10 April 2024

GBON National Gap Analysis: LIBERIA

Systematic Observations
Financing Facility

**Weather
and climate
data for
resilience**

Screening of the National Gap Analysis (NGA) of Liberia

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

Date: 30 September 2024

Signature:

Albert Fischer

Director, WIGOS Branch, Infrastructure Department, WMO

GBON National Gap Analysis Report
Liberia

Beneficiary Country Focal Point and Institute	Arthur Gar-Glahn/Liberia
Peer Advisor Focal Point and Institute	Oluwaseun Wilfred IDOWU/NiMet

1. Country information from the GBON Global Gap Analysis

Please provide in this Table the country information as provided by the WMO Global GBON Gap Analysis.

Table I. 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	3	0	3	0	3
Upper-air stations over land Standard density[2] 500km	1	0	0	1	1

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

Please complete the two tables below and add remarks and Annexes with technical details as needed.

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

GBON Requirements	Existing observation stations (# of stations)			
	NMHS network		Third-party network	
	Reporting to req. [3]	To improve	Reporting to req. [4]	To improve
Surface land stations Standard density 200km Variables: SLP, T, H, W, P, SD	0	11	0	1
Upper-air stations operated from land Horizontal resolution[5]: 500km. Vertical resolution: 100m, up to 30 hPa Variables: T, H, W	0	0	0	0
Surface marine stations in Exclusive Economic Zones: 500 km Variables: SLP, SST	0	0	0	0
Upper-air stations operated in Exclusive Economic Zones:[6] 1000 km. Vertical resolution: 100m, up to 30 hPa Variables: T, H, W	0	0	0	0

Table III. Assessment of existing GBON stations per station characteristics. Station type: S: Surface, UA: Upper-Air; M: Marine; Owner of the station: NMHS or name of third-party; GBON variables: SLP: Atmospheric pressure; T: Temperature; H: Humidity; W: wind; P: Precipitation; SD: Snow depth; SST: Sea surface temperature; Reporting cycle: Number of observation reports exchanged internationally per day (0-24); GBON compliance: weather the station is GBON compliant or not (see GBON guide on compliance criteria).

Station name	Station type (S/UA/M[7])	Owner (NMHS/3rd party)	Funding source	GBON variable measured							Reporting cycle (obs/day)	GBON Compliant (Y/N)
				SLP	T	H	W	P	SD	SST		
Roberts Int'l, Airport	S	NMHS	Early Warning System Project	X	X	X	X	X			0	N
James Springgs Payne Airfield	S	Aviation	UNDP Project								Vandalized	N
Zwedru Air Strip	S	NMHS	Early Warning System Project	X	X	X	X	X			0	N
Tapeta Air Strip	S	NMHS	Early Warning System Project	X	X	X	X	X			0	N
Harper Air Strip	S	NMHS	Early Warning System Project								Closed	N
Grand Cess Air Strip	S	NMHS	Early Warning System Project	X	X	X	X	X			0	N
Forestry Training Institute	S	NMHS	Early Warning System Project	X	X	X	X	X			0	N
Buchanan MoA	S	NMHS	Early Warning System Project	X	X	X	X	X			0	N
Fish Town MoA	S	NMHS	Early Warning	X	X	X	X	X			0	N

			System Project										
CARI	S	NMHS	Early Warning System Project	X	X	X	X	X			0		N
Voinjama MoA	S	NMHS	Early Warning System Project	X	X	X	X	X			0		N
Sarclepea Magisterial Court	S	NMHS	Early Warning System Project	X	X	X	X	X			0		N

3. Results of the GBON National Gap Analysis

Table IV. Results of the GBON national gap analysis. SLP: Atmospheric pressure; T: Temperature; H: Humidity; W: wind; P: Precipitation; SD: Snow depth; SST: Sea surface temperature**.**

GBON requirements	GBON target (# of stations)	GBON Compliant stations (#)	Stations gap	
			To improve	New
Surface land stations Standard density[8] 200km Variables : SLP, T, H, W, SD Observing cycle: 1h	3	0	3	0
Upper-air stations operated from land Standard density[89] 500km. Vertical resolution: 100m, up to 30 hpa Variables: T, H, W Observing cycle: twice a day	1	0	0	1
Surface marine stations in Exclusive Economic Zones:[10] Density 500 km Variables: SLP, SST Observing cycle: 1h	2	0	0	2*
Upper-air stations operated in Exclusive Economic Zones: [11] Density 1000 km. Vertical resolution: 100 m, up to 30 hPa Variables: T, H, W Observing cycle: twice a day	0	0	0	0

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* There is currently no surface marine station in the operations of the Liberia Meteorological Service (LMS). However, feedback gotten from our stakeholders' engagement indicated that the Liberia Ports Authority and players in the Maritime industry desires to have marine observations for their operation and LMS is open to idea of operating a marine station.

3.1 Recommended existing surface, upper-air and marine[13] stations to be designated to GBON

Table V. Recommended existing surface, upper-air and marine stations to be designated to GBON.

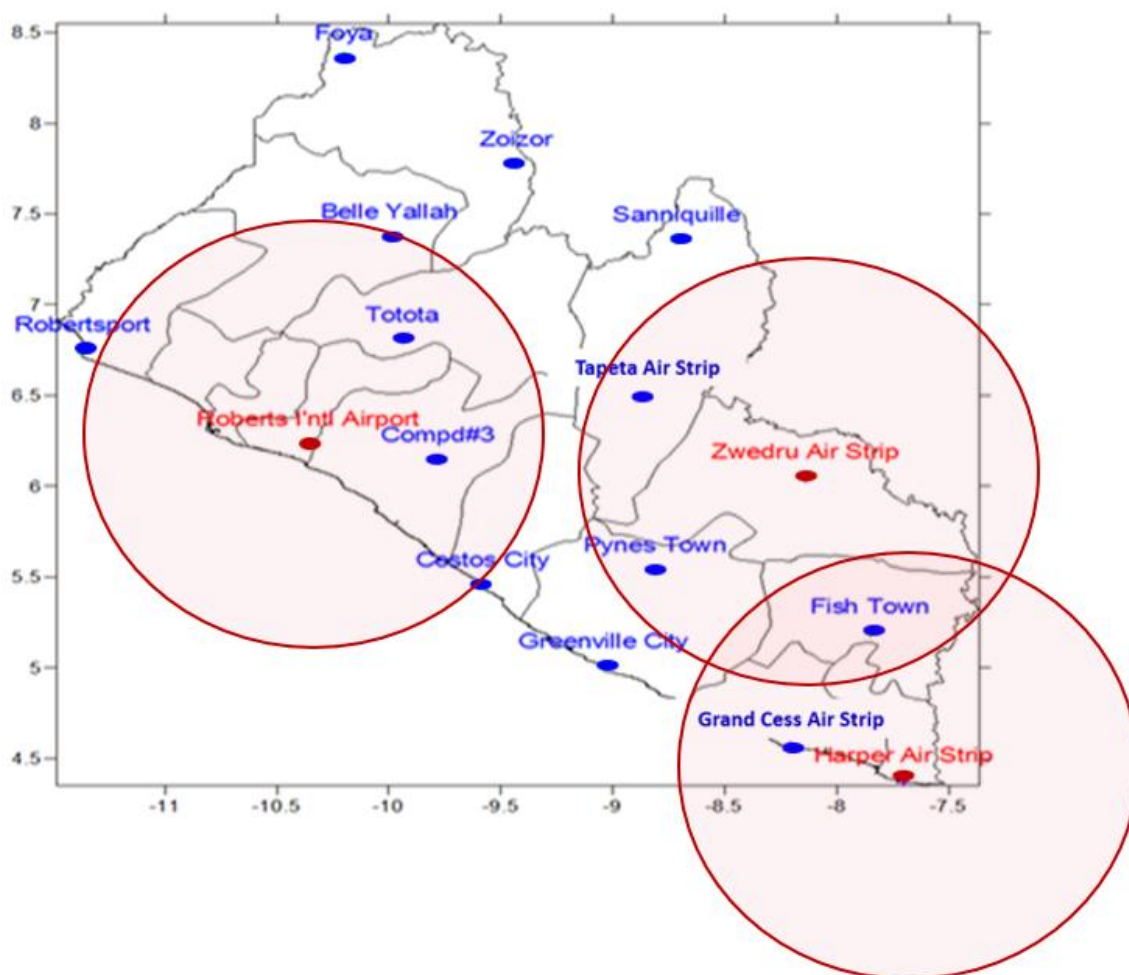| Station name	Station type (S/UA/M[14])
Roberts International Airport (RIA)	Surface
Tapeta Airstrip	Surface
Zwedru Airstrip	Surface
Roberts International Airport (RIA)	Upper Air

Figure 1: Geographical distribution of proposed GBON surface stations to be supported by SOFF, with a diameter of approximately 200km. **Proposed GBON stations are labelled and circled in red.**
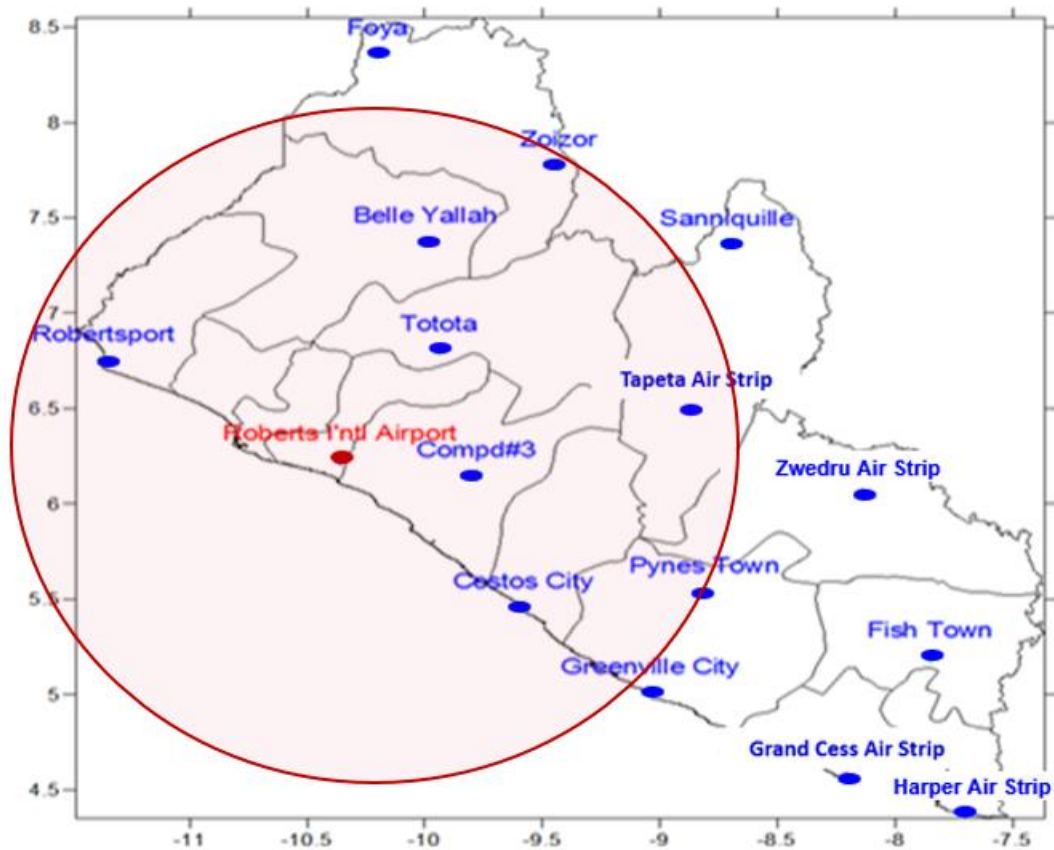
Figure 2: Location of the proposed GBON Upper Air Station to be established by SOFF and located at Roberts International Airport, Margibi, with a horizontal resolution of 500km.

Note:

- While the upper air station will be at Roberts International Airport (RIA) and one surface station will also be rehabilitated at RIA, the other two surface stations to be rehabilitated will be at Zwedru and Harper Airstrips.

4. Report completion signatures

Peer Advisor signature
WMO Technical Authority screening signature
Beneficiary Country signature

Addendum

Observations:

1. The Liberia Meteorological Service (LMS) operates and maintains a network of 30 Automatic Weather Stations (AWS) consisting of eleven (11) synoptic and agromet stations deployed nationally by the Early Warning System (EWS) project, one (1) third-party owned station deployed by UNDP at Spriggs Airfield and eighteen (18) rainfall station deployed under Liberia's National Adaptation Program of Action (NAPA) with the objective of rehabilitating the Liberia Meteorological Service (LMS) under the Ministry of Transport and the Liberian Hydrological Service (LHS) under the Ministry of Mines & Energy.

2. Among all these stations only twelve (12) are capable of measuring GBON variables (Atmospheric pressure, Temperature, Humidity wind and Precipitation. However, the one at Spriggs Airfield has been vandalized and is currently out of operation, and another one at Harper Air Strip is also damaged due to corrosion and is currently closed. The remaining ten (10) stations are recording but not reporting due to the challenge of internet connectivity.

3. All the stations were built to be solar powered. Many of them are still functional though all require routine maintenance.

4. LMS has no marine and upper stations in its operations but has received requests from the country's Port Authority for the establishment of marine stations along the country's vast coastal areas.

5. Computer hardware for data collation, collection and transmission is part of the challenges hindering many of the stations within LMS from meeting GBON requirements.

6. None of Liberia's stations is currently transmitting to WDQMS.

Recommendations

1. The GBON global gap analysis from 2023 recommends that Liberia is eligible for the rehabilitation of three (3) Surface land stations and for 1 new upper-air station to be installed. We are recommending that in addition to these, the remaining eight (8) out of the eleven (11) that are measuring GBON variables should also be rehabilitated with the provision of internet connectivity.

2. Given that Liberia has vast coastal areas with port activities, we are recommending the establishment of two (2) marine weather stations for the LMS.

3. Rehabilitation of the vandalized station at James Spriggs Payne Airfield is also recommended as the location serves as the local airport and the station could provide data for weather and climate variability within Monrovia city centre.

4. The transfer of the station at Harper Air Strip to a nearby building as the fencing wire is rapidly corroding because of salt-infused sea breeze.

5. The metadata of all the stations needs to be verified.

6. The supply of spare parts for the AWS, and training of staff on maintenance and calibration are very critical.

7. Operationalisation of WIS2.0 will aid data sharing.