8 May 2024

GBON National Gap Analysis

Uganda

Systematic Observations
Financing Facility

Weather
and climate
data for
resilience

WEATHER CLIMATE WATER

Systematic Observations Financing Facility

Screening of the National Gap Analysis (NGA) of Uganda

WMO Technical Authority screens the GBON National Gap Analysis to ensure consistency with the GBON regulations and provides feedback for revisions as needed. *The screening of the NGA is conducted according to the SOFF Operational Guidance Handbook, version: 04.07.2023 and the provisions in Decision 5.7 of the SOFF Steering Committee.*

Following iterations with peer advisor and beneficiary country, WMO Technical Authority confirms that the National Gap Analysis is consistent with GBON regulations.

While the WMO GBON Global Gap Analysis identified the need for 7 surface land station and 1 upper air station to meet the GBON horizontal requirement, the **WMO Technical Authority confirms the NGA results which indicate the need for 9 surface land stations and 2 upper air station based on specific national circumstances.**

Date: 17 May 2024

Signature:

Albert Fischer
Director, WIGOS Branch, Infrastructure Department, WMO

Document review process notes:

GBON National Gap Analysis Report
UGANDA

Beneficiary Country Focal Point and Institute	Dr Bob Alex Ogwang, Executive Director, Uganda National Meteorological Authority
Peer Advisor Focal Point and Institute	Mr. Rubert Konijn, Royal Netherlands Meteorological Institute, The Netherlands

Version no.	**Date submission for comments**	**Other**
Version 1	12th of March 2024	
Version 2	8th of April 2024	
Version 3	25th of April 2024	
Version 4	8th of May 2024	

Introduction

As of 1 January 2023, the extraordinary session of the World Meteorological Congress (WMO; Cg-Ext 2021) approved Resolution 2 Modifying the Technical Regulations relating to the establishment of the Global Basic Observing Network (GBON). The regulation puts an obligation on all Members to acquire and exchange the most essential surface-based observation data at a minimum level of spatial resolution and time interval internationally. Once implemented, GBON improves the availability of the most essential surface data, which has a direct positive impact on the quality of weather forecasts.

To implement GBON at the national level, members are encouraged to complete the GBON National Gap Analysis to identify and understand existing gaps in the required observational network and create a national plan to close these gaps.

It is within this framework that the Ugandan National Meteorological Authority (UNMA) has carried out an in-depth diagnosis of the current situation of the observation network, highlighting the state of the stations in terms of territorial coverage, equipment, infrastructure, competencies of personal, and other needs.

KNMI visited UNMA between February 10 -16, 2024 to obtain data for this report, the country hydromet diagnostic report and the GBON National Contribution Plan.

Summary of GBON regulations

The GBON regulations published in the Manual on the WMO Integrated Global Observing System (WMO-No. 1160), Annex VIII of the WMO Technical Regulations, 2023 edition, section 3.2.2, describes the spatial and temporal resolution of surface-based weather stations. The GBON regulations include standard practices and procedures that members are required to follow and recommended practices and procedures that members are urged to comply with. Members shall make available internationally through the WMO Information System (WIS) all GBON observations in real time or near-real time according to the overall WMO data policy.

1. Country information from the GBON Global Gap Analysis

The Uganda National Meteorological Authority (UNMA) has registered 15 surface stations in OSCAR/Surface of which 11 stations have a GBON affiliation. These are visible in the WIGOS Data Quality Monitoring System (WDQMS; Figure 1). All 11 existing GBON affiliated stations are having severe data availability issues. The WIGOS Data Monitoring System (WDQMS) webtool indicates average information availability of <30%; an average of 2-3 observations for the key parameters per day, ranging between 0-4 per day.

No upper air observation station is registered in WDQMS (Figure 2). The existing upper air station (Entebbe International Airport) is inactive and requires replacement of the Hydrogen generator.

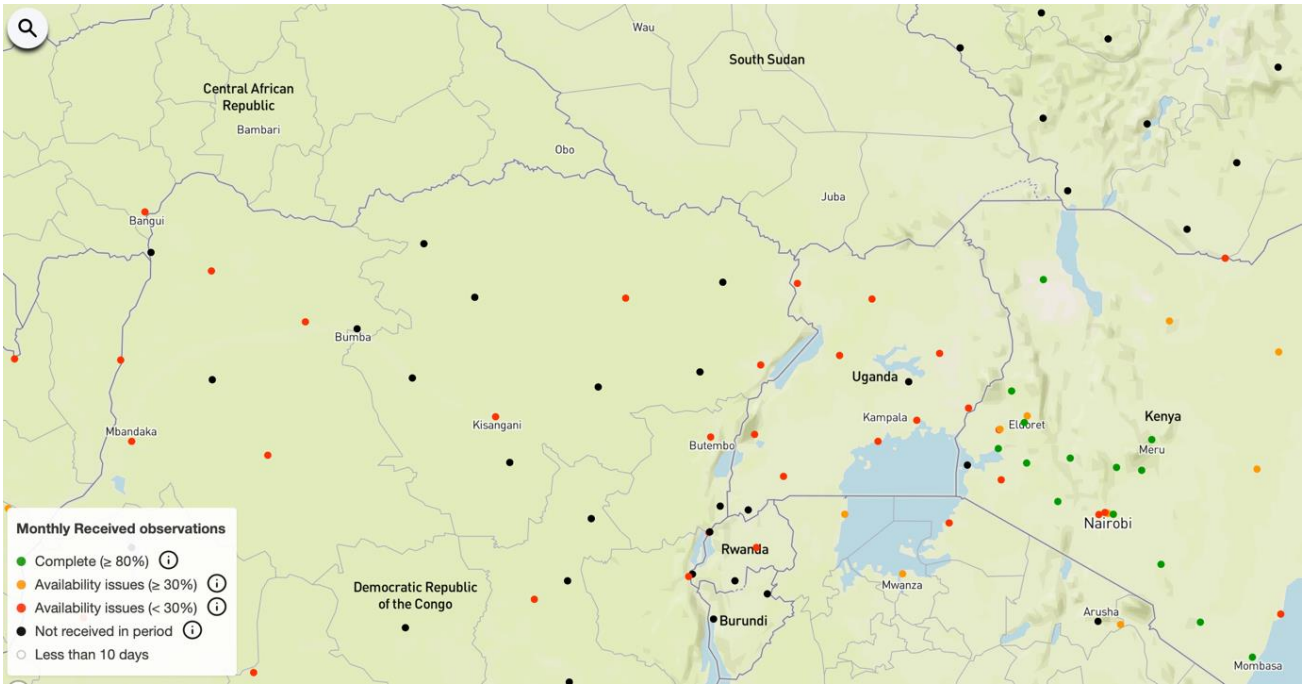

Figure 1. The status of surface weather stations in Uganda and its neighboring countries registered in WIGOS Data Quality Monitoring System (WDWMS) information. No Upper air observation stations are registered for Uganda and Central Africa region. Source: WDQMS.

Figure 2. The status of upper air stations in Uganda and its neighboring countries based on WDQMS information on the 7th of March 2024.

Using the country's surface area of 241,550 km^2 (2021, World Bank) divided by 40,000 km^2 (200x200 km grid) requires a minimum of surface 7 stations and one upper air station on a 500x500 km grid (**Error! Reference source not found.**).

Table 1. WMO GBON Global Gap Analysis (June 2023). Illustration of the information that the WMO Secretariat provides to each country

A. GBON horizontal resolution requirements	B. Target	C. Reporting to req [1]	D. Gap to improve	E. Gap new	F. Gap total
Surface stations Standard density[2] 200 km	7	0	7	0	7
Upper-air stations over land Standard density[2] 500km	1	0	1	0	1

[1] The rationale for classifying surface and upper-air stations as reporting is based on the WIGOS Data Quality Monitoring System (WDQMS) for the chosen time period (WMO GBON Global Gap analysis, June 2023). Stations with data availability more than 80% on at least 80% of days, are considered as reporting. Other listed stations are counted as having the possibility to be improved.

[2] For SIDS, for the WMO GBON Global Gap Analysis in June 2023, the EEZ area has been added to the total surface area which is the basis for the target number of stations. The standard density requirements for SIDS have been calculated with 500 km for surface stations and 1000 km for upper-air stations.

2. Analysis of existing GBON stations and their status against GBON requirements

Introduction Uganda National Meteorological Authority

UNMA (formerly Department of Meteorology) under the Uganda Ministry of Water and Environment is a semi-autonomous government institution for weather and climate services (UNMA Act. 2012)[3] and a focal institution to Inter-Governmental Panel on Climate Change (IPCC).

UNMA is responsible for establishing and maintaining a meteorological observing station network, collection, analysis and production of weather and climate information products (including warnings/advisories) to support social and economic development in Uganda.

UNMA management and staff are highly motivated to improve service delivery and improve operations to meet international and national stakeholder expectations, with improved early warning (winds, thunderstorms, rainfall) and seasonal forecasting (agriculture) being the main products required.

UNMA observation network

UNMA maintains a more significant number of sub-surface stations than the GBON affiliated one's which are summarised below:

- 12 synoptic stations collocated both for manual measurements and an Automatic Weather Station (AWS), of which one station is manned 24/7 (Entebbe International Meteorological Station),
- 87 AWSs in functional state, transmitting the data to a central server at the UNMA HQ,
- 37 traditional climatological or agrological weather stations with manned observation instruments,
- 150 rain gauge stations,
- 1 upper air station, inactive since 2017, awaiting the replacement of the repairment of the Hydrogen gas-generator,
- 3 doppler Radars, of which two were functioning at the date of inspection, and
- no third-party weather stations are available to UNMA.

Main synoptic weather stations

There is one (1) main synoptic weather station at Entebbe International Airport, located near the NMC. Messages are manually collected, written and send every 30 minutes via email to the RTH in Nairobi. The Entebbe station and the NMC do not feed automatically into the global telecommunications system and thus have no access to RSTFA/SMT network. The Entebbe station is manned 24/7. There is one older and decommissioned reference AWS located next to the NMC.

Secondary synoptic weather stations

Next to the main station at Entebbe (above) there are 11 other synoptic weather stations administered by UNMA. These eleven are manned 12 hours per day and 7 days a week. Over the past 10 years, data delivery has improved to 68%. SMS text messages are written and transmitted every 30 minutes (over the 12 h operational period) to the UNMA HQ and the NMC.

[3] https://climate-laws.org/document/uganda-national-meteorological-authority-act-2012_48c4#

Annex 1 lists the seriously poor conditions of the 1 main- and the 11 secondary synoptic station, indicating numerous non-functioning, instable, or unrealisable sensors and or data logger.

AWS

UNMA has total of 90 AWS stations registered, 87 of which are (partly) functioning (including the 12 synoptic stations). The peer advisor was not able to evaluate their condition, but based on the AWS situation these are unlikely to be favourable.

Traditional climatological or agricultural stations

UNMA reports the existence of 54 traditional, manually operated stations, only 37 of which are (partly) operational. The peer advisor has not been able to verify their condition.

Rain gauge stations.

There are 150 manual and no automatic rain gauges in Uganda, excluding the AWSs. In general, manual stations are operated by rainfall observers reporting to UNMA at a 10-day frequency.

Upper Air Stations

There is no WIGOS registered Upper Air Station (UAS) in Uganda. However, one UAS is located at Entebbe International Airport but is not in operation since 2017 (see next section).

Doppler Radar stations

UNMA operates three Doppler Radar stations (two German systems from LEONARDO at Lira and Mbarara, and one Finnish Vaisala located at Entebbe. Entebbe is currently out of action due to failure of the uninterruptible power supply unit (UPS) and awaits repairs for over a year. The radars are operated at 240-250 km ranges, covering all of Uganda and Lake Victoria. Composite images are produced at the NWC Entebbe with software programme RAINBOW. Radar data is only stored for approximately 3 days', due to lack of data storage infrastructure.

Third-party weather stations

There are no official observation networks belonging to third parties that operate in Uganda and are identified, used or incorporated by UNMA.

Surface stations

Coverage

The present GBON coverage of the 11 surface stations in Uganda is reasonable with coverage gaps in the northwest – an area prone to drought and around Mubende (Figure 3). While the station at the Makerere University in Kampala is not visible at the WDQMS, UNMA shares data to the GTS of this station. It is registered at OSCAR/Surface with a WIGOS station identifier 63680. Therefore, this station is included as the GBON subset in the rest of this report and analyses.

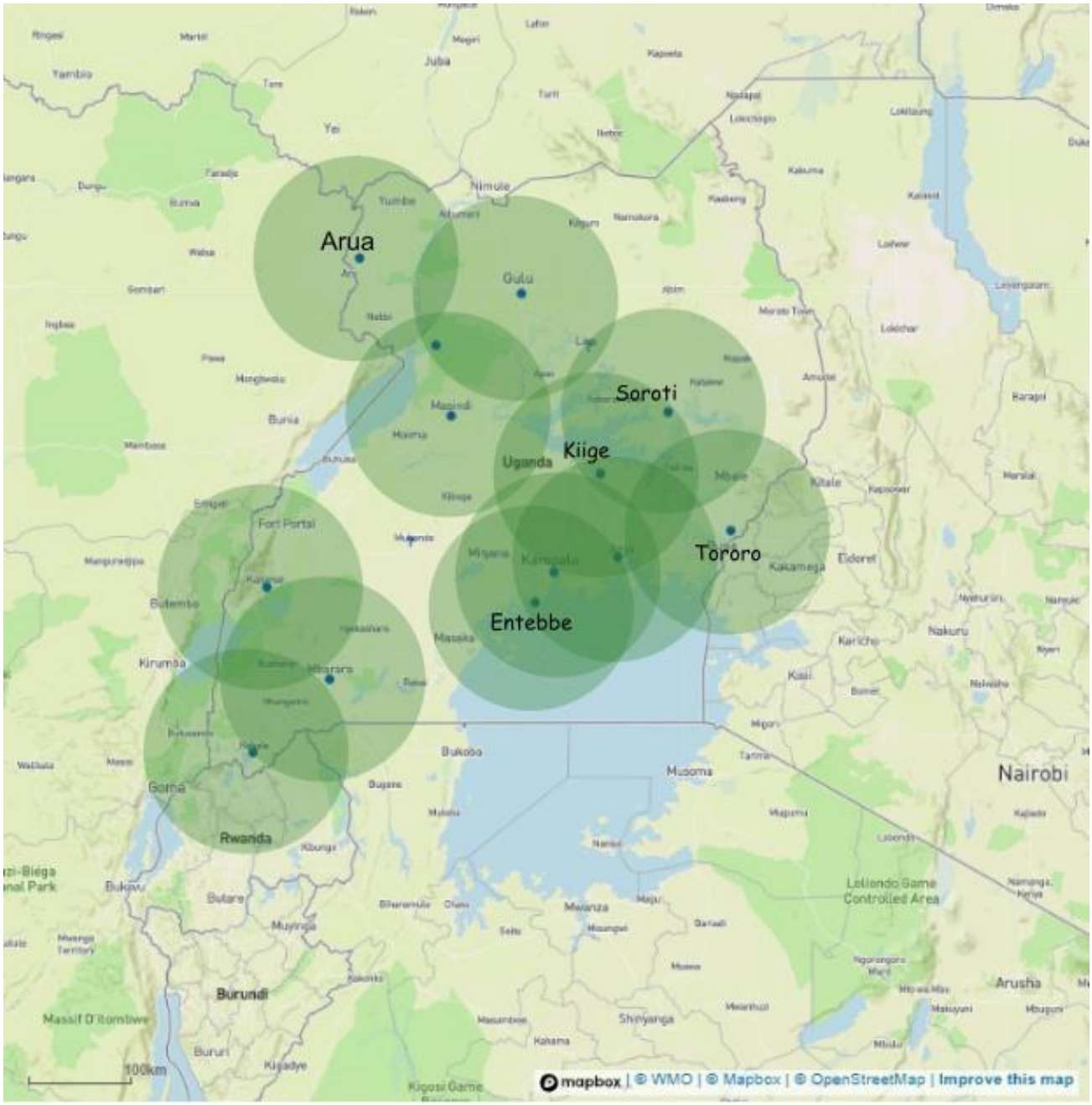

Figure 3: Stations registered with WIGOS ID available in OSCAR/Surface. GBON affiliated surface stations in Uganda are encircled with a diameter of 200 km as an indication of station coverage, gaps (central west and northeast) and overlap. Source map: OSCAR/Surface.

Station distribution in Uganda and neighbouring countries indicate reasonable distribution in the west – east axis and with Rwanda, and limited coverage in the north (South Sudan) and south of Uganda (Tanzania and Rwanda; Figure 1). Table 2 and Table 3 summarizes the existing GBON station networks. UNMA indicates potential for more intensive collaboration regarding station distribution with surrounding countries (esp. Rwanda, Kenya, Tanzania), especially within the framework of the East African Meteorological Society[4].

[4] https://ifms.org/index.cfm/ifms/members/east-african-meteorological-society/

Table 2. Assessment of existent stations per their operational status and network ownership

GBON Requirements	Existing observation stations (# of stations)			
	NMHS network		Third-party network	
	Reporting (GBON compliant) [5]	To improve	Reporting (GBON compliant)	To improve
Surface land stations Standard density[6] 200km Variables: SLP, T, H, W, P, SD	**0**	**12**	**0**	**0**
Upper-air stations operated from land Horizontal resolution[6]: 500km Vertical resolution: 100m, up to 30 hPa	**0**	**1**	**0**	**0**

Table 3. Assessment of existing GBON stations per station characteristics, including intended number of observations. Station type: S: Surface, UA: Upper-Air; Owner of the station: UNMA or name of third-party; GBON variables: SLP: Atmospheric pressure; T: Temperature; H: Humidity; W: wind; P: Precipitation. Reporting cycle: Number of observation reports exchanged internationally per day (0-24); GBON compliance: whether the station is GBON compliant or not.

Station name	Station type (S/UA/M)	Owner (UNMA /3rd party)	Funding source	GBON variable measured							Reporting cycle (obs/day)	GBON Compliant (Y/N)
				SLP	T	H	W	P	SD	SST		
Kiige	S	UNMA	UNMA	x	x	x	x	x	-	-	24	N
Makerere	S	UNMA	UNMA	x	x	x	x	x	-	-	24	N
Entebbe	S	UNMA	UNMA	x	x	x	x	x	-	-	48	N
Arua	S	UNMA	UNMA	x	x	x	x	x	-	-	24	N
Gulu	S	UNMA	UNMA	x	x	x	x	x	-	-	24	N
Soroti	S	UNMA	UNMA	x	x	x	x	x	-	-	24	N
Tororo	S	UNMA	UNMA	x	x	x	x	x	-	-	24	N
Jinja	S	UNMA	UNMA	x	x	x	x	x	-	-	24	N
Kabale	S	UNMA	UNMA	x	x	x	x	x	-	-	24	N
Mbarara	S	UNMA	UNMA	x	x	x	x	x	-	-	24	N
Kasese	S	UNMA	UNMA	x	x	x	x	x	-	-	24	N
Masindi	S	UNMA	UNMA	x	x	x	x	x	-	-	24	N

[5] The rationale for classifying surface and upper-air stations as reporting is based on the WIGOS Data Quality Monitoring System (WDQMS) for the chosen time period during the development of National Gap Analysis Stations with data availability more than 80% on at least 80% of days, are considered as reporting. Other listed stations are counted as having the possibility to be improved.

[6] For SIDS, for the WMO GBON Global Gap Analysis in June 2023, the EEZ area has been added to the total surface area which is the basis for the target number of stations. The standard density requirements for SIDS have been calculated with 500 km for surface stations and 1000 km for upper-air stations.

GBON-compliance

At present, none of the 12 GBON affiliated stations (nor the three (3) proposed stations to close remaining coverage gaps; see section 3) are GBON complaint. All stations require upgrading and partial rehabilitation. Stations have been installed in 2014-2016 under the Strengthening Meteorological product services and use in the agriculture and water sectors (SMEPS)[4] funded by German Development Cooperation GIZ and USAID. Such station equipment has a life cycle of about 10 years.

Of the 12 existing stations only Entebbe International Airport is operated 24/7; 10 others on 12/7 basis due to lack of manpower. While the stations are collocated both for manual measurements and with an AWS, currently, the manual measurements are communicated to the RTH for reasons of instability, unreliability and dysfunctional sensors (see Annex 1) and the lack of homogenization analyses between the AWSs and manual measurements. Challenges include the operation and maintenance and/or repair of the measuring equipment (both sensors and data loggers). There are no national calibration facilities in Uganda. A private company performs calibration annually. In some cases, sensors are sent to Nairobi for calibration.

Annex I provides an overview of station conditions and sensor functioning for the 12 WIGOS / GBON registered stations and three suggested additional stations (see section 3).

Data transfer gap

The major gap relevant for GBON is caused by the non-WIS complaint (or GTS) data transmission from stations to the Regional Telecommunication Hub (RTH) in Nairobi.

Station reports from the stations to the NWC is done manually (SMS, email) at 30 minutes intervals for 12/7 at 30 minutes intervals. NWC Entebbe forwards these data manually via email to the RTH in Nairobi at 30 minutes intervals. All manually transferred data is considerate to be vulnerable to data errors.

Upper air station - UAS

UNMA has no operational upper air station registered in WIGOS or at the WDQMS. The present Upper Air Station is located at Entebbe International Airport (Figure 4) and is inactive since 2017. Although station site and housing have recently been rehabilitated in 2023 (GoU funded), the station does not function due to failure of an obsolete Hydrogen generator, awaiting immediate replacement. Balloons and radio- sondes are in stock but are possibly in the vicinity of the expiry dates. Computer facilities (hard- and software) are lacking or are severely outdated.

[4] https://www.unma.go.ug/partners/giz-usaid

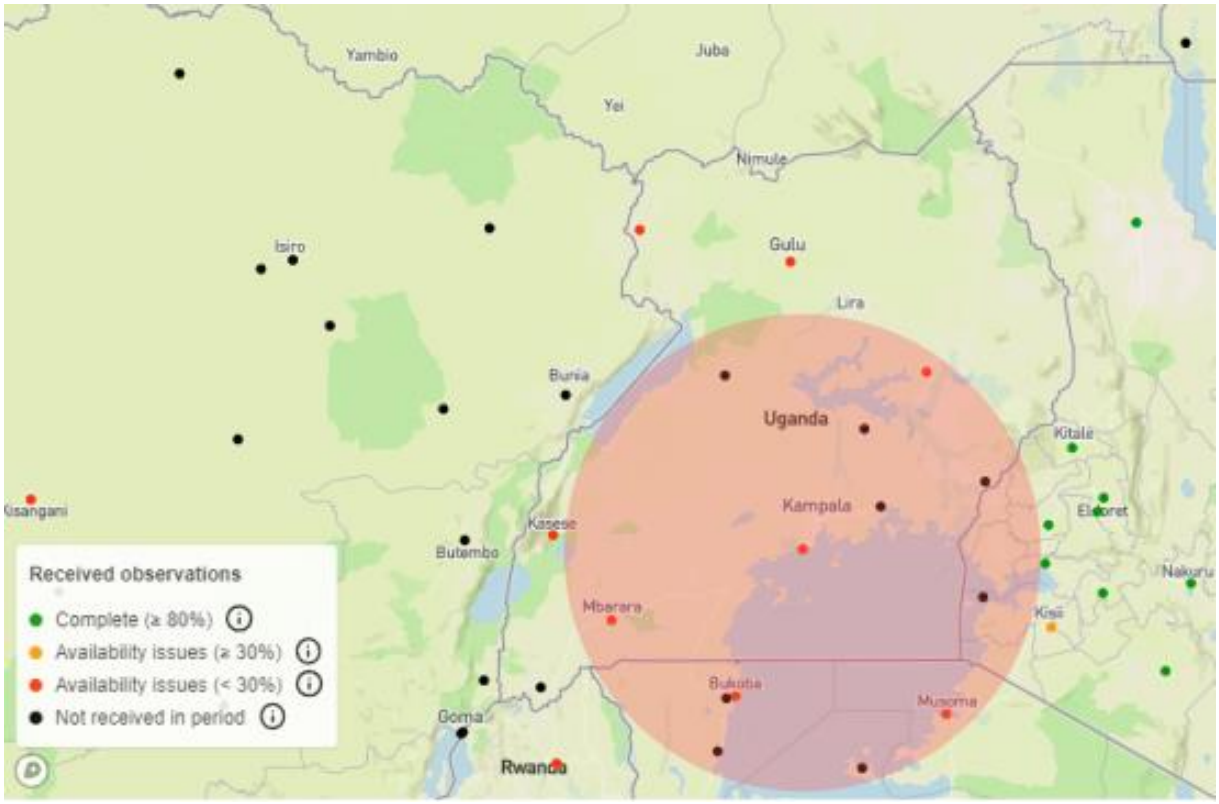

Figure 4: There are no registered Upper Air Stations (UAS) in Uganda indicated in WDQMS. An UAS at Entebbe International Airport is inactive and requires rehabilitation. The red circles indicate the 500 km diameter coverage areas. Source map: WDQMS.

3. Results of the GBON National Gap Analysis

Station locations

Based on the initial analysis in Section 1, seven (7) surface stations and one (1) upper air sounding station would fulfil the minimum GBON global requirement for spatial coverage in Uganda. However, the WMO guide no. 1160 states that "*Members should operate surface land observing networks/platforms at horizontal resolutions of 100 km or higher*". Uganda's topography and microclimate distribution, close proximity to conflict areas and concentration of socio-economic relevance in the central south requires at least nine (9) stations within the GBON complaint network (Figure 5: WDQMS registered surface stations to be included in SOFF for Uganda with diameter 200 km circles in green, including three new GBON affiliations for Kotido, Kitgum and Mubende in yellow. Source map: WDQMS.
Six (6) existing GBON affiliated stations of Kampala/Makerere, Tororo, Kiige, Kabale, Jinja and Gulu will be excluded in the SOFF proposal, although it is the intention to continue to share the observational data to the GTS or via WIS2.

Inclusion of two (2) surface stations above minimal requirement

There are very good arguments for the inclusion of 2 additional stations above the minimum requirement of seven (7). First and for all, only with nine (9) stations a full coverage of the Uganda national territory can be achieved. Second, two stations (Arua and Kasese) are located near the border of the Democratic Republic of the Congo, where armed conflict might disrupt the swift implementation of SOFF, rendering these close-border stations of sub-regional importance, as SOFF efforts for this region will increase data density from the conflict area. Thirdly, Kasese is situated in a mountainous area, at the location of an airport serving Uganda's number one tourist attractions, as Kasese is the entry point for the mountain gorilla visitors to Uganda.

). UNMA and the Peer Advisor realize that SOFF-related resources are limited. However, there are very strong arguments for the proposed nine (9) stations over the minimal seven (7).

Three (3) additional GBON surface stations may close remaining spatial gaps in the central-west (Mubende) and north-western sections (Kotido, Kitgum) of Uganda. Those stations are indicated with yellow circles in Figure 5. These locations have functioning stations already, but are not yet registered in WIGOS or GBON affiliated. The proposed Kotido and Kitgum stations contribute to better representation of the dryer climate and rainfall distribution in the north-western region, which affect people their lives.

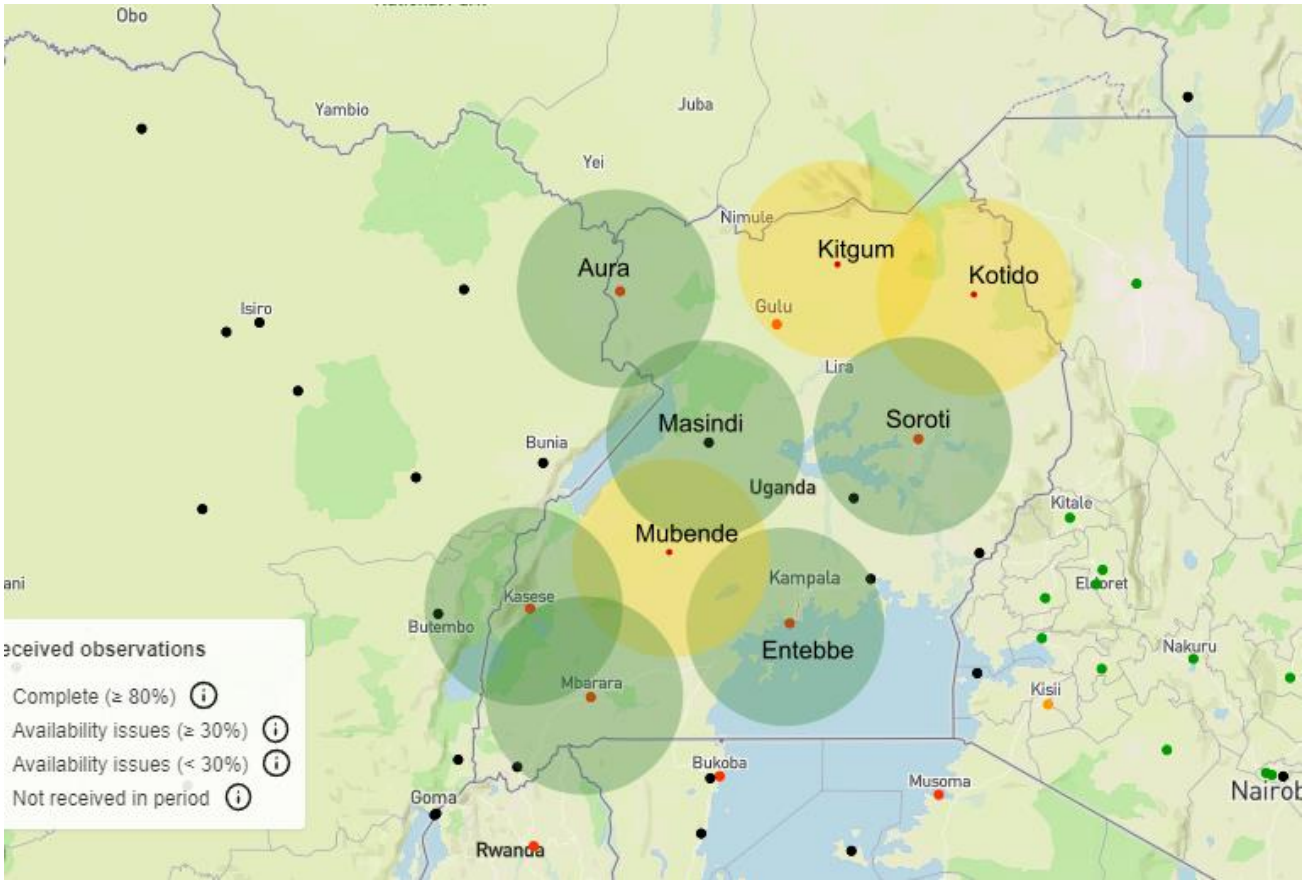

Figure 5: WDQMS registered surface stations to be included in SOFF for Uganda with diameter 200 km circles in green, including three new GBON affiliations for Kotido, Kitgum and Mubende in yellow. Source map: WDQMS.

Six (6) existing GBON affiliated stations of Kampala/Makerere, Tororo, Kiige, Kabale, Jinja and Gulu will be excluded in the SOFF proposal, although it is the intention to continue to share the observational data to the GTS or via WIS2.

Inclusion of two (2) surface stations above minimal requirement

There are very good arguments for the inclusion of 2 additional stations above the minimum requirement of seven (7). First and for all, only with nine (9) stations a full coverage of the Uganda national territory can be achieved. Second, two stations (Arua and Kasese) are located near the border of the Democratic Republic of the Congo, where armed conflict might disrupt the swift implementation of SOFF, rendering these close-border stations of sub-regional importance, as SOFF efforts for this region will increase data density from the conflict area. Thirdly, Kasese is situated in a mountainous area, at the location of an airport serving Uganda's number one tourist attractions, as Kasese is the entry point for the mountain gorilla visitors to Uganda.

With these arguments UNMA and the Peer Advisor strongly encourage SOFF GBON to include nine (9) rather than just seven (7) stations in this phase of SOFF.

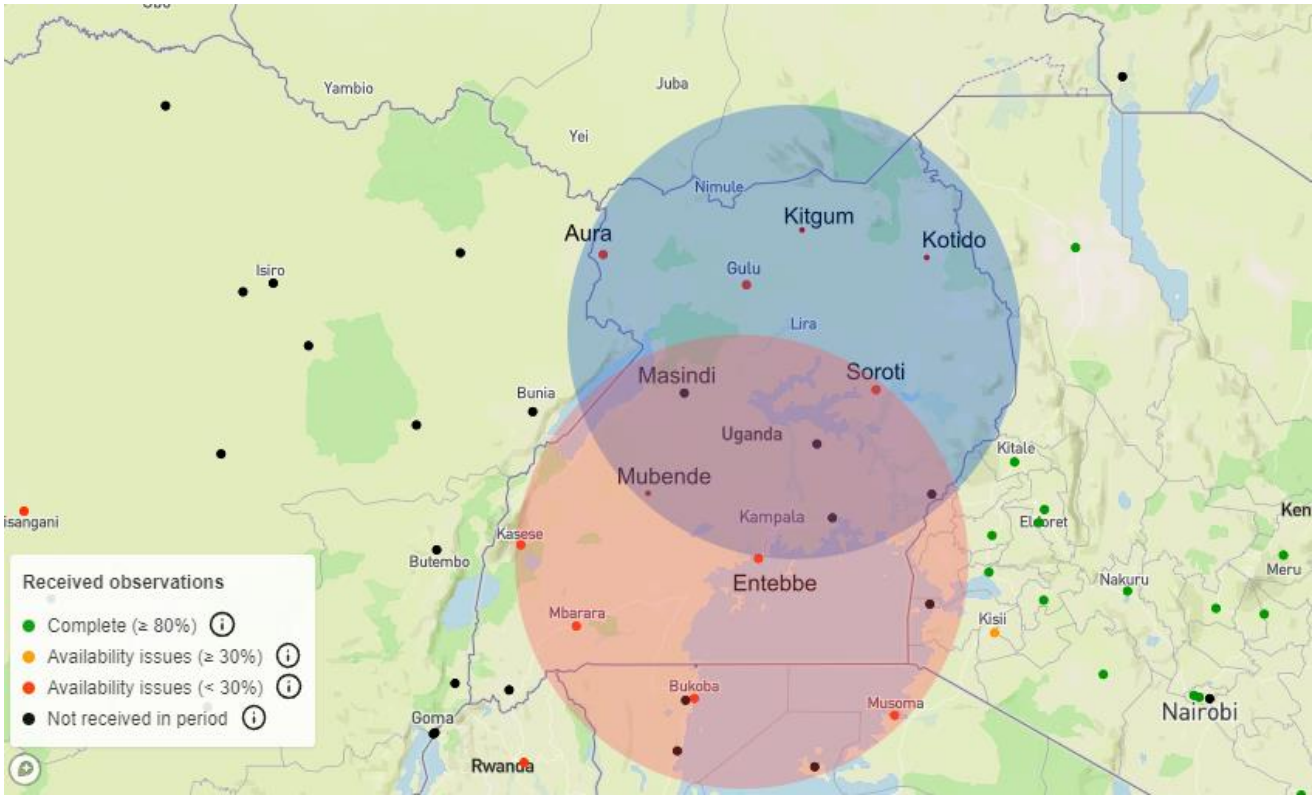

Figure 6. There are no registered Upper Air Stations (UAS) in Uganda registered in WDQMS. The circles indicate the 500 km diameter coverage areas. The UAS at Entebbe International Airport is inactive and requires rehabilitation (red). A newly proposed station at Lira (an existing radar site) is indicated, representing optimal coverage (blue). Gulu (northwest of Lira) is an alternative location. Source map: WDQMS.

Upper Air Station

The UAS at Entebbe International Airport should be registered in WIGOS once it is again in operation. The existing (but non-functional) UAS, operated from Entebbe International Airport will cover approximately 55-60 % of the country, including most of Lake Victoria (Figure 6). A second station will increase the coverage, for instance when this is located at Lira (Doppler Radar site) or Gulu (WIGOS registered AWS) (Figure 6). The rehabilitation of the existing station is considered the first priority.

Improvements needed to meet the GBON requirements.

The UNMA – KNMI peer review delegation carried out a field mission to the primary synoptical AWS at Entebbe International Airport (

7 and Figure 88). Additional information for the nine (9) proposed stations was obtained via questionnaire on the status of station infrastructure and communications. The current stations transmitting data to GTS and the three (3) newly proposed GBON affiliated stations are not compliant with GBON standards. All nine (9) stations (including the 3 stations new to GBON) require major updates and rehabilitation in the coming 2-3 years taking into account the 10 year end of life cycle of the sensors and dataloggers.

Calibration efforts are minimal. Manufacturer maintenance plans cannot be executed. Data collection (data logger) technology in general is moderate. Software availability and internet connection for data transfer are poor or not existing. UNMA capacity for station maintenance is generally moderate, with lack of capacity, spares, calibration possibilities and financial resources being the main obstacles.

The installation of a RSTFA/SMT network is necessary to meet Uganda's data transmission limitations on the global network. WIS compliant data transmission between stations, UNMA HQ/NWC and RTH in Nairobi is considered the main gap. The anticipated increase in data generated from extensive AWS network will translate into enhance demand for data storage facilities as well as a need for refresher training of UNMA staff in quality control techniques.

Conclusions

The results of the GBON Gap Analysis for Uganda are summarized in Table 4. Results of the GBON national gap analysis. Table 4 below.

Table 4. Results of the GBON national gap analysis.

GBON requirements	Global GBON target (# of stations)	Approved national target (# of stations)	GBON Compliant stations (#)	Stations gap	
				To improve	New*
Surface land stations	7	9	0	9	0
Upper-air stations operated from land	1	2	0	1	1

These finding suggest the following upgrades:

- Replacing of the nine (9) AWS dataloggers compliant with GBON equipped with the possibility transmit to the Global Transmission System (GTS) or WIS2 without human interference,
- Rehabilitation of the nine (9) AWS in 2025 – 2026,
- Revamping of the existing manually UAS at Entebbe by immediate replacing the hydrogen generator and computer hard-and software, and

In addition, this gap analysis demonstrates the need for:

- Facilitation of the repair- and maintenance facilities, materials, and capacity at UNMA.
- Rehabilitating and re-equipping of the sensor calibration laboratory.
- Providing local data storage- and management facilities and improve a climate database management system.

3.1 Recommended existing surface and upper-air stations to be designated to GBON

Table 5. Recommended existing surface stations and upper-air station to be designated to GBON.

Station name	Station type (S/UA)
Kitgum	S
Kotido	S
Mubende	S
Entebbe International Airport	UA
Lira	UA

Figure 7: Existing and representative surface AWS located at Entebbe International Airport.

Figure 8: First UNMA – KNMI field mission within the context of SOFF program. At Entebbe Station with UNMA staff. From left Eric Mauso, James Magezi Akiiki, Sharon Najjuma, Raimond Hafkenscheid (KNMI), Marlies van der Schee (KNMI), Fred Ssebabi, UNMA staff, Rubert Konijn (KNMI), Dr. Godwin Ayesiga on 14th of February 2024.

4. Report completion signatures

Peer Advisor signature  Mr Rubert Konijn, Director International Affairs, Royal Netherlands Meteorological Institute (KNMI), The Netherlands
WMO Technical Authority screening signature 
Beneficiary Country signature  Dr. Bob Alex Ogwang, Executive Director, Uganda National Meteorological Authority (UNMA), WMO PR of Uganda

ANNEX I **Current state of synoptic (WIGOS registered) meteorological stations**

ENTEBBE INTERNATIONAL AIRPORT – WIGOS ID: 63705			
Lat : 0.05	**Lon : 32.45**	**Elev : 1155m**	**Date opening: 2016**
TITLE/EQUIPMENT	**PROBLEMS ENCOUNTERED**	**IMPACTS ON OPERATIONS**	**PROPOSED SOLUTIONS**
Surface Measurement Equipment	1) Anemometer: life span 8 years – not sensitive. 2) Wind Vane: life span 8 years – not sensitive 3) Thermometer: life span 5 years – inconsistent 4) Hygrometer: life span 5 years – out of range 5) Atmospheric Barometer: life span 5 years – erratic 6) Rain gauge: life span 8 years – inconsistent 7) Data logger: life span 8 years – power problem 8) Solar panel life span 8 years – charges low	1) Wind data not used/ shared 2) Wind data not used/ shared 3) Temperature data not used/ shared 4) Data is not used and shared 5) Data is not used and shared 6) Data is not used and shared 7) Data not transmitted 8) Data logger not working 24 hours	1) Replace Anemometer 2) Replace wind vane 3) Replace thermometer 4) Replace Hydrometer 5) Replacement of Barometer 6) Replace Rain gauge 7) Replace Batteries (stock batteries) 8) Replace solar panel
Transmission	Data logger does not connect to GTS. Weather data not in table driven format codes.	Weather data not transmitted to GTS weather data not accepted on GTS	Create interface between AWS to Nairobi hub Equip Server with conversion software.
Building	Office accommodation dilapidated.	Reduced commitment to office time.	Renovate office block and adequately furnish it with basic necessities.
Station Environment	insecure office environment	Night work reduced	Provide for office safety measures/facilities.
Work Environment	Poor work environment	Reduced commitment to office time	Enhance working environment by providing necessities like breakfast and launch
Human Resources (Staff)	Capacity low on IT based work	Adoption of new work methods low	periodic Capacity building trainings
Other remarks			In general a number weather sensors require replacement
Picture site if available			

MASINDI METEOROLOGICAL STATION – WIGOS ID: 63654			
Lat : 1.68	**Lon : 31.72**	**Elev : 1147m**	**Date opening: 2016**
TITLE/EQUIPMENT	**PROBLEMS ENCOUNTERED**	**IMPACTS ON OPERATIONS**	**PROPOSED SOLUTIONS**
Surface Measurement Equipment	1) Anemometer: life span 8 years – not sensitive. 2) Wind Vane: life span 8 years – not sensitive 3) Thermometer: life span 5 years – inconsistent 4) Hygrometer: life span 5 years – out of range 5) Atmospheric Barometer: life span 5 years – erratic 6) Rain gauge: life span 8 years – inconsistent 7) Data logger: life span 8 years – power problem 8) Solar panel life span 8 years – charges low	1) Wind data not used/ shared 2) Wind data not used/ shared 3) Temperature data not used/ shared 4) Data is not used and shared 5) Data is not used and shared 6) Data is not used and shared 7) Data not transmitted 8) Data logger not working 24 hours	1) Replace Anemometer 2) Replace wind vane 3) Replace thermometer 4) Replace Hydrometer 5) Replacement of Barometer 6) Replace Rain gauge 7) Replace Batteries (stock batteries) 8) Replace solar panel
Transmission	Data logger does not connect to GTS. Weather data not in table driven format codes.	Weather data not transmitted to GTS weather data not accepted on GTS	Create interface between AWS to Nairobi hub Equip Server with conversion software.
Building	Office accommodation dilapidated.	Reduced commitment to office time.	Renovate office block and adequately furnish it with basic necessities.
Station Environment	secure office environment	Commitment to office time is good	Provide for office safety measures/facilities.
Work Environment	Poor work environment	Reduced commitment to office time	Enhance working environment by providing necessities like breakfast and launch
Human Resources (Staff)	Capacity low on IT based work	Adoption of new work methods low	periodic Capacity building trainings
Other remarks			In general a number weather sensors require replacement
Picture site if available			

KASESE METEOROLOGICAL STATION – WIGOS ID: 63654			
Lat : 0.18	**Lon : 30.10**	**Elev : 691m**	**Date opening: 2016**
TITLE/EQUIPMENT	**PROBLEMS ENCOUNTERED**	**IMPACTS ON OPERATIONS**	**PROPOSED SOLUTIONS**
Surface Measurement Equipment	1) Anemometer: life span 8 years – not sensitive. 2) Wind Vane: life span 8 years – not sensitive 3) Thermometer: life span 5 years – inconsistent 4) Hygrometer: life span 5 years – out of range 5) Atmospheric Barometer: life span 5 years – erratic 6) Rain gauge: life span 8 years – inconsistent 7) Data logger: life span 8 years – power problem 8) Solar panel life span 8 years – charges low	1) Wind data not used/ shared 2) Wind data not used/ shared 3) Temperature data not used/ shared 4) Data is not used and shared 5) Data is not used and shared 6) Data is not used and shared 7) Data not transmitted 8) Data logger not working 24 hours	1) Replace Anemometer 2) Replace wind vane 3) Replace thermometer 4) Replace Hydrometer 5) Replacement of Barometer 6) Replace Rain gauge 7) Replace Batteries (stock batteries) 8) Replace solar panel
Transmission	Data logger does not connect to GTS. Weather data not in table driven format codes.	Weather data not transmitted to GTS weather data not accepted on GTS	Create interface between AWS to Nairobi hub Equip Server with conversion software.
Building	Good	Good commitment to office time.	Renovate office block and adequately furnish it with necessities.
Station Environment	secure office environment but no safety gear	Good commitment	Provide for office safety measures/facilities.
Work Environment	Poor work environment	Reduced commitment to office time	Enhance working environment by providing necessities like breakfast and launch
Human Resources (Staff)	Capacity low on IT based work	Adoption of new work methods low	periodic Capacity building trainings
Other remarks			In general a number weather sensors require replacement
Picture site if available			

KABALE METEOROLOGICAL STATION – WIGOS ID: 63726			
Lat : -1.25	**Lon : 29.98**	**Elev : 1869m**	**Date opening: 2016**
TITLE/EQUIPMENT	**PROBLEMS ENCOUNTERED**	**IMPACTS ON OPERATIONS**	**PROPOSED SOLUTIONS**
Surface Measurement Equipment	1) Anemometer: life span 8 years – not sensitive. 2) Wind Vane: life span 8 years – not sensitive 3) Thermometer: life span 5 years – not calibrated 4) Hygrometer: life span 5 years – not calibrated 5) Atmospheric Barometer: life span 5 years – erratic 6) Rain gauge: life span 8 years – inconsistent 7) Data logger: life span 8 years – power problem 8) Solar panel life span 8 years – charges low	1) Wind data not used/ shared 2) Wind data not used/ shared 3) Temperature data not used/ shared 4) Data is not used and shared 5) Data is not used and shared 6) Data is not used and shared 7) Data not transmitted 8) Data logger not working 24 hours	1) Replace Anemometer 2) Replace wind vane 3) Replace thermometer 4) Replace Hydrometer 5) Replacement of calibrated Barometer 6) Replace Rain gauge 7) Replace Batteries (stock batteries) 8) Replace solar panel
Transmission	Data logger does not connect to GTS. Weather data not in table driven format codes.	Weather data not transmitted to GTS weather data not accepted on GTS	Create interface between AWS to Nairobi hub Equip Server with conversion software.
Building	Office accommodation dilapidated.	Reduced commitment to office time.	Renovate office block and adequately furnish it with necessities.
Station Environment	secure office environment but no safety gear	Commitment to work is good	Provide for office safety measures/facilities.
Work Environment	Poor work environment	Reduced commitment to office time	Enhance working environment by providing necessities like breakfast and launch
Human Resources (Staff)	Capacity low on IT based work	Adoption of new work methods low	periodic Capacity building trainings
Other remarks			In general a number weather sensors require replacement
Picture site if available			

MBARARA METEOROLOGICAL STATION – WIGOS ID: 63702			
Lat : -0.60	**Long : 30.68**	**Elev : 1420m**	**Date opening: 2016**
TITLE/EQUIPMENT	**PROBLEMS ENCOUNTERED**	**IMPACTS ON OPERATIONS**	**PROPOSED SOLUTIONS**
Surface Measurement Equipment	1) Anemometer: life span 8 years – not sensitive. 2) Wind Vane: life span 8 years – not sensitive 3) Thermometer: life span 5 years – not calibrated 4) Hygrometer: life span 5 years – not calibrated 5) Atmospheric Barometer: life span 5 years – erratic 6) Rain gauge: life span 8 years – inconsistent 7) Data logger: life span 8 years – power problem Solar panel life span 8 years – charges low	1) Wind data not used/ shared 2) Wind data not used/ shared 3) Temperature data not used/ shared 4) Data is not used and shared 5) Data is not used and shared 6) Data is not used and shared 7) Data not transmitted Data logger not working 24 hours	1) Replace Anemometer 2) Replace wind vane 3) Replace thermometer 4) Replace Hydrometer 5) Replacement of Barometer 6) Replace Rain gauge 7) Replace Batteries (stock batteries) Replace solar panel
Transmission	Data logger does not connect to GTS. Weather data not in table driven format codes.	Weather data not transmitted to GTS weather data not accepted on GTS	Create interface between AWS to Nairobi hub Equip Server with conversion software.
Building	Office accommodation is good.	-	-
Station Environment	secure office environment but not safety gear	Commitment to work	Provide for office safety measures/facilities.
Work Environment	Poor work environment	Reduced commitment to office time	Enhance working environment by providing necessities like breakfast and launch
Human Resources (Staff)	Capacity low on IT based work	Adoption of new work methods low	periodic Capacity building trainings
Other remarks			In general a number weather sensors require replacement
Picture site if available			

SOROTI METEOROLOGICAL STATION – WIGOS ID:63658			
Lat : 1.72	**Lon : 33.62**	**Elev : 1132m**	**Date opening: 2016**
TITLE/EQUIPMENT	**PROBLEMS ENCOUNTERED**	**IMPACTS ON OPERATIONS**	**PROPOSED SOLUTIONS**
Surface Measurement Equipment	1) Anemometer: life span 8 years – not sensitive. 2) Wind Vane: life span 8 years – not sensitive 3) Thermometer: life span 5 years – not calibrated 4) Hygrometer: life span 5 years – Not calibrated 5) Atmospheric Barometer: life span 5 years – erratic 6) Rain gauge: life span 8 years – inconsistent 7) Data logger: life span 8 years – power problem Solar panel life span 8 years – charges low	1) Wind data not used/ shared 2) Wind data not used/ shared 3) Temperature data not used/ shared 4) Data is not used and shared 5) Data is not used and shared 6) Data is not used and shared 7) Data not transmitted Data logger not working 24 hours	1) Replace Anemometer 2) Replace wind vane 3) Replace thermometer 4) Replace Hydrometer 5) Replacement of Barometer 6) Replace Rain gauge 7) Replace Batteries (stock batteries) Replace solar panel
Transmission	Data logger does not connect to GTS. Weather data not in table driven format codes.	Weather data not transmitted to GTS weather data not accepted on GTS	Create interface between AWS to Nairobi hub Equip Server with conversion software.
Building	Office accommodation dilapidâted.	Reduced commitment to office time.	Renovate office block and adequately furnish it with necessities.
Station Environment	secure office environment but no safe gear	Risk free work environment	Provide for office safety measures/facilities.
Work Environment	Poor work environment	Reduced commitment to office time	Enhance working environment by providing necessities like breakfast and launch
Human Resources (Staff)	Capacity low on IT based work	Adoption of new work methods low	periodic Capacity building trainings
Other remarks			In general a number weather sensors require replacement
Picture site if available			

GULU METEOROLOGICAL STATION – WIGOS ID: 63630			
Lat : 2.78	**Lon : 32.28**	**Elev : 1147m**	**Date opening: 2016**
TITLE/EQUIPMENT	**PROBLEMS ENCOUNTERED**	**IMPACTS ON OPERATIONS**	**PROPOSED SOLUTIONS**
Surface Measurement Equipment	1) Anemometer: life span 8 years – not sensitive. 2) Wind Vane: life span 8 years – not sensitive 3) Thermometer: life span 5 years – functional 4) Hygrometer: life span 5 years – functional 5) Atmospheric Barometer: life span 5 years – erratic 6) Rain gauge: life span 8 years – functional 7) Data logger: life span 8 years – power problem 8) Solar panel life span 8 years – charges low	1) Wind data not used/ shared 2) Wind data not used/ shared 3) Temperature data not used/ shared 4) Data is not used and shared 5) Data is not used and shared 6) Data is not used and shared 7) Data not transmitted Data logger not working 24 hours	1) Replace Anemometer 2) Replace wind vane 3) Replace thermometer 4) Replace Hydrometer 5) Replacement of Barometer 6) Replace Rain gauge – life span 7) Replace Batteries (stock batteries) Replace solar panel
Transmission	Data logger does not connect to GTS. Weather data not in table driven format codes.	Weather data not transmitted to GTS weather data not accepted on GTS	Create interface between AWS to Nairobi hub Equip Server with conversion software.
Building	Office accommodation too small	Reduced commitment to office time.	Construct bigger office block and adequately furnish it with basic necessities.
Station Environment	secure office environment	Operations risk free	maintain
Work Environment	Poor work environment	Reduced commitment to office time	Enhance working environment by providing necessities like breakfast and launch
Human Resources (Staff)	Capacity low on IT based work	Adoption of new work methods low	periodic Capacity building trainings
Other remarks			In general a number weather sensors require replacement
Picture site if available			

MAKERERE METEOROLOGICAL STATION			
Lat : 0.25	**Lon : 32.63**	**Elev : 1200m**	**Date opening: 2016**
TITLE/EQUIPMENT	**PROBLEMS ENCOUNTERED**	**IMPACTS ON OPERATIONS**	**PROPOSED SOLUTIONS**
Surface Measurement Equipment	1) Anemometer: life span 8 years – not sensitive. 2) Wind Vane: life span 8 years – not sensitive 3) Thermometer: life span 5 years – inconsistent 4) Hygrometer: life span 5 years – out of range 5) Atmospheric Barometer: life span 5 years – erratic 6) Rain gauge: life span 8 years – inconsistent 7) Data logger: life span 8 years – power problem 8) Solar panel life span 8 years – charges low	1) Wind data not used/ shared 2) Wind data not used/ shared 3) Temperature data not used/ shared 4) Data is not used and shared 5) Data is not used and shared 6) Data is not used and shared 7) Data not transmitted 8) Data logger not working 24 hours	1) Replace Anemometer 2) Replace wind vane 3) Replace thermometer 4) Replace Hydrometer 5) Replacement of Barometer 6) Replace Rain gauge 7) Replace Batteries (stock batteries) 8) Replace solar panel
Transmission	Data logger does not connect to GTS. Weather data not in table driven format codes.	Weather data not transmitted to GTS weather data not accepted on GTS	Create interface between AWS to Nairobi hub Equip Server with conversion software.
Building	Office accommodation is good but small.	-	-.
Station Environment	Secure office environment	Security provided	-
Work Environment	Poor work environment	Reduced commitment to office time	Enhance working environment by providing necessities like breakfast and launch
Human Resources (Staff)	Capacity low on IT based work	Adoption of new work methods low	periodic Capacity building trainings
Other remarks			In general a number weather sensors require replacement
Picture site if available			

KOTIDO METEOROLOGICAL STATION			
Lat : 3.02	**Lon : 34.17**	**Elev :1260m**	**Date opening: 2016**
TITLE/EQUIPMENT	**PROBLEMS ENCOUNTERED**	**IMPACTS ON OPERATIONS**	**PROPOSED SOLUTIONS**
Surface Measurement Equipment	1) Anemometer: life span 8 years – not sensitive. 2) Wind Vane: life span 8 years – not sensitive 3) Thermometer: life span 5 years – inconsistent 4) Hygrometer: life span 5 years – out of range 5) Atmospheric Barometer: life span 5 years – erratic 6) Rain gauge: life span 8 years – inconsistent 7) Data logger: life span 8 years – power problem Solar panel life span 8 years – charges low	1) Wind data not used/ shared 2) Wind data not used/ shared 3) Temperature data not used/ shared 4) Data is not used and shared 5) Data is not used and shared 6) Data is not used and shared 7) Data not transmitted Data logger not working 24 hours	1) Replace Anemometer 2) Replace wind vane 3) Replace thermometer 4) Replace Hydrometer 5) Replacement of Barometer 6) Replace Rain gauge 7) Replace Batteries (stock batteries) Replace solar panel
Transmission	Data logger does not connect to GTS. Weather data not in table driven format codes.	Weather data not transmitted to GTS weather data not accepted on GTS	Create interface between AWS to Nairobi hub Equip Server with conversion software.
Building	Office accommodation in a uniport	Reduced commitment to office time.	construct office block and adequately furnish it with basic necessities.
Station Environment	insecure office environment	Commitment to work reduced	Provide for office safety measures/facilities.
Work Environment	Poor work environment	Reduced commitment to office time	Enhance working environment by providing necessities like breakfast and launch
Human Resources (Staff)	Capacity low on IT based work	Adoption of new work methods low	periodic Capacity building trainings
Other remarks			In general a number weather sensors require replacement
Picture site if available			

KITGUM METEOROLOGICAL STATION			
Lat : 3.30	**Lon : 32.88**	**Elev :940 m**	**Date opening: 2016**
TITLE/EQUIPMENT	**PROBLEMS ENCOUNTERED**	**IMPACTS ON OPERATIONS**	**PROPOSED SOLUTIONS**
Surface Measurement Equipment	1) Anemometer: life span 8 years – not sensitive. 2) Wind Vane: life span 8 years – not sensitive 3) Thermometer: life span 5 years – inconsistent 4) Hygrometer: life span 5 years – out of range 5) Atmospheric Barometer: life span 5 years – erratic 6) Rain gauge: life span 8 years – inconsistent 7) Data logger: life span 8 years – power problem Solar panel life span 8 years – charges low	1) Wind data not used/ shared 2) Wind data not used/ shared 3) Temperature data not used/ shared 4) Data is not used and shared 5) Data is not used and shared 6) Data is not used and shared 7) Data not transmitted Data logger not working 24 hours	1) Replace Anemometer 2) Replace wind vane 3) Replace thermometer 4) Replace Hydrometer 5) Replacement of Barometer 6) Replace Rain gauge 7) Replace Batteries (stock batteries) Replace solar panel
Transmission	Data logger does not connect to GTS. Weather data not in table driven format codes.	Weather data not transmitted to GTS weather data not accepted on GTS	Create interface between AWS to Nairobi hub Equip Server with conversion software.
Building	Office accommodation dilapidâted.	Reduced commitment to office time.	Renovate office block and adequately furnish it with basic necessities.
Station Environment	insecure office environment	Night work reduced	Provide for office safety measures/facilities.
Work Environment	Poor work environment	Reduced commitment to office time	Enhance working environment by providing necessities like breakfast and launch
Human Resources (Staff)	Capacity low on IT based work	Adoption of new work methods low	periodic Capacity building trainings
Other remarks			In general a number weather sensors require replacement
Picture site if available			

NTUSI METEOROLOGICAL STATION			
Lat : 0.57	**Lon : 31.38**	**Elev :1275m**	**Date opening: 2016**
TITLE/EQUIPMENT	**PROBLEMS ENCOUNTERED**	**IMPACTS ON OPERATIONS**	**PROPOSED SOLUTIONS**
Surface Measurement Equipment	1) Anemometer: life span 8 years – not sensitive. 2) Wind Vane: life span 8 years – not sensitive 3) Thermometer: life span 5 years – inconsistent 4) Hygrometer: life span 5 years – out of range 5) Atmospheric Barometer: life span 5 years – erratic 6) Rain gauge: life span 8 years – inconsistent 7) Data logger: life span 8 years – power problem Solar panel life span 8 years – charges low	1) Wind data not used/ shared 2) Wind data not used/ shared 3) Temperature data not used/ shared 4) Data is not used and shared 5) Data is not used and shared 6) Data is not used and shared 7) Data not transmitted Data logger not working 24 hours	1) Replace Anemometer 2) Replace wind vane 3) Replace thermometer 4) Replace Hydrometer 5) Replacement of Barometer 6) Replace Rain gauge 7) Replace Batteries (stock batteries) Replace solar panel
Transmission	Data logger does not connect to GTS. Weather data not in table driven format codes.	Weather data not transmitted to GTS weather data not accepted on GTS	Create interface between AWS to Nairobi hub Equip Server with conversion software.
Building	Office accommodation is a uniport	Reduced commitment to office time.	Construct proper office block and adequately furnish it with basic necessities.
Station Environment	Insecure office environment	Commitment to work reduced	Provide for office safety measures/facilities.
Work Environment	Poor work environment	Reduced commitment to office time	Enhance working environment by providing necessities like breakfast and launch
Human Resources (Staff)	Capacity low on IT based work	Adoption of new work methods low	periodic Capacity building trainings
Other remarks			In general a number weather sensors require replacement
Picture site if available			

MUBENDE METEOROLOGICAL STATION.			
Lat : 0.58	**Lon : 31.37**	**Elev : 1290m**	**Date opening: 2016**
TITLE/EQUIPMENT	**PROBLEMS ENCOUNTERED**	**IMPACTS ON OPERATIONS**	**PROPOSED SOLUTIONS**
Surface Measurement Equipment	1) Anemometer: life span 8 years – not sensitive. 2) Wind Vane: life span 8 years – not sensitive 3) Thermometer: life span 5 years – inconsistent 4) Hygrometer: life span 5 years – out of range 5) Atmospheric Barometer: life span 5 years – erratic 6) Rain gauge: life span 8 years – inconsistent 7) Data logger: life span 8 years – power problem 8) Solar panel life span 8 years – charges low	1) Wind data not used/ shared 2) Wind data not used/ shared 3) Temperature data not used/ shared 4) Data is not used and shared 5) Data is not used and shared 6) Data is not used and shared 7) Data not transmitted 8) Data logger not working 24 hours	1) Replace Anemometer 2) Replace wind vane 3) Replace thermometer 4) Replace Hydrometer 5) Replacement of Barometer 6) Replace Rain gauge 7) Replace Batteries (stock batteries) Replace solar panel
Transmission	Data logger does not connect to GTS. Weather data not in table driven format codes.	Weather data not transmitted to GTS weather data not accepted on GTS	Create interface between AWS to Nairobi hub Equip Server with conversion software.
Building	Station has no Office accommodation.	Reduced commitment to office time.	Construct office block and adequately furnish it with basic necessities.
Station Environment	Insecure office environment	Staff can't work in bad weather	Provide for office safety measures/facilities.
Work Environment	Poor work environment	Reduced commitment to office time	Enhance working environment by providing necessities like breakfast and launch
Human Resources (Staff)	Capacity low on IT based work	Adoption of new work methods low	periodic Capacity building trainings
Other remarks			In general a number weather sensors require replacement
Picture site if available			

JINJA METEOROLOGICAL STATION – WIGOS ID: 63682			
Lat : 0.45	**Lon : 33.18**	**Elev : 1175m**	**Date opening: 2016**
TITLE/EQUIPMENT	**PROBLEMS ENCOUNTERED**	**IMPACTS ON OPERATIONS**	**PROPOSED SOLUTIONS**
Surface Measurement Equipment	1) Anemometer: life span 8 years – not sensitive. 2) Wind Vane: life span 8 years – not sensitive 3) Thermometer: life span 5 years – inconsistent 4) Hygrometer: life span 5 years – out of range 5) Atmospheric Barometer: life span 5 years – erratic 6) Rain gauge: life span 8 years – functional 7) Data logger: life span 8 years – power problem 8) Solar panel life span 8 years – charges low	1) Wind data not used/ shared 2) Wind data not used/ shared 3) Temperature data not used/ shared 4) Data is not used and shared 5) Data is not used and shared 6) Data is not used and shared 7) Data not transmitted 8) Data logger not working 24 hours	1) Replace Anemometer 2) Replace wind vane 3) Replace thermometer 4) Replace Hydrometer 5) Replacement of Barometer 6) Replace Rain gauge 7) Replace Batteries (stock batteries) Replace solar panel
Transmission	Data logger does not connect to GTS. Weather data not in table driven format codes.	Weather data not transmitted to GTS weather data not accepted on GTS	Create interface between AWS to Nairobi hub Equip Server with conversion software.
Building	Office accommodation is too small.	Reduced commitment to office time.	Acquire more office space and adequately furnish it with basic necessities.
Station Environment	Insecure office environment	Night work reduced	Provide for office safety measures/facilities.
Work Environment	Poor work environment	Reduced commitment to office time	Enhance working environment by providing necessities like breakfast and launch
Human Resources (Staff)	Capacity low on IT based work	Adoption of new work methods low	periodic Capacity building trainings
Other remarks			In general a number weather sensors require replacement
Picture site if available			

TORORO METEOROLOGICAL STATION – WIGOS ID: 63684			
Lat : 0.68	**Lon : 34.17**	**Elev : 1170m**	**Date opening: 2016**
TITLE/EQUIPMENT	**PROBLEMS ENCOUNTERED**	**IMPACTS ON OPERATIONS**	**PROPOSED SOLUTIONS**
Surface Measurement Equipment	1) Anemometer: life span 8 years – not sensitive. 2) Wind Vane: life span 8 years – not sensitive 3) Thermometer: life span 5 years – not calibrated 4) Hygrometer: life span 5 years – not calibrated 5) Atmospheric Barometer: life span 5 years – erratic 6) Rain gauge: life span 8 years – non functional 7) Data logger: life span 8 years – power problem 8) Solar panel life span 8 years – charges low	1) Wind data not used/ shared 2) Wind data not used/ shared 3) Temperature data not used/ shared 4) Data is not used and shared 5) Data is not used and shared 6) Data is not used and shared 7) Data not transmitted Data logger not working 24 hours	1) Replace Anemometer 2) Replace wind vane 3) Replace thermometer 4) Replace Hydrometer 5) Replacement of Barometer 6) Replace Rain gauge 7) Replace Batteries (stock batteries) Replace solar panel
Transmission	Data logger does not connect to GTS. Weather data not in table driven format codes.	Weather data not transmitted to GTS weather data not accepted on GTS	Create interface between AWS to Nairobi hub Equip Server with conversion software.
Building	Office accommodation fair.	Confidence and Commitment to office time.	-.
Station Environment	Uncertain due to upcoming future developments	Fear of station obstruction	Provide for office safety measures/facilities.
Work Environment	Poor work environment	Reduced commitment to office time	Enhance working environment by providing necessities like breakfast and launch
Human Resources (Staff)	Capacity low on IT based work	Adoption of new work methods low	periodic Capacity building trainings
Other remarks			In general a number weather sensors require replacement
Picture site if available			

ARUA METEOROLOGICAL STATION – WIGOS ID: 63602			
Lat : 3.05	**Lon : 30.92**	**Elev : 1280m**	**Date opening: 2016**
TITLE/EQUIPMENT	**PROBLEMS ENCOUNTERED**	**IMPACTS ON OPERATIONS**	**PROPOSED SOLUTIONS**
Surface Measurement Equipment	1) Anemometer: life span 8 years – not sensitive. 2) Wind Vane: life span 8 years – not sensitive 3) Thermometer: life span 5 years – not calibrated 4) Hygrometer: life span 5 years – not calibrated 5) Atmospheric Barometer: life span 5 years – erratic 6) Rain gauge: life span 8 years – inconsistent 7) Data logger: life span 8 years – power problem 8) Solar panel life span 8 years – charges low	1) Wind data not used/ shared 2) Wind data not used/ shared 3) Temperature data not used/ shared 4) Data is not used and shared 5) Data is not used and shared 6) Data is not used and shared 7) Data not transmitted 8) Data logger not working 24 hours	1) Replace Anemometer 2) Replace wind vane 3) Replace thermometer 4) Replace Hydrometer 5) Replacement of Barometer 6) Replace Rain gauge 7) Replace Batteries (stock batteries) Replace solar panel
Transmission	Data logger does not connect to GTS. Weather data not in table driven format codes.	Weather data not transmitted to GTS weather data not accepted on GTS	Create interface between AWS to Nairobi hub Equip Server with conversion software.
Building	Office accommodation is good.	High commitment to work.	Maintain or improve
Station Environment	secure but no safety gear	Risk fatalities, increase of accidents	Provide for office safety measures/facilities.
Work Environment	Poor work environment	Reduced commitment to office time	Enhance working environment by providing necessities like breakfast and launch
Human Resources (Staff)	Capacity low on IT based work	Adoption of new work methods low	periodic Capacity building trainings
Other remarks			In general a number weather sensors require replacement
Picture site if available			

LIRA METEOROLOGICAL STATION			
Lat : 2.25	**Lon : 32.90**	**Elev : 1068m**	**Date opening: 2016**
TITLE/EQUIPMENT	**PROBLEMS ENCOUNTERED**	**IMPACTS ON OPERATIONS**	**PROPOSED SOLUTIONS**
Surface Measurement Equipment	1) Anemometer: life span 8 years – not sensitive. 2) Wind Vane: life span 8 years – not sensitive 3) Thermometer: life span 5 years – inconsistent 4) Hygrometer: life span 5 years – out of range 5) Atmospheric Barometer: life span 5 years – erratic 6) Rain gauge: life span 8 years – non functional 7) Data logger: life span 8 years – power problem 8) Solar panel life span 8 years – charges low	1) Wind data not used/ shared 2) Wind data not used/ shared 3) Temperature data not used/ shared 4) Data is not used and shared 5) Data is not used and shared 6) Data is not used and shared 7) Data not transmitted 8) Data logger not working 24 hours	1) Replace Anemometer 2) Replace wind vane 3) Replace thermometer 4) Replace Hydrometer 5) Replacement of Barometer 6) Replace Rain gauge 7) Replace Batteries (stock batteries) Replace solar panel
Transmission	Data logger does not connect to GTS. Weather data not in table driven format codes.	Weather data not transmitted to GTS weather data not accepted on GTS	Create interface between AWS to Nairobi hub Equip Server with conversion software.
Building	Office spare good	-	
Station Environment	Secure office environment	-	-
Work Environment	poor	Non motivating towards work	Enhance working environment by providing necessities like breakfast and launch
Human Resources (Staff)	Capacity low on IT based work	Adoption of new work methods low	periodic Capacity building trainings
Other remarks			In general a number weather sensors require replacement
Picture site if available			

UPPER AIR STATION ENTEBBE			
Lat : 0.05	**Lon : 32.42**	**Elev : 1155m**	**Date opening:**
TITLE/EQUIPMENT	**PROBLEMS ENCOUNTERED**	**IMPACTS ON OPERATIONS**	**PROPOSED SOLUTIONS**
Surface Measurement Equipment	1) Hydrogen generator (life time 10 years) – not working 2) Hydrogen gas: not under production 3) Sounding system (life time 10 years) 4) Radiosondes (life time 5 years) 5) Balloons old	1) No hydrogen gas produced 2) Weather balloons not released 3) Upper air weather data not captured 4) No exchange of upper weather data 5) No sounding made	1) Repair the hydrogen gas generator. 2) Stock radiosondes 3) Stock Balloons 4) Replace radiosondes 5) Replace balloons
Transmission	Sounding System does not connect to GTS-Nairobi	Upper Weather data not transmitted to GTS Upper Air weather data not accepted on GTS	Equip internet connectivity interface between upper air station and GTS
Building	No Problem-newly rehabilited	-	-
Station Environment	Well maintained and secure	-	-
Work Environment	Poor work environment	Reduced commitment to office time at night	Provide beddings.
Human Resource (Staff)	Capacity low in making upper air soundings	Adoption of new work methods low	Periodic Capacity building trainings Recruit more staff
Other remarks			
Picture site if available			