

Attribute description-case

Water supply

- What amount of water can the individual households access?. If this information is difficult to access, the type of water supply is used as an indicator. To enter this information into the model, the percentage of households using the different water sources must be obtained.
- The d-cat function is used, unit is L/household/day: 0-10L (A);10-50L (B);50-200L (C);200+ (D)
- To translate water source into water amounts, the following assumptions were made:
 - No water source: 0-10
 - Protected well: 50-200
 - Hand pump: 50-200
 - Electric pump: 200+
 - Disrupted network supply: 50-200
 - Continuous network supply: 200+

Energy supply

- How many hours of electricity are usually available per day in this region (households in the same region are usually supplied by the same electricity network. Therefore a power cut effects all households equally and information from a few houses can be generalized)
- The d-continuous function is used, unit hours/day

Frequency of O&M

- How feasible is it to find human labor for a specific workload? If it is difficult to find this information, find out if there are people working in the sanitation maintenance business and ask them what they think (e.g. pit emptier)
- Use d-continuous function with the unit: hours/month/household

Temperature range

- What is the daily average temperature? This information can be found online or bigger institutional organizations in the area can usually provide it.
- Use d-continuous function with the unit: degree Celsius

Flooding

Vehicular access

- How wide is the access to the house? This information can roughly be obtained by measuring streets/paths in Google maps (if no better source is available)
- A d-continuous function should be used and the unit is meter

Slope

- What is the slope in that location? The data can be found online (DEM) or bigger institutional organizations in the area can usually provide it.
- The d-continuous function can be used with the unit %

Soil type/hydraulic conductivity

- What is the soil type in that area? This information can most likely be obtained from geographic soil distribution maps which can be found only or be provided by bigger regional institutions (NGOs)
- Use the d-cat function with the following categories: clay, silt, sand, gravel

Groundwater depth

- What is the distribution of groundwater depth in the case location? This information can be provided by bigger locally involved institutions (NGOs) or by measuring water level in existing wells (if possible)
- The d-continuous function should be used, unit: meter

Excavation

- How feasible is excavation in this area? If there is rocky soil which is difficult to penetrate, excavation is “hard”. If the soil is sandy and trenches can be dug with a shovel, excavation is “easy”.
- Use the d-cat function including the following categories: easy, hard

Population density

- What is the current population density in this area? This information can be obtained from district communities or governmental offices. If only the population but not the population density is available, assumption regarding the area can be made upon Google maps images.
- Use d-continuous function to describe spatial variations of population density if possible.

Construction skills

- What kind of construction skills are available within local boundaries? Use the following structure in the functions:
 - 1-none
 - 2-mason
 - 3-specially trained mason
 - 4-construction engineer
 - 5-supervisor
- Use a d-continuous function

Design skills

- What kind of design skills are available within local boundaries? Use the following structure in the functions:
 - 1-none
 - 2-unskilled labor
 - 3-mason
 - 4-specially trained mason
 - 5-planning engineer
 - 6-supervisor
- Use a d-continuous function

O&M skills

- What kind of O&M skills are available within local boundaries? Use the following structure in the functions:
 - 1-none
 - 2-unskilled labor
 - 3-specially trained labor
 - 4-technicien
 - 5-supervisor
 - 6-administrator
 - 7-engineer
 - 8-scientist
- Use a d-continuous function

Management level

- What level of management is possible/preferred in that region? By the “level of management” it is meant, if people want to manage their “sanitation chain” themselves (household level) or if they prefer shared facilities (shared) or if they want it to be managed on an institutional level (public)
- Use d-cat function with the following categories: household, shared, public

Pipe supply

Pump supply

Concrete supply

Spare parts supply

Surface area onsite

- How much area do the individual households have that they could use to implement a sanitation technology? Local community council or involved institutions can be ask for this information. Assumptions can also be made from Google earth pictures.
- Use d-continuous function with the unit square meter

Surface area offsite

- Is there available space (belonging to the community or possible donors) that can be used for a decentralized wastewater treatment facility? Local community council or involved institutions can be ask for this information. Assumptions can also be made from Google earth pictures.
- Use d-cat function with the following categories:
 - Yes (if the area is easily available)
 - Medium (if reconstructions have to be made but it's possible)
 - No (if it's not possible, all build with permanent structures)

Population growth/decline rate

- What is the expected population change in that area during the next 10 years (in %)? This information can often be obtained from governmental studies or bigger institutional organizations involved in that area.
- Use d-range function with the unit: % of population change (negative if decline is predicted)

Cleansing method

Potential to accommodate changing discharge volumes

Indirectly covered by the attribute “population growth/decline rate”

Potential to accommodate changing pollution loads

Indirectly covered by the attribute “population growth/decline rate”

Odor

The odor is a very difficult information to grasp. The accepted level of odor depends on the benefits that come with it which makes it difficult to obtain general information for a pre-selection. It should be discussed during a community meeting as part of the detailed assessment.

User awareness

After discussions with Mingma, it was found to be too difficult to make general assumptions on this kind of information because it is very sensitive to their individual education and preferences. Also it is very technology specific. It should be discussed in the detailed study to not draw wrong conclusions.

Energy supply disruption

The daily energy supply disruption is already taken into account by supporting the data from the attribute “energy supply”.

Water supply disruption

Since the water supply disruption is in most areas the result of seasonal fluctuations and has very different influences of the individual water supply sources, it is best looked at in the detailed assessment