

## 6.4 Annex IV: QA/QC protocol

### Quality assurance and Quality Control (QA/QC) protocol for the wastewater treatment Standardized Baseline for municipal and sugar industry sectors in Uganda

<b>Sectoral scope</b>	Scope 13: Waste handling and disposal
<b>Name of DNA</b>	Ministry of Water and Environment Climate Change Department (former Climate Change Unit)/DNA Secretariat P. O. Box 28119 Kampala, Uganda
<b>Primary person for the QC report</b>	Mr. Chebet Maikut
<b>Contact info of the contact person</b>	chmaikut@yahoo.com, <a href="mailto:chmaikut@gmail.com">chmaikut@gmail.com</a> Phone: (256) 414 237 690/ (256) 752 414 609 Fax: (256 ) 414 346 530
<b>Implementation date of QC procedures</b>	The QC procedures were implemented from the start date of the Ugandan Wastewater Standardized Baseline (SBL) development in June 2014 until the submission of SBL documents to the UNFCCC (expected by the December 2015). The same will be applicable for the renewal process of SBL.
<b>Please describe how the QC procedures were implemented</b>	
<p>The QC procedures are implemented by the CDM and Standardized Baseline coordinating personnel and focal point within the DNA of Uganda, at the Climate Change Department (CCD) of the Ministry of Water and Environment. When necessary, assistance from national and/or international consultants with relevant expertise will be acquired.</p> <p>All the data and information sources regarding the wastewater treatment plants within the municipal and sugar industry sectors were checked for their credibility by contacting the focal points within the relevant organizations and/or double checked against any existing datasets made available to the Ministry of Water and Environment.</p> <p>For the establishment of the first Standardized Baseline (SBL) document, the project manager travelled three times to Kampala to assure and control quality in terms of data collection process, data quality, data gap possibilities and data credibility and the overall progress during the SBL development. The consultants also have directly and actively led in the capacity building and stakeholder workshops held in Kampala on 18-19 December 2014 and on 25 August 2015. The stakeholders were informed during the workshop of the procedures and steps taken during the data collection and SBL development. This increased the transparency in data collection efforts, minimized data gaps and reduced risks in receiving irrelevant and false figures and values for the development of the first SBL.</p>	

The data for development of municipal wastewater SBL was provided by Ugandan authorities, namely, the National Water & Sewerage Corporation (NWSC) who has access to most up-to-date data on municipal anaerobic ponds throughout Uganda. NWSC has its own local and central labs based in Jinja and Kampala and other major regions within the country and follows specific data testing and data measurement protocols.

For the sugar industry sector, the relevant data was submitted directly by sugar manufacturers where available.

In both cases (municipal and sugar industry) the data was reviewed in case of doubts and data gaps, the relevant contacts were re-approached for clarification. In some cases, where data was not available at all, conservative measures such as extrapolation method was used in order to replace blank data cells with feasible figures. It was assured that the assumptions in filling the data gap will lead to a conservative SBL calculation.

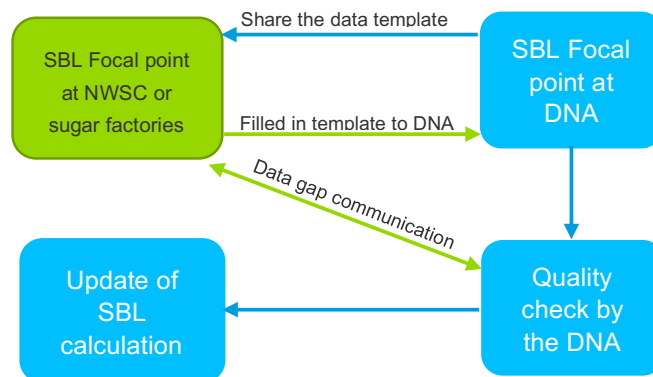
Moreover, the DNA of Uganda will be supported by the UNFCCC regional Collaboration Centre (RCC) based in Kampala during the SBL submission process and all probable issues will be cleared before the SBL documents are submitted to UNFCCC. This as well applies when the SBL needs to be updated and renewed.

The data and information that were checked are as follows:

Data	Source	Cross checking method
Name of the municipal treatment sites and the locations, COD inflow and Wastewater discharge in municipal anaerobic ponds and sites	National Water and Sewage Corporation (NWSC)	<ul style="list-style-type: none"> <li>- Independent check through local experts in the field (EcoSan);</li> <li>- Independent check with sources and other contacts within NWSC;</li> <li>- Direct cross check with the Climate Change Department (DNA secretariat) based on their ongoing studies and similar datasets submitted by NWSC to the Ministry of Water and Environment</li> </ul>

		<p>(these studies were not public and the check was made by the BTC/CCD focal point Ms. Martha Kasozi;</p> <ul style="list-style-type: none"> <li>- Additional check by the UNFCCC Regional Collaboration Centre in Kampala will be held before the SBL submission/renewal process;</li> </ul>
Name of the sugar producer and the locations, COD inflow and Wastewater discharge in the factory.	Sugar producers/factories in Uganda	<ul style="list-style-type: none"> <li>- Checking the lab testing protocols and measurement procedures followed by sugar factory personnel;</li> <li>- Asking the sugar factories for any official lab testing evidence if available;</li> <li>- Independent check through local experts in the field (EcoSan);</li> <li>- Independent review with Uganda Sugar Manufacturer's Association (USMA) as well as the Uganda manufacturers' Association (UMA);</li> <li>- Additional check by the UNFCCC</li> </ul>

		Regional Collaboration Centre in Kampala will be held before the SBL submission;
<p>All the data acquired for the development of the SBL will be archived and maintained electronically at least for three years from the date of SBL approval and/or renewal.</p> <p><b>Data collection process</b></p> <p>Currently, the information in regards to the existing municipal wastewater treatment sites are being collected by NWSC. The DNA of Uganda through its dedicated focal point for SBL development and update/renewal will be in touch with NWSC to make sure up-to-date and credible data for the anaerobic ponds will be collected for renewal of the SBL. The DNA will make sure there will be permanent contacts within the NWSC to follow up the data collection process regularly, at least every three months. The DNA of Uganda will remain the focal point for follow ups and data tracing. The DNA will assure that the data flow will not be interrupted and in all times the submitted data has satisfactory data quality with minimum data gaps. Where data gaps are discovered within the data templates, contacts will be made with NWSC to justify and evidence the data gaps and find a conservative manner to fill the gaps.</p> <p>Similar procedure will be followed in the case of sugar factories wastewater data collection. In addition, since sugar factories are mostly private entities, it will be ensured that the sugar producers will be periodically updated on the procedures needed to update the SBL report. This will be done by sharing the most up to date report and calculations of the SBL with the sugar producers. Special attention will be given on why sugar manufacturers may become interested in using such a report and advantages of maintaining and renewing a SBL will be explained to these entities.</p> <p>The SBL will be renewed based on the approved SBL guidelines and all data templates will be reviewed and updated in case the applied tools are upgraded to newer versions. The overall data collection and data quality check structure that DNA will implement during the update/renewal process of the SBL is shown as follows:</p>		



### Data template

NWSC is the ultimate authority in Uganda that keep track of municipal wastewater treatment plants in Uganda and keeps data on the following fields:

- Information on the plants' organizational charts, performance and maintenance;
- Information on each plants' name, location and operator;
- Information on wastewater data such as wastewater discharge rates, COD inflow and COD outflow;

In regards to sugar industry data, detail wastewater treatment performance indicators such as COD inflow and wastewater discharge are either being tested at the dedicated lab located at each sugar factory or in case they do not poses a lab within their premises, the test is carried out by external labs (e.g. DWRM). Each sugar factory collects, maintains and reports the relevant wastewater test results. Therefore, sugar factories remain the only source of data when it comes to SBL update/renewal.

The DNA of Uganda will use data templates in order to collect the most up-to-date data sets from the municipal anaerobic ponds (through NWSC) as well as sugar factories (via direct contact to their wastewater testing labs, and if possible via DWRM). The example of the data templates that will be used is as follows:

### Data template to be used for data collection from Municipal anaerobic ponds in Uganda:

Municipal Sector Wastewater Treatment Data from Ponds in Uganda												
Please complete the template below with any relevant additional informations												
No.	AREA	POND SYSTEM	POND	DESIGN DEPTH (m)	Wastewater Q (m <sup>3</sup> /d)	COD <sub>IN</sub> (mg/l)	COD <sub>OUT</sub> (mg/l)	National Standard for COD OUT (mg/l)	COD removal efficiency	Where is the final treated water discharged?	How is the remaining sludge treated?	Comments
1								100				
2								100				
3								100				
4								100				
5								100				
6								100				
7								100				
8								100				
9								100				
10								100				
11								100				
12								100				
13								100				
14								100				
15								100				
16								100				
17								100				
18								100				
19								100				
20								100				
Please add more rows as needed.												
Please provide data for the latest three years as possible/available, e.g. 2012, 2013 and 2014/2015.												

*Data template to be used for data collection from Sugar factories anaerobic ponds in Uganda:*

**Sugar Industry Sector Wastewater Treatment Data in Uganda**

**Important note:** Industry types can be mentioned per anonymous company, in case it is sensitive to have the name of the company, having the type of industry and relevant data suffices.

No.	Town/ address	Industry name/id	POND / treatment type	DESIGN DEPTH (m)	Wastewater Q (m <sup>3</sup> /d)	Q (m <sup>3</sup> /yr)	COD <sub>in</sub> (mg/l)	COD <sub>out</sub> (mg/l)	National Standard for CODOUT (mg/l)	COD removal efficiency	Where is the final treated water discharged?	How is the remaining sludge treated?	Comments
1						0			100				
2						0			100				
3						0			100				
4						0			100				
5						0			100				
6						0			100				
7						0			100				
8						0			100				
9						0			100				

Please add more rows as needed.

Please provide data for the latest three years as possible/available, e.g. 2012, 2013 and 2014/2015.

### Capacity building workshops carried out

The DNA of Uganda with the support from the Belgian Development Agency (BTC) has held two workshops for the wastewater treatment sector in Uganda on 18-19 December 2014 and 25 August 2015 as follows:

#### *Stakeholder workshop I: 18-19 December 2014*

The main objectives of the stakeholder meeting were to inform and update the main stakeholders identified in Annex I in regards to the SBL establishment assignment as well as to increase their capacity in the context of CDM and Standardized Baseline. The workshop comprised topics in relation to the CDM, SBL concept, baseline indicators, data collection, data management, SBL calculation and renewal of Ugandan wastewater SBL. Through the workshop draft data templates were presented to the sector. These data templates will facilitate further transparency in data collection as well as quality control. The workshop organizers distributed feedback forms during the workshop in order to receive any comments in relation to the SBL development assignment in general and the development of SBLs for both municipal and sugar industry sectors and the outcome of the SBLs feasibility study in specific.

#### *Stakeholder workshop II: 25 August 2015*

The main objectives of the stakeholder meeting were to inform and update the main stakeholders identified in Annex I in regards to the result of the Standardized Baseline establishment for both municipal and sugar industry sectors and next steps towards the approval of the SBL.

Both workshops' objectives, processes, agenda, participants and feedback are documented and available.

### Future DNA training workshop and SBL update instructions/manual

The DNA of Uganda is already planning for further improvement of SBL data collection, calculations and update/renewal. For this the DNA has already begun with designing training sessions for dedicated DNA personnel who will be responsible for tracking and acquiring most up-to-date data for SBL calculations update and renewal from both municipal and sugar industry sectors.

### Please specify how the credibility of the data sources was checked.

The data supplied are either from the Uganda authorities i.e. National Water and Sewage Corporation (NWSC) or from the sugar producers (in case of the sugar industry SBL) in consultation with Uganda Manufacturers

Association (UMA) and Uganda Cleaner Production Centre (UNIDO), all of which credible and reputable organizations in Uganda. Please refer to the table above where the cross checking activities held are listed.

**Please specify how the accuracy of the data was checked.**

NWSC is a governmental organization whose accuracy in wastewater indicators' testing is a key for the operation and performance of the Ugandan municipal wastewater treatment anaerobic ponds. NWSC follows national standards that assure stable performance of water and sewage networks in the country. The accuracy of the data received from NWSC was cross checked with several contacts within the NWSC all of which resulted in the same data source.

For the sugar industry sector, the data was only available through direct contacts at sugar factories in Uganda. For this sector the data accuracy was checked when possible through accredited wastewater test labs. It is noteworthy that the wastewater treatment sector in Uganda is under-represented and suffers from lack of capacity and modern practices. However, each of the sugar factories are equipped with a relatively up-to-date wastewater testing devices and each follows the manufacturer's calibration and test manuals and protocols. This was assessed by the DOE during the SBL assessment site visit as well.

**Please specify how the consistency was achieved and how the data vintage provision was met.**

For the data from NWSC, the consistency of the data vintage was checked with the NWSC lab principals and senior data managers. The data vintage achieved was most-up-to-date between 2011 and 2014/2015. The detail data for wastewater discharge was provided monthly between 2011 and 2015. The monthly values were used to come up with an annual average value per given year. The COD data was provided as annual average values for 2012, 2013 and 2014. For the calculation of SBL the data from 2012, 2013 and 2014 (and part of 2015 if there was data) has been used.

For sugar factories, since wastewater treatment systems in most of these facilities are just commissioned, most up-to-date data was mostly from 2013 or 2014.

**Please specify how the completeness was achieved.**

The calculation process and approach follows the latest approved version of the Guidelines for the establishment of sector specific standardized baseline in combination with the latest version of the small scale methodology AMS-III.H.. The methodology asks for specific parameters, data and information for the determination of the baseline indicators. These data and information were available through the above mentioned official sources in Uganda. The calculated SBL is independently checked by a UNFCCC approved DOE (TuV Nord) and the final assessment report is submitted as a complimentary document to the SBL submission. Moreover, the completeness for the submission of the SBL will be checked both by the DNA's focal point as well as the UNFCCC regional collaboration center (RCC) based in Kampala.

Completeness in regards to data gaps in municipal SBL was achieved by the fact that the data submitted by NWSC was complete and there was no need for conservative assumptions/estimations to fill the data gaps.

Completeness in regards to data gaps in industrial SBL was achieved by applying the most conservative values achieved within the industry for those sugar factories that either had no data or had incomplete data. This was to ensure that the final SBL result will be a conservative representative for the sector despite of data gap assumptions made.
<b>Please specify how the transparency was achieved.</b>
<p>The transparency was achieved during data collection activities, calculation of SBL by the consultants and their constant reporting to the DNA and BTC (the funding agency) as well as during the assessment of the SBL by the DOE through the following steps:</p> <ul style="list-style-type: none"> <li>- The official sources and specifically NWSC were available to share the documented and well managed data sources with the consultants and the DNA;</li> <li>- The consultants could meet with the focal points from NWSC and other stakeholders for further information or clarification of any raised issue;</li> <li>- Although the data collection effort was a time intensive process, the officials had the utmost cooperation during the assignment and have provided more up-to-date and further complete datasets till October 2015;</li> <li>- Up to 28 stakeholders were invited to a workshop held on 18-19 December 2014 on how the SBL development process works, what data is needed, how data collection efforts shall be managed, how data gaps shall be addressed and how the SBL can be maintained for renewal;</li> <li>- The final stakeholder workshop was held on 25 August 2015 during which the final results were presented and the stakeholders were informed on the renewal process of the SBL including the data collection procedures;</li> </ul> <p>All the supplied data and information are listed and made publically available through the SBL submission. The intention of the DNA would be to publish the SBL related information and updates on the DNA's web-page.</p> <p>The DNA will also have the opportunity to cross check the data and calculation processes before each SBL renewal/update through the UNFCCC Regional Collaboration Centre in Kampala.</p>
<b>Please specify major issues and uncertainties identified during the QC procedures.</b>
General point: some data gaps were identified during the quality check, specifically in relation to sugar industry SBL calculations. However, these gaps were minor and could be filled using extrapolation approach by using conservative figures from other sugar factories who submitted complete datasets. Overall, it was assured that the data replacements will lead to a conservative calculation of baseline during the SBL establishment.
<b>Please specify major corrective actions taken during the QC procedures.</b>
Data gaps were filled using conservative approaches, such as extrapolation.
<b>Please justify the conservativeness of the approaches taken during the QC procedures</b>



In addition to conservative measures taken into consideration when dealing with data gaps, the approach for SBL establishment follows an approved UNFCCC tool “Guidelines for the establishment of sector specific standardized baseline” as well as small scale methodology AMS-III.H. thus all conservative measures are already taken into account within the applied tool/methodology. For instance the benchmark for identifying the SBL is set by the guidelines at 90%, meaning that the baseline indicator established in the SBL is more conservative than 90% of the contribution within the sector. No additional conservative measure was taken into account.

**Please summarize key findings and present a plan to improve the data quality in future**

The current data management system implemented is sufficient to renew the SBL calculations for Ugandan wastewater treatment sector. Further suggestions were given through workshop and capacity building practices<sup>21</sup> in 2014 and 2015, where specific data templates were presented to NWSC, sugar producers, Climate Change Department of the Ministry of Environment and other present stakeholders in order to facilitate a smoother and further timely calculation of the future SBLs.

In general, data availability and capacity are of major issues when it comes to specific sectors in under-represented countries such as Uganda. Modern wastewater treatment systems and related knowledge have not been practiced/spread in a systematic manner and in a country wide scale. Further capacity building in waste handling and management sector in Uganda is definitely required. The DNA of Uganda is therefore planning specific training sessions for dedicated DNA personnel in order to improve the data collection and data quality for future updates. This capacity building workshop is expected to be held before 2016.

**Date to of QC report finalization**

**Signature of the DNA**

<sup>21</sup> Funded by the Belgian Development Agency (BTC), ccoordinated and managed by the DNA of Uganda and carried out/presented by the consultants.