Must Be Covered By	Requires that polygons of one feature class must be contained within polygons of another feature class. Polygons may share edges or vertices. Any area defined in the contained feature class must be covered by an area in the covering feature class. This rule is used when area features of a given type must be located within features of another type. This rule is useful when modeling areas that are subsets of a larger surrounding area, such as management units within forests or blocks within block groups.
Boundary Must Be Covered By	Requires that boundaries of polygon features must be covered by lines in another features class. This rule is used when area features need to have line features that mark the boundaries of the areas. This is usually when the areas have one set of attributes and their boundaries have other attributes. For example, parcels might be stored in the geodatabase along with their boundaries. Each parcel might be defined by one or more line features that store information about their length or the date surveyed, and every parcel should exactly match its boundaries.
Area Boundary Must Be Covered By Boundary Of	Requires that boundaries of polygon features in one feature class be covered by boundaries of polygon features in another feature class. This is useful when polygon features in one feature class, such as subdivisions, are composed of multiple polygons in another class, such as parcels, and the shared boundaries must be aligned.
Contains Point	Requires that a polygon in one feature class contain at least one point from another feature class. Points must be within the polygon, not on the boundary. This is useful when every polygon should have at least one associated point, such as when parcels must have an address point.