COUNTRY HYDROMET DIAGNOSTICS

Informing policy and investment decisions for high-quality weather forecasts, early warning systems, and climate information in developing countries.

April 2025

St. Lucia

Peer Review Report

Reviewing Agency: GeoSphere Austria

Authors: Wolfgang Senoner, Giora G.H. Gershtein, Andreas Schaffhauser, Veronika Krieger, Delia Arnold Arias, Gerhard Wotawa

Copyright

Dr. Andreas Schaffhauser, Permanent Representative (PR) of Austria with World Meteorological Organization (WMO)
GeoSphere Austria, Hohe Warte 38, Vienna, Austria

with a copy to Ms. Vigil Saltibus, PR of St. Lucia with WMO:
St. Lucia Meteorological Services, Hewanorra International Airport, St. Lucia

The findings, interpretations and conclusions expressed are those of the named authors alone and do not necessarily reflect those of the agencies involved.

Authorisation for release of this report has been received from the Peer Reviewing Agency and the Country National Meteorological Service as of 30.04.2025.

Disclaimer

Table of Contents

Executive Summary

The St. Lucia Meteorological Service (SLMS) is the national meteorological agency operating under its own Meteorological Service Department, which falls under the Ministry of Infrastructure, Ports, Transport, Physical Development, and Urban Renewal. Originally established to primarily support the civil aviation sector, SLMS has, in recent years, broadened its scope and now offers services and products to a range of sectors including emergency management, water resources, and agriculture—though its involvement in these areas remains limited.

The SLMS currently faces a number of challenges, which can be summarized as follows:

a. Legal framework – currently, SLMS acts without any proper legislative framework. A legal act is in the process of legislation – but SLMS is mentioned briefly or not mentioned at all in any other governmental act.

b. Men power – the SLMS is heavily understaffed, especially with people with sufficient academic background.

c. Observational network - a sustainable solution for the maintenance and real-time transmission of the data from the AWSs should be found, including the procurement of relevant spare parts.

d. Facilities - The current workspace setup is inefficient, with separate computers for each system. These should be consolidated onto a single workstation to streamline operations. Overall, the office is too small and does not meet the current or future needs of SLMS. If possible, a larger office should be provided, including a centralized workstation that allows for monitoring and managing all systems in one place.

e. Hydrological Service - The government should aim to establish a dedicated operational hydrological service, either within the SLMS or the National Water Resources Management Agency (WRMA). While WRMA currently carries out some hydrological activities, these are not conducted on a 24/7 basis. A formalized service could provide hydrological forecasts and warnings, develop related products, and manage the national hydrological data archive. At present, responsibilities are unclear, and a clear definition of roles and mandates would greatly improve coordination and efficiency.

The Peer reviewed results are presented in the Fig 1 below.

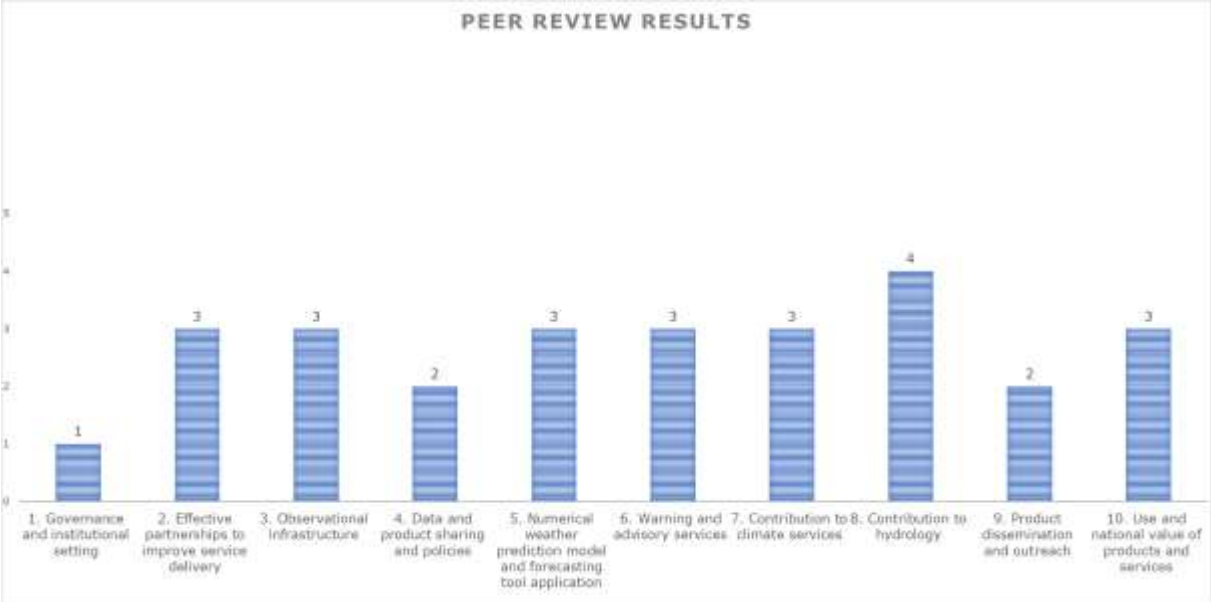


Figure 1: Peer review results

Element	Maturity level score
1. Governance and institutional setting	1
2. Effective partnerships to improve service delivery	3
3. Observational infrastructure	3
4. Data and product sharing and policies	2
5. Numerical weather prediction model and forecasting tool application	3
6. Warning and advisory services	3
7. Contribution to climate services	3
8. Contribution to hydrology	4
9. Product dissemination and outreach	2
10. Use and national value of products and services	3

Fig 1.: The maturity level scores for the SLMS, according to the CHD Methodology

1. General information

Introduction

St. Lucia

St. Lucia is an island state of the Lesser Antilles, which are part of the Eastern Caribbean Region, located roughly in the center of the Windward Island chain and nestled between Martinique to the north and St. Vincent and the Grenadines to the south. Castries, the capital and largest city, is located on the northwest coast of the island.

The country has an area of approximately 616 km^2 and a population of approximately 180,000 inhabitants. The overall population density is normally distributed (299.4/km^2), but unevenly scattered across the island.

The country gained its independence from the United Kingdom in 1979, becoming and remaining a member of the British Commonwealth, as well as of different regional and continental organizations and communities[1].

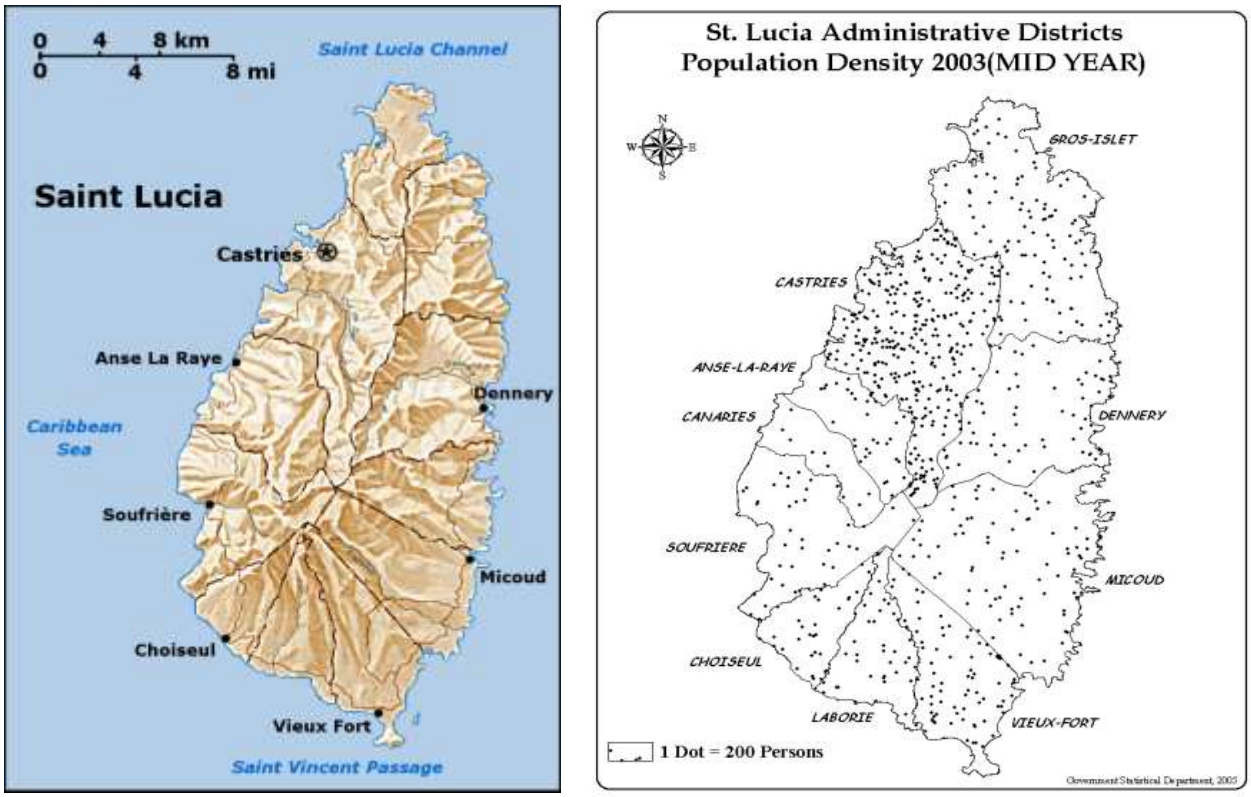


Figure 2: Map of St. Lucia[2] as well as its population density map[3] (

Inform Risk Index

[1] https://www.loc.gov/resource/frdcstdy.islandsofcommonw00medi/?sp=327&st=image
[2] https://en.wikipedia.org/wiki/Geography_of_Saint_Lucia#/media/File:Saint_Lucia_geography_map_en.png
[3]http://unstats.un.org/UNSD/demographic/meetings/wshops/Trinidad_22Oct07/docs/Countries_presentations/St_Lucia_Paper.pdf

The country has an Inform risk index of 2.8 (scale 0-10, 0 is optimum) and is thus positioned in the risk class "Low". This means that the country is at a low risk of a humanitarian crisis in case of natural or man-made disaster. The coping capacity of the country is low as well.

Hazard and exposure: 1.9 [0-10]

Vulnerability: 3 [0-10]

Lack of coping capacity: 4.0 [0-10]

Topography

The island of Saint Lucia is a typical windward island formation of volcanic rock. There are many short swift streams. Dominated by high peaks and rain forests in the interior, the 616-square-kilometer (238-square-mile) island is known for the twin peaks of Gros Piton and Petit Piton on the southwestern coast. Mount Gimie, the highest peak, is located in the central mountain range and rises to 958 meters above sea level, a contrast that is also evident in the abrupt climatic transition from coastal to inland areas. The steep terrain also accentuates the many rivers that flow from central Saint Lucia to the Caribbean[4]. Most of the country is covered by highly dense tropical vegetation with its largest urban concentration in and around the city of Castries.

Climate

Saint Lucia has a tropical, humid climate moderated by northeast trade winds that allow for pleasant year-round conditions. Mean annual temperatures range from 26 °C to 32 °C at sea level and drop to an average of 13 °C in the mountain peaks. The abundant annual rainfall accumulates to approximately 2,000 millimetres, with most precipitation occurring during the June to December wet season. Hurricanes are the most severe climatic disturbance in this area and have been known to cause extensive damage.

[4] https://en.wikipedia.org/wiki/Geography_of_Saint_Lucia

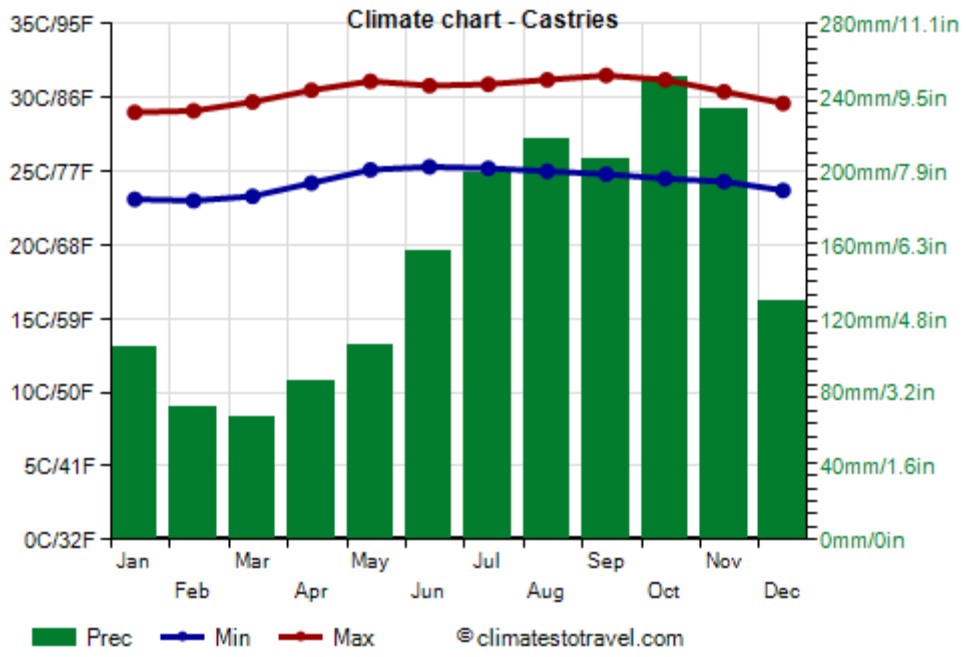


Figure 3.: Climate data Castries[5]

As a West Indies island country in the Caribbean, annual precipitation totals are high in most places and significant in most months.

On average, St. Lucia receives 1,830 mm of rainfall per year in the capital Castries. The southern city Vieux Fort, close to the international Airport Hewanorra, receives 1.500 mm of rainfall per year. Most of the rainfall occurs on the windward side of the island and/or along the central mountain range due to orographic lifting.

During the wet season, which runs from July to November, Saint Lucia receives over 200 mm in rainfall per month (see Figure 3). There is also considerable inter-annual variability in the rainfall record. In addition, there is evidence that some of the variability is driven by global climatic fluctuations such as the El Niño-Southern Oscillation (ENSO).

Climate projections for St. Lucia indicate an increase in sea surface temperatures, reduced average annual rainfall, prolonged and frequently occurring droughts, and the potential for an increase in the intensity of tropical storms. If the severity of these events increases, the resilience and recovery capabilities of the country may be stretched. The economy of St. Lucia is heavily based upon agriculture and tourism, the first of which is highly vulnerable for droughts (but also storms) and the touristic infrastructure is highly sensitive to tropical storms.

[5] https://www.climatestotravel.com/climate/saint-lucia

The National Meteorological Services of St. Lucia

The St. Lucia Meteorological Service (SLMS) is a department under the Ministry of Infrastructure, Ports, Transport, Physical Development and Urban Renewal of St. Lucia.

Since its foundation, it was serving mainly the civil aviation sector, but since a few years, its activity has expanded and currently already provides services and products to the emergency entities, water, agriculture and other sectors. However, its ability to expand and extend its services is limited due to a major shortage of skilled manpower and the challenges with allocating and recruiting new employees, as well serious challenges with providing its own existing employees the possibility of getting a relevant academic education. In addition, the SLMS suffers from the inability to receive real-time data from its different observational stations.

Since its foundation, SLMS has been operating without any proper legislative framework. A model Meteorological Services Bill is in preparation for enactment – however it has already been in the same state for more than four years. No other law mentions SLMS in a proper way.

CHD methodology

This report has been prepared using the methodology described in the 2022 update of the Country Hydromet Diagnostics. A joined workshop was organised in Barbados, with representatives of the Meteorological Services of St. Lucia, St. Vincent and the Grenadines and Dominica, as well as representatives from regional and international organisations. Following this workshop, in-country visits were then undertaken, followed by the report's revision and approval. The first in-country visit included meetings in the capital Castries, the Vieux Fort International Airport as well as visits to the Micoud observation site. A second visit took place in early July 2024.

The 10 elements of the Diagnostic are defined as follows:

1. Governance and institutional setting - The level of formalization of the NMHS mandate and its implementation, oversight, and resourcing.

2. Effective partnership to improve service - The level of effectiveness of the NMHSs in bringing together national and international partners to improve the service offering

3. Observational infrastructure - The level of compliance of the observational infrastructure and its data quality with prescribed standards.

4. Data and product management, sharing, and policies - The level of data and product sharing on a national, regional and global level.

5. Numerical model and forecasting tool application - The role of numerical weather prediction model output and other forecasting tools in product generation. Whether local modelling is sustainably used to add value to model output from WMO Global Data processing and Forecasting System (GDPFS) centres.

6. Warning and advisory services - NMHS' role as the authoritative voice for weather-related warnings and its operational relationship with disaster and water management structures.

7. Contribution to climate services - NMHS role in and contribution to a national climate framework according to the established climate services provision capacity.

8. Contribution to hydrology - NMHS role in and contribution to hydrological services according to mandate and country requirements.

9. Product dissemination and outreach - The level of effectiveness of the NMHS in reaching all public and private sector users and stakeholders.

10. Use and national value of products and services - Accommodation of public and private sector users and stakeholders in the service offering and its continuous improvement.

For each value cycle element, a limited number of standardized indicators is used, and each indicator uses explicitly defined data sources. The assessment of these critical elements of the National Meteorological Service should lead to their maturity level. Note that Level 5 is the highest attainable maturity level in the CHD assessment.

This document is intended to provide crucial information for the SOFF initiative implementation phase, which in St. Lucia is coordinated by GeoSphere Austria together with the World Food Programme (WFP), as well as informing the ambitious EW4All initiative of the U.N. The assessment by GeoSphere Austria has been facilitated by on-site visits as well as various remote consultations. Following the CHD structure, this report is presented along the ten most critical elements of the hydromet value cycles with an indication of their respective maturity level and some high-level recommendations to help lifting up that maturity level, and as mentioned above, with special emphasis on monitoring, forecasting, climate projection and warning systems for climate-related hazards, across timescales.

2. Country Hydromet Diagnostics

Element 1: Governance and institutional setting

1.1 Existence of Act or Policy describing the NMHS legal mandate and its scope

St. Lucia Meteorological Service (SLMS) is a department under the Ministry of Infrastructure, Ports, Transport, Physical Development and Urban Renewal of St. Lucia.

Since its foundation, it was serving mainly the civil aviation sector, but since a few years, its activity has expanded and currently already provides services and products to the emergency entities, water, agriculture and other sectors. Currently, SLMS acts without any proper legislative framework. A model Meteorological Services Bill is in preparation for enactment.

1.2 Existence of Strategic, Operational and Risk Management plans and their reporting as part of oversight and management.

A strategic plan is currently being developed with support from the Caribbean Meteorological Organization (CMO); however, progress has been slow due to staff constraints. As a result, SLMS is falling behind other neighbouring National Meteorological Services (NMSs), which began the process at the same time but have already completed their plans.

1.3 Government budget allocation consistently covers the needs of the NMHS in terms of its national, regional, and global responsibilities and based, among others, on cost-benefit analysis of the service. Evidence of sufficient staffing to cover core functions.

The current budget of SLMS amounts to 1.8 million East Caribbean Dollars (for 2024). Out of which around 64% goes to staffing and the rest goes, mostly, to facility maintenance. Investments (for new AWSs, for example), spare parts or IT is highly deficient.

The budget sole provider is the government and although the SLMS is, first, a provider of meteorological services for aviation, there is only a small recovery mechanism through *Saint Lucia Air and Sea Ports Authority (SLASPA)*.

The current budget is insufficient to address the challenges the institution is facing, among them, maintaining and operating a robust observational network (upgrading it to AWSs, broadcasting and transmissions costs, spare parts, etc.), as well as problems with staffing. Last, but not least, marine stations are a need that will add to the challenges already existing.

1.4 Proportion of staff (availability of in-house, seconded, contracted- out) with adequate training in relevant disciplines. Institutional and policy arrangements in country to support training needs of NMHS.

The St. Lucian Met Service mostly has a well-trained and highly motivated team of 23 staff. However, with only six forecasters providing 24/7 coverage, there is almost no redundancy. Moreover, at SLMS, the director also acts as forecaster. In addition, the current director as well as his predecessor have both retired and were recalled back to service due to a lack of sufficient staff. The situation with technical staff is also very

critical, currently only a single technician is responsible for the whole island. Therefore, there is no backup in any case.

There are no researchers or hydrologists on staff. However, collaboration with the National Water Resource Management Agency (WRMA) could be beneficial, as it is the primary agency legally responsible for managing and protecting the country's water resources. The only major institute producing experts for SLMS is to be found outside of St. Lucia: it is the Caribbean Institute for Meteorology and Hydrology (CIMH) in Barbados, of which the SLMS is a member. The CIMH is the main provider of education and training in the fields of meteorology, hydrology and climatology in the Caribbean region. No further educational or training possibilities exist in the country itself.

As mentioned, the SLMS is severely understaffed. Additionally, most of the staff lack a sufficient academic background, with only three employees holding the necessary qualifications—two of whom are nearing retirement. This poses significant challenges in developing the next generation of management, research, and other critical roles. The main reasons for the understaffing are:

A. A limited budget, resulting in significantly fewer positions than needed (currently 22 out of 35).

B. Relatively low salaries, making it difficult to attract young, promising experts and increasing the risk of high staff turnover.

C. Limited opportunities for postgraduate studies, as all available programs are abroad (mainly at CIMH), imposing significant financial burdens on either the government or the students.

With regard to gender balance, the organization currently has 14 male and 9 female employees.

1.5 Experience and track record in implementing internationally funded hydromet projects as well as research and development projects in general.

The SLMS is currently involved in several internationally funded projects, including a component of the CREWS initiative, SDRC (Strengthening Disaster and Climate Resilience in the Eastern and Southern Caribbean), implemented by the CIMH and funded by the USAID, DVRP - Disaster vulnerability reduction project, and being part of CCCCC - Caribbean Climate Change Coordination Center.

Overall, these projects have a positive impact on the work of the SLMS. Nevertheless, there is an increasing need for additional projects. Especially those which can cover fields for which the SLMS does not have self-funding possibility or any previous experience. Moreover, as in many other similar situations, these projects and their achievements are not sustainable for the long run, due to limited budget and staffing.

Summary score and recommendations for Element 1

The CHD Element 1 score for the "Governance and Institutional Setting" assessed as Maturity Level 1(+) on the CHD scale, reflecting "Weakly defined mandate; serious funding challenges; essential skills lacking; little formalized governance and future planning".

Despite these challenges, the SLMS has proven to be, especially in the last few years, a progressing institution. As such, a set of recommendations that should be both realistic and aligned with the current situation of the country should be followed:

a. Legally - To finalize the legislation process of the act of SLMS. To review and update other governmental acts, which have anything to do with the activities, present and potential, of the SLMS. As part of the legislation process, the SLMS should be allowed to enjoy additional income resources.

b. Financially – The SLMS should strive to search for additional potential sources of income, to be added to its current budget, especially for investments in observational, IT and other infrastructure. These sources might include an agreed cost recovery mechanism for aviation, but also marine sectors, tailored products for the quickly developing touristic industry and specialized services. At the moment it's not allowed in terms of St. Lucian law.

c. Manpower – The shortage of staff is already apparent with the activities of SLMS. However, even with such a highly motivated staff, without a serious treatment of this issue, the already existing challenges might become impossible to cope with in time. The government should seek ways to increase the number of vacancies offered, offer more educational scholarships for promising students abroad (through a cooperation with universities beyond the Caribbean Region – Reading in the UK, the Maryland University in the USA, etc.), much strengthen the accessibility of the already existing staff for further studies.

d. Future perspective – In addition, a careful planning has to be done as for the future of the hydrological, climatological and marine services of the SLMS. Currently there is nobody at the SLMS, who can provide any support in these fields (there is only one person, who is also trained as a hydrologist, but her time allocation is highly limited due to other professional needs). One possible strategy is to create hybrid positions (a technician, who could also work as a forecaster, a hydrologist, who could also have some knowledge about marine meteorology, etc.).

Element 2: Effective partnerships to improve service delivery

2.1 Effective partnerships for service delivery in place with other government institutions.

The SLMS has well-functioning and rapidly developing partnerships with different governmental and semi-governmental institutions, like the National Emergency Management Organization (NEMO), the Water Company (WASCO), National Environment information system (NEIS), different ministry departments, etc. However, these partnerships are very often based on informal and personal contacts, rather than a more formalized fashion (through a legislation and/or MoUs, with the partial exception of WRMS, but even here, the existing MoU requires a major update). The current partnerships allow a direct, continuous and interaction between the different experts for planning, preparing for large events, events management and post-events analyzing. There is also a monthly Flood and drought committee meeting held to discuss the next steps, planning and, if necessary, to review previous events.

2.2. Effective partnerships in place at the national and international level with the private sector, research centers and academia, including joint research and innovation projects.

Currently, there are no partnerships in place with the private sector. The SLMS is working on an MoU with SLASPA. At the moment of writing this report, signatures are still pending.

Regarding research centers and academia, St. Lucia lacks its own institutions. This limits SLMS's options for partnerships to CIMH, which is primarily training its future workforce. In the past, there were also collaborations with the University of Reading in the UK.

2.3. Effective partnerships in place with international climate and development finance partners.

Through different development projects, there are existing partnerships with the CREWS, CIMH, CMO, USAID and CCRIF (Caribbean Catastrophe Risk Insurance Facility). However, these partnerships are mostly limited to the time-range of projects, except where it concerns the CMO and CIMH.

2.4. New or enhanced products, services or dissemination techniques or new uses or applications of existing products and services that culminated from these relationships.

None. The Agromet Bulletin and National Bulletin, both previously produced monthly, were discontinued due to staff shortages, which led to inconsistency in publication. Additionally, the lack of a proper webpage for distribution and customer access further contributed to their discontinuation.

Summary score, recommendations, and comments for Element 2

The CHD Element 2 score for the "Effective partnerships to improve service delivery" assessed as Maturity Level 3 on the CHD scale, reflecting, "Moderately effective partnerships but generally regarded as the weaker partner in such relationships, having little say in relevant financing initiatives.".

Recommendations:

a. As in the previous element - Finishing the legislation process of the law on meteorology, with the support of the CMO.

b. Formalizing the different existing partnerships with the different governmental and semi-governmental entities through updating the related acts or/and via MoUs.

c. To seek for possible partnerships in the tourism and marine transportation sectors, as well as with big farms and private sectors inside of St. Lucia.

d. Due to the large impact of climate change in St. Lucia, to search for potential collaboration with foreign universities for possible research projects related to the ecological environment of the country. Relevant universities can include the Reading University at UK, the Maryland University in the USA, the University of the West Indies in Jamaica, etc.

Element 3: Observational infrastructure

3.1. Average horizontal resolution in km of both synoptic surface and upper-air observations, including compliance with the Global Basic Observing Network (GBON) regulations.

According to the GBON Criteria, SLMS should operate at least one surface and one upper-air observation sites, transmitting data 24/7 and on a real-time base. The SLMS is operating currently 17 surface AWSs (from 3 different vendors, making their operation, maintenance and calibration ineffective and lacking sustainability) and performing observations on an hourly interval base, and two manual stations. The AWS network is currently operating at a reduced capacity, with significant degradation in station availability.

At present, approximately 37.5% of the network can be considered fully operational (but not providing real-time data, due to issues related to cellular connectivity). This includes five HydroLynx stations. Around 41.7% of stations are offline primarily due to issues related to repeater connectivity. An additional 12.5% of stations are non-operational due to hardware malfunctions and outdated systems requiring upgrades. Lastly, 8.3% of the stations have been decommissioned due to vandalism and are considered irrecoverable without full-site rehabilitation.

As for upper-air observations, the SLMS is not operating any. However, thanks to the proximity of Barbados to St. Lucia, the upper-air observations performed in Barbados, can fully answer for the compliance of SLMS as well.

3.2. Additional observations used for nowcasting and specialized purposes.

The SLMS does not operate any additional observations, except a single coast station measuring waves. Nevertheless, its staff is using the freely available imagery of the radar operating in Barbados, satellite imagery from NOAA and some other weather service providers.

3.3. Standard Operating Practices in place for the deployment, maintenance, calibrations and quality assurance of the observational network.

SOPs are partially established, as the deployment of existing stations was done with the support of CIMH. Maintenance is performed through a SOP. However, the single technician working at SLMS is responsible for the entire country and due to a lack of spare parts (or the funds to obtain them), the maintenance SOP is time-limited and non-sustainable. The calibration can be performed only at CIMH, but their calibration services are limited to a reduced number of instruments. Moreover, as mentioned earlier, the fact that the stations were produced by three different vendors makes it even more challenging – the technician is trained only with one kind of stations, spare parts of one vendor cannot be used in stations produced by a different vendor, etc.

Quality check is being performed on a basic level, but since the data flow is much delayed, no near-time initial QC is possible.

3.4 Implementation of sustainable newer approaches to observations.

None.

3.5. Percentage of the surface observations that depend on automatic techniques.

Roughly 80% of stations are automatic, but due to technical issues, none of the AWSs is transmitting data on a real-time basis.

Summary score, recommendations, and comments for Element 3

The CHD Element 3 score for the "Observational Infrastructure" assessed as Maturity Level 3 on the CHD scale, reflecting "Moderate network with some gaps with respect to WMO regulations and guidance and with some data quality issues."

Recommendations:

a. Hopefully, through different projects and initiatives (such as SOFF), the issue with real-time data transmission will be solved, at least for a single station. However, with a correct approach, it can also help the other stations, also with spare-parts.

b. **The authors of this CHD see no reason to invest in procuring an upper-air station for SLMS.** The GBON definition for upper-air stations requires a distance between stations of 1000 kms. In such a case, the upper air operated by the Barbados Meteorological Service is already covering the island of St. Lucia. Another upper air station would mean a high investment for a low added benefit (cost, training, spare parts vs. available data). Due to the already strained personnel situation, an upper air station would make little sense. Recently, during a meeting of the heads of the NMSs of CARICOM, a map of upper-air locations was adopted. In this map, the upper-air site operated by Barbados will continue serving the neighboring countries, including St. Lucia.

c. The purchase, installment and training with a data management system is highly recommended.

d. The training of at least one additional technical expert should be implemented as a matter of urgency.

e. The SLMS should focus its attention on a single vendor, which stations were proved to be well working and sustainable in St. Lucia and aspire towards a future change of all of the AWSs to have stations produced by this single vendor.

Element 4: Data and product sharing and policies

4.1. Percentage of GBON compliance – for how many prescribed surface and upper-air stations are observations exchanged internationally. Usage of regional WIGOS centers.

Currently, none of the weather stations operated by the SLMS is GBON-compliant. Though most of them do perform measurements on an hourly base, due to already mentioned reasons, none is able to transmit its data on a real-time base.

SLMS does not operate any upper-air stations, but as mentioned in the previous chapter, the upper-air station in Barbados fulfils also the necessary GBON requirements for St. Lucia as well (the requirement holds that an upper-air station should be located in a distance of up to 1000 kms, whereas the distance in between the countries is less than 150 km).

4.2. A formal policy and practice for the free and open sharing of observational data.

None. However, through a MoU with the Water Resource Management Agency, data is shared with them, as well as any other governmental entity requesting it. However, it is done only for past observations, as no data is available on a real-time base.

4.3. Main data and products received from external sources in a national, regional and global context, such as model and satellite data.

WIS2.0 was implemented in 2024, and GEONETCast-A was also installed at the Hewanorra station the same year.

SLMS makes use of global models, such as GFS and ECMWF, but only through their respective websites. Although different models and products should be also made available via CIMH, their usage is limited – either to lack of availability, lack of awareness or unclear performance. SLMS also makes use of satellite products, mainly from NOAA, but again, only through their respective websites.

Roughly 80% of the staff is trained in interpreting these data products.

Summary score, recommendations, and comments for Element 4

The CHD Element 4 score for the "Data and Product Sharing and Policies" assessed as Maturity Level 2 on the CHD scale, reflecting, „A limited amount of GBON compliant data is shared internationally. The existing data sharing policies or practices or the existing infrastructure severely hamper two-way data sharing".

Recommendations:

a. As mentioned in Element 3, through different projects (such as SOFF), SLMS should strive to fix the real-time transmission issues affecting its observational network.

b. A basic data management should be procured, with which the observational data could be received, archived, quality checked (at least basically), transmitted nationally and internationally and most important, allowing an easy visual access to the data, real-time and historical.

c. Without an additional manpower, dedicated for IT, station maintenance and QC, SLMS would not be able to make a full use of its data collection possibilities, either for weather, climate or other applications.

d. Through the meteorological act, MoUs and other agreements, to set a technical framework allowing other governmental entities to receive the observational in a near-real time base and/or the historical raw data.

Element 5: Numerical model and forecasting tool application

5.1. Model and remote sensed products form the primary source for products across the different forecasting timescales.

The forecasters of the SLMS have access to the visual results of: A. the runs of global models (GFS, ECMWF). B. seasonal model (CIMH). C. the weather radar of Barbados (covering also the entire territory of St. Lucia). However, the entire access is established through the respective websites of the different operating organizations (readily available products). No raw data is reaching the LMS, and there are no resources available to post-process and archive these data in order to enhance the services provided.

However, the data access is through the respective websites (readily available products) of the different operating organizations and no post-processing of the products or gridded data files is performed.

5.2. a) Models run internally (and sustainably), b) Data assimilation and verification performed, c) appropriateness of horizontal and vertical resolution.

None.

5.3. Probabilistic forecasts produced and, if so, based on ensemble predictions.

Since the initial, and still major purpose and goal of the SLMS is to support national aviation services, probabilistic forecasts are used to issue TAFs (Terminal Area Forecast). In addition, SLMS utilizes ensemble forecasts (GFS, ECMWF, WRF, AROME) to issue the following forecast products:

- Thrice-daily weather forecasts issued at 6am, 12 noon and 6pm *(Figure 4)*
- Daily current conditions on webpage *(Figure 5)*
- Press releases for severe events (e.g. flash flood warning, heat wave alert, Saharan dust, hurricane watches and warnings) *(Figure 6)*
- 5-day weather forecast updated daily *(5day Forecast, Figure 7)*

Regional and local model climate forecasts are further used to produce:

- Monthly seasonal climate forecasts shared with stakeholders at Flood and Drought committee meetings, of which the Met. Service is the Chair and Water Resource Management Agency (WRMA) is Co-chair *(Figure 8).*
- Monthly Climate Bulletin produced with data from the Regional Climate Centre, which includes long-range forecasts and sector-specific guidance. The bulletin provides key advisories for sectors such as health, agriculture, water, and tourism services, helping stakeholders in these areas make informed decisions. It was temporarily discontinued due to staffing constraints but will be reinstated in 2025.

SAINT LUCIA METEOROLOGICAL SERVICES
MINISTRY OF INFRASTRUCTURE, PORTS, TRANSPORT, PHYSICAL DEVELOPMENT & URBAN RENEWAL
HEWANORRA METEOROLOGICAL OFFICE, VIEUX-FORT, ST. LUCIA.
HOTLINE: 454-3452 **EMAIL:** slumet@yahoo.com **WEBSITE:** http://www.slumet.gov.lc

6:00 am Weather Report
Date: 1st May, 2025
Forecaster: Dr. E. Francis

Present weather at Hewanorra Airport is partly cloudy and hazy.
Present temperature at Hewanorra Airport is 27°C or 81°F.
Last night's minimum temperature at Hewanorra Airport was 26°C or 79°F.
Relative humidity at Hewanorra Airport is 79%.
Wind at Hewanorra Airport is blowing from the east at 13 mph or 20 km/h.

Rainfall in the 24-hour period that ended at 2:00 am today:
At Hewanorra Airport: 0.6 mm.
Total rainfall for the month of April so far:
At Hewanorra Airport: 26.5 mm.

Sunset today: 6:19 pm. Sunrise tomorrow: 5:41 am.

FORECAST FOR SAINT LUCIA VALID FOR THE NEXT 24 HOURS
Winds will be blowing from between the east-southeast and east near 14 mph or 22 km/h.
Weather: Fair to partly cloudy and hazy, with a few brief showers.

MARINE FORECAST FOR SEAS IN A 25 MILE OR 40 KM RADIUS FROM SAINT LUCIA
Tides for Castries Harbour: Low at 12:59 pm...High at 7:43 pm.
Tides for Vieux Fort Bay: High at 6:43 am...Low at 2:26 pm.
Seas: Slight to moderate with waves 3 to 5 feet or 0.9 to 1.5 metres.

FORECAST FOR THE LESSER ANTILLES
Over the Leeward and northern Windward Islands, partly cloudy to occasionally cloudy and hazy, with some scattered showers. Elsewhere, fair to partly cloudy and hazy, with a few brief showers.

WEATHER SUMMARY
Moisture and instability associated with a low-level trough, will cause occasional cloudiness and some scattered showers, mainly over the northern half of the Lesser Antilles, during the next 24 hours.

Light to moderate easterly winds will persist across the Eastern Caribbean, during the next few days.

Figure 4. Example of a Daily Weather Report (May 1st, 2025)

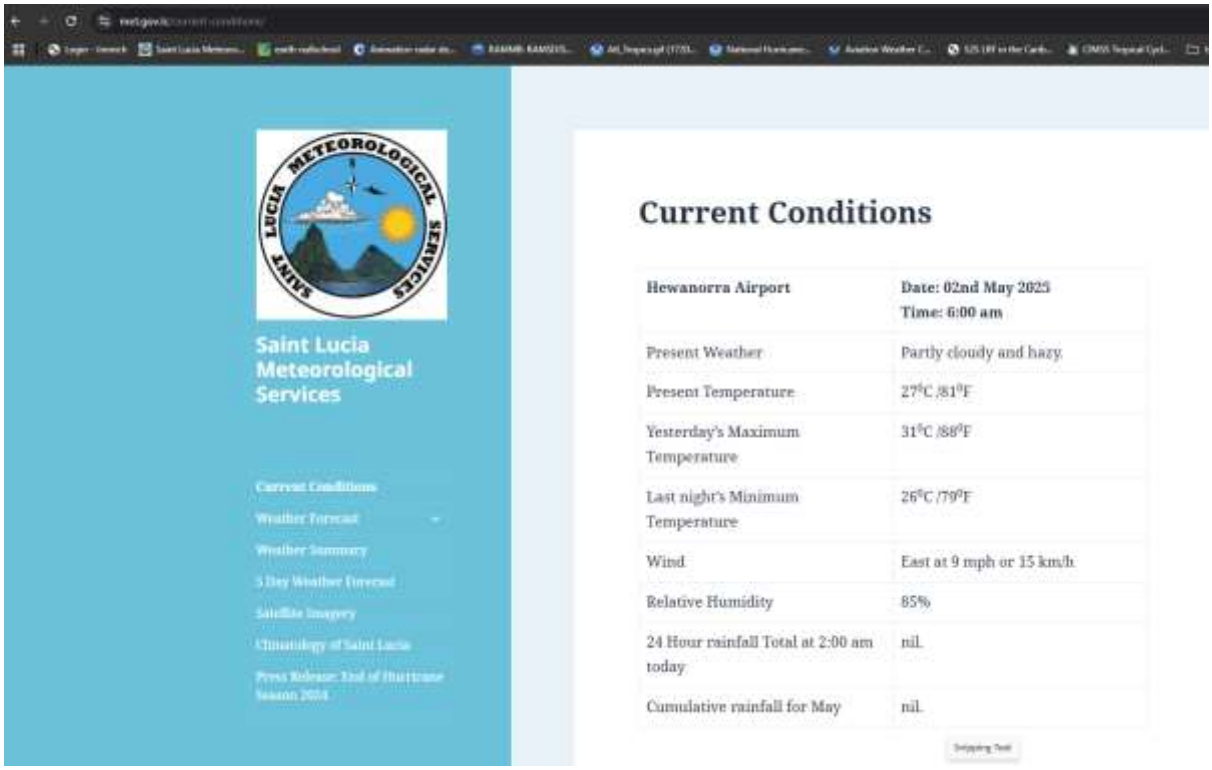


Figure 5. Exemplary Daily Current Conditions (May 2nd, 2025)

GOVERNMENT OF SAINT LUCIA
Ministry of Infrastructure, Ports, Energy & Labour

SAINT LUCIA METEOROLOGICAL SERVICES

HEWANORRA INTERNATIONAL AIRPORT

Tel: (758) 454 6550 or (758) 721 7139

Fax: (758) 454 9705

Website: slumet@gov.lc E-mail: slumet@yahoo.com

Date: 24 September.

PRESS RELEASE: ***High Air Temperatures Affecting Saint Lucia***

The Climate of Saint Lucia is characterized by a Heat Season which runs from August to October every year. During that period, depending on the relative positions and movement of weather features that influence the island, it may experience excessive heat for periods ranging from one to several days.

Over the past few days, both nighttime and daytime temperatures in Saint Lucia have been significantly above normal. According to the forecast model projections, this trend is expected to continue for at least the next three days. The combination of high temperatures, dry spells in many locations and the absence of a fresh breeze from the northeasterly trade winds, is causing discomfort to residents.

Recognizing the dangers associated with this excess heat, the public is therefore advised to take the following precaution:

- Remain hydrated with water or other non-alcoholic, non-carbonated beverages such as juice
- Wear clothing that is light in colour and loose fitting
- Stay in an air-conditioned environment if possible
- Avoid strenuous activity such as running to avoid water loss

The Saint Lucia Meteorological Services will closely monitor the situation and will issue further advice if necessary.

_____

Andre Joyeux, Director

Saint Lucia Meteorologist Services

Figure 6. Exemplary Press Release for severe events

	Friday 02nd May 2025	Saturday 03rd May 2025	Sunday 04th May 2025	Monday 05th May 2025	Monday 06th May 2025
Forecaster: Maclean Jn Baptiste					
Temperature (°C)	High: 32 Low: 26	High: 32 Low: 25	High: 31 Low: 23	High: 32 Low: 26	High: 32 Low: 26
Weather	Fair to occasionally cloudy and hazy, with a few showers.	Cloudy and hazy with a few scattered showers at first becoming fair to partly cloudy with a few brief showers after.	Fair to occasionally cloudy skies, with a few scattered showers	Fair to partly cloudy skies, with a few isolated showers.	Fair skies, becoming cloudy at times, with a few showers
Average Wind Speed	15 mph to 24 km/h	15 mph to 24 Km/h	12 mph to 19 Km/h, becoming lighter at times.	14 mph to 22 km/h	15 mph to 24 km/h
Wind Direction	East southeasterly & Easterly	Easterly	Easterly & East southeasterly	Easterly & East southeasterly	Easterly & East southeasterly
Tides: Castries	High: 6:32 am Low: 2:03 pm High: 8:51 pm	Low: 12:46 am High: 7:16 am Low: 3:11 pm High: 10:03 pm	Low: 2:11 am High: 8:54 am Low: 4:15 pm High: 11:08 pm	Low: 3:50 am High: 10:23 am Low: 5:08 pm High: 11:30 pm	Low: 5:15 am High: 11:45 am Low: 5:52 pm
Tides: Vieux-Fort	Low: 1:10 am High: 7:36 am Low: 3:30 pm High: 9:58 pm	Low: 2:13 am High: 8:13 am Low: 4:38 pm High: 11:12 pm	Low: 3:38 am High: 10:01 am Low: 5:42 pm	High: 12:16 am Low: 5:17 am High: 11:30 am Low: 6:35 pm	High: 1:03 am Low: 6:42 am High: 12:52 pm Low: 7:19 pm
Daylight	Sunrise: 5:41 am Sunset: 6:20 pm	Sunrise: 5:41 am Sunset: 6:20 pm	Sunrise: 5:40 am Sunset: 6:20 pm	Sunrise: 5:40 am Sunset: 6:21 pm	Sunrise: 5:39 am Sunset: 6:21 pm

Figure 7. Exemplary 5-days forecast (May 2nd – 6th, 2025)

Volume 1, Issue 3 12th August 2019

NATIONAL CLIMATE BULLETIN

Monthly report by Saint Lucia Meteorological Services

The Saint Lucia Monthly Climate Bulletin provides a broad overview of current climate conditions, as well as, an outlook of climate conditions 3 to 6 months in advance. The information is developed and disseminated by the Saint Lucia National Met Services and is intended to help stakeholders manage climate risk and help build resilience to climate related hazards in Saint Lucia.

A more active than usual hurricane season is predicted for 2019. Projections indicate a warmer and drier than usual wet season.

Summary: JULY 2019

For the month of July, Hewanorra (HEW) recorded 152.1 mm of rainfall which is slightly above the long term mean of 149.9 mm. George F. L. Charles (GC) recorded 147.5 mm which was significantly below its monthly mean value of 191.9 mm. Barthe station had the highest recorded total of 379.8 mm and GC the least. There were 20 wet days at HEW and at GC 18 days *(1.0 mm or more is a wet day)*.

Figure 1: June total rainfall (mm)

There were no significant dry spells *(7 days or more with less than 1.0 mm rainfall)* during the month. The highest daily rainfall occurred on July 28th during the passage of a tropical wave.

2019 annual rainfall accumulation through to July continues to be below average for HEW and GC stations.

Graph showing rainfall(mm) accumulation in 2019 at HEW *(left)* and GC *(right)*

The average maximum temperature was normal with 30.7°C at GC and above normal with 31.3°C at HEW. The average minimum temperature was also normal with 25.0°C at GC and above normal with 26.2°C at HEW.

Table 1. Temperatures at Hewanorra and George FL Charles

JULY	Highest Max Temp(°C)	Date of Highest Max Temp (°C)	Mean Max Temp (°C)	Mean Min Temp(°C)	Lowest Min Temp (°C)	Date of Lowest Min Temp (°C)
HEW	32.3	27th	31.3	26.2	23.9	15th
GC	32	30th	30.7	25	22.7	15th

Winds were moderate to brisk with easterly winds averaging 17 knots (20 mph/31 kph) at HEW and light with 8 knots (9 mph/15 kph) at GC. July was relatively moist with an average humidity of 78% and partly cloudy with 5 oktas. Hewanorra station recorded an average of 9.4 daily sunshine hours and daily evaporation average of 7.7mm. A few small craft advisories and warnings were issued during July for above normal seas of 6 ft (1.8 m) and above.

Table 2. Average Monthly Data at Hewanorra and George FL Charles

STATION	Cloud Cover (oktas)	Wind Dir (0 from North)	Wind Speed (kt)	Air Temp. (°C)	RH (%)	Rainfall Long-Term Mean (mm)	Rainfall Total (mm)	Daily Sunshine (hrs)	Daily Evap. (mm)	Soil Temp 5cm (°C)	Soil Temp 10cm
HEW	5	90	17	28.5	78	149.9	152.1	9.4	7.7	27.8	28
GFLC	5	90	8	28.7	78	191.9	147.5				

SEASONAL OUTLOOK

PRECIPITATION OUTLOOK

July to September (**ASO**): below normal

Hewanorra	372.2 mm to 487.0 mm
George F. L. Charles	536.6 mm to 612.7 mm

October to December (**NDJ**): below normal

Hewanorra	243.6 mm to 319.6 mm
George F. L. Charles	311.5 mm to 413.3 mm

TEMPERATURE OUTLOOK

ASO and **NDJ**: warmer than usual maximum (*daytime*) temperatures at both stations with lower than usual minimum (*night time*) temperatures at GC and higher than usual at HEW.

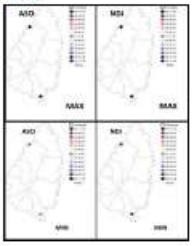


Figure 2: Maximum (daytime) and minimum (*night time*) temperatures for ASO and NDJ

DROUGHT OUTLOOK

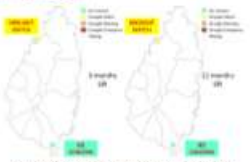
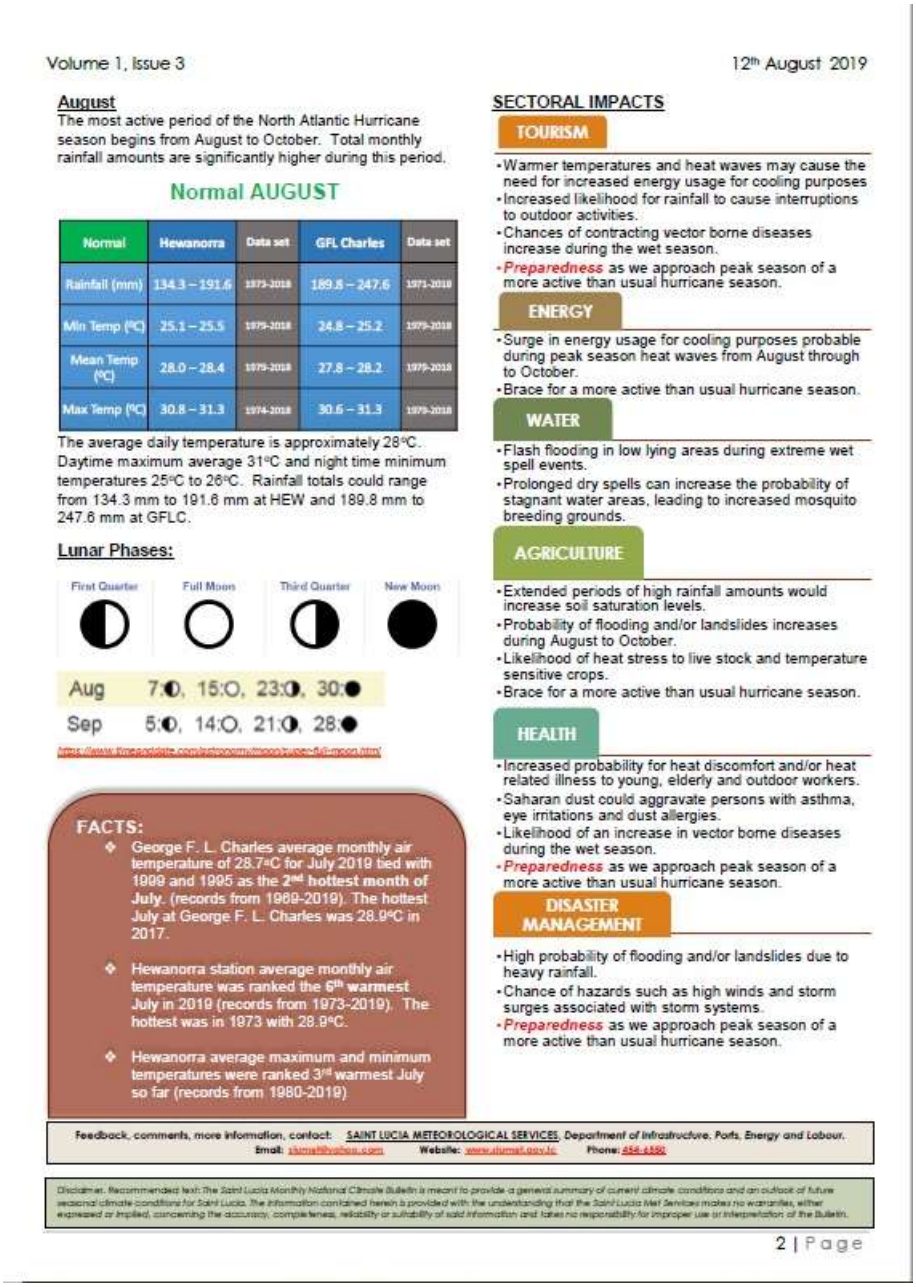


Figure 3: 6 month SPI *(left)* 12 month SPI *(right)*

There is some concern of short-term and long term drought particularly to the north of the island. Drought watch means that a drought may be possible during this season. The short term and evolving long-term drought bares close monitoring and citizens should:

- ✓ continue monitoring resources
- ✓ practice conservation measures
- ✓ keep updated with the weather.

1 | Page



Volume 1, Issue 3 — 12th August 2019

August

The most active period of the North Atlantic Hurricane season begins from August to October. Total monthly rainfall amounts are significantly higher during this period.

Normal AUGUST

Normal	Hewanorra	Data set	GFL Charles	Data set
Rainfall (mm)	134.3 – 191.6	1973-2018	189.8 – 247.6	1971-2018
Min Temp (°C)	25.1 – 25.5	1979-2018	24.8 – 25.2	1979-2018
Mean Temp (°C)	28.0 – 28.4	1979-2018	27.8 – 28.2	1979-2018
Max Temp (°C)	30.8 – 31.3	1974-2018	30.6 – 31.3	1979-2018

The average daily temperature is approximately 28°C. Daytime maximum average 31°C and night time minimum temperatures 25°C to 26°C. Rainfall totals could range from 134.3 mm to 191.6 mm at HEW and 189.8 mm to 247.6 mm at GFLC.

Lunar Phases:

First Quarter · Full Moon · Third Quarter · New Moon

Aug 7:◐, 15:○, 23:◑, 30:●

Sep 5:◐, 14:○, 21:◑, 28:●

FACTS:

- George F. L. Charles average monthly air temperature of 28.7°C for July 2019 tied with 1999 and 1995 as the 2nd hottest month of July. (records from 1969-2019). The hottest July at George F. L. Charles was 28.9°C in 2017.
- Hewanorra station average monthly air temperature was ranked the 6th warmest July in 2019 (records from 1973-2019). The hottest was in 1973 with 28.9°C.
- Hewanorra average maximum and minimum temperatures were ranked 3rd warmest July so far (records from 1980-2019)

SECTORAL IMPACTS

TOURISM

- Warmer temperatures and heat waves may cause the need for increased energy usage for cooling purposes
- Increased likelihood for rainfall to cause interruptions to outdoor activities.
- Chances of contracting vector borne diseases increase during the wet season.
- *Preparedness* as we approach peak season of a more active than usual hurricane season.

ENERGY

- Surge in energy usage for cooling purposes probable during peak season heat waves from August through to October.
- Brace for a more active than usual hurricane season.

WATER

- Flash flooding in low lying areas during extreme wet spell events.
- Prolonged dry spells can increase the probability of stagnant water areas, leading to increased mosquito breeding grounds.

AGRICULTURE

- Extended periods of high rainfall amounts would increase soil saturation levels.
- Probability of flooding and/or landslides increases during August to October.
- Likelihood of heat stress to live stock and temperature sensitive crops.
- Brace for a more active than usual hurricane season.

HEALTH

- Increased probability for heat discomfort and/or heat related illness to young, elderly and outdoor workers.
- Saharan dust could aggravate persons with asthma, eye irritations and dust allergies.
- Likelihood of an increase in vector borne diseases during the wet season.
- *Preparedness* as we approach peak season of a more active than usual hurricane season.

DISASTER MANAGEMENT

- High probability of flooding and/or landslides due to heavy rainfall.
- Chance of hazards such as high winds and storm surges associated with storm systems.
- *Preparedness* as we approach peak season of a more active than usual hurricane season.

Feedback, comments, more information, contact: SAINT LUCIA METEOROLOGICAL SERVICES, Department of Infrastructure, Ports, Energy and Labour. Email: [illegible] Website: www.slumet.gov.lc Phone: 454-4580

Disclaimer. Recommended text: The Saint Lucia Monthly National Climate Bulletin is meant to provide a general summary of current climate conditions and an outlook of future seasonal climate conditions for Saint Lucia. The information contained herein is provided with the understanding that the Saint Lucia Met Services makes no warranties, either expressed or implied, concerning the accuracy, completeness, reliability or suitability of said information and takes no responsibility for improper use or interpretation of the Bulletin.

2 | Page

Figure 8. Monthly Climate Bulletin with data from the Regional Climate Centre (2019)

Summary score, recommendations, and comments for Element 5

The CHD Element 5 score for the "Numerical Weather Prediction Model and Forecasting Tool Application" assessed as Maturity Level 3 on the CHD scale, reflecting: "Prediction based mostly on model guidance from external and limited internal sources (without data assimilation) and remoted sensed products in the form of maps, figures and digital data and cover nowcasting, short and medium forecast time ranges".

Recommendations:

a. Procurement of suitable forecasting workstations (also available to people dealing with climatology, marine, hydrology as well as outside of the SLMS),

would make the access and use of the different global models much easier and effective.

b. No regional model should be operated by the SLMS. An operation and development of a regional model requires large human and IT resources that SLMS is not in the position of providing. The CIMH is developing and operating regional models for the Caribbean Region. However, it seems that the employees of the SLMS are not being able to make a full use of the products of these models, due to accessibility issues and lack of sufficient related training.

c. However, in case there will be a possibility for recruiting R&D personnel, different post-processing schemes could be developed, especially for nowcasting and climatology in a higher resolution.

d. In a later stage, with a suitable R&D personnel, basic verifications of the results of the global models should be performed as well.

e. The entire future IT infrastructure of the SLMS should be planned and implemented with careful thought over the ever-increasing volume of data arriving from abroad (and hopefully also from inside the country).

Element 6: Warning and advisory services

6.1. Warning and alert service cover 24/7.

The SLMS operates a partially functioning warning system, which is limited to certain hydrometeorological hazards: rain, wind, thunderstorms, volcanic ash, and tropical cyclones. The warnings are issued in a standard CAP format and are distributed by email, phone, WhatsApp, and with the help of the media as well as NEMO (National Emergency Management Organization).

Another limiting factor is the fact that the observations are not available on a real-time basis. Much of the essential immediate data required for issuing accurate warnings is either missing or made available too late. In addition, there is no sufficient knowledge of the hydrology of the country, making it more demanding to provide useful information regarding floods and flash floods.

In addition, the constrained number of forecasters does not allow the redundancy required for fully operating early warning services.

6.2. Hydrometeorological hazards for which forecasting and warning capacity is available and whether feedback and lessons learned are included to improve warnings.

The weather parameters addressed by SLMS's early warnings are described in section 6.1 above. Additionally, and in coordination with WRMA, SLMS provides warnings for floods and landslides. Finally, SLMS also serves as the national authority for issuing tsunami warnings. Recent warnings were related to severe weather events, storm surge, as well as instructions for action during the last Hurricane season.

Unfortunately, due to lack of staff, these warnings are not passing any systematic verification or validation. Moreover, no information is gathered systematically from the end users regarding their level of satisfaction with the warnings, though it can it is made per event on an ad-hoc basis. Nevertheless, there are good personal and informal interactions with both the Emergency Authority and the Water Company – the staff of the SLMS is in constant direct contact with both organizations.

6.3. Common alerting procedures in place based on impact-based services and scenarios taking hazard, exposure and vulnerability information into account and with registered alerting authorities.

Currently, some impact-based services are provided. A few forecasters were trained in this field. The SLMS is planning to commence providing these in the not very remote future. Nevertheless, CAP warnings are issued on a constant based and delivered to the emergency authorities (NEMO) of St. Lucia. The SLMS is working on relaunching CAP to meet international standards in 2025.

Summary score, recommendations, and comments for Element 6

The CHD Element 6 score for the "Warning and Advisory Services" assessed as maturity level 3 on the CHD scale, reflecting "Weather-related warning service with modest public reach and informal engagement with relevant institutions, including disaster management agencies.".

Recommendations:

a. As previously mentioned, the relations with warnings users should be formalized, also including formalized and systematic feedback mechanisms.

b. As described throughout this report, without an additional manpower there can be no redundancy in the shift work, which may cause real disruptions with issuing warning in a continuous way.

c. In the future, SLMS should incorporate a hydrological division to enhance its capability to provide information and issue warnings for floods and flash floods.

d. In a later stage, with a future R&D staff, and perhaps through a cooperation with foreign universities and institutions, SLMS should consider developing risk information to enhance its early warning services, including through the assessment of the exposure of vulnerability of the population and different economic sectors of St. Lucia.

Element 7: Contribution to Climate Services

7.1. Where relevant, contribution to climate services according to the established capacity for the provision of climate services.

The main constraint in delivering climate information and services is limited personnel, with only one trained climatologist who also serves in multiple roles, including as the PR. Additionally, there are gaps in historical data, and only basic quality control and homogenization are performed—limited to just two manual stations. However, despite these challenges, there is sufficient technical expertise to develop some statistical products, maps, and other climate-related outputs.

Seasonal forecasts are provided with the support of CIMH (incl. with an automated system allowing for downscaling to local level), but there is no involvement with climate predictions scenarios.

In St. Lucia, the governmental entity mandated to deal with climate change is the ministry of Sustainable Development, rather than the SLMS.

Summary score, recommendations, and comments for Element 7

The CHD Element 7 score for the "Contribution to Climate Services" assessed as Maturity Level 3 on the CHD scale, reflecting "Essential Capacity for Climate Services Provision".

Recommendations:

a. Attempts at locating, retrieving and digitalizing historical data are mandatory for any basic climatic products.

b. Additional staff should be recruited and trained by CIMH (and other relevant institutions) in the field of climatology.

c. Additional IT infrastructure should be acquired and installed – more servers, back-ups, computers and an improved central data management system with modern software, allowing an easy access, quality check and use of climatological data.

d. Perhaps through a collaboration with a foreign research institute, SLMS should strive towards a statistical downscaling of relevant global or regional climatic models (but only after some additional data rescue).

[6]: https://production-new-commonwealth-files.s3.eu-west-2.amazonaws.com/migrated/documents/vacancies/terms-of-service/Final%20ToR%20-%20Modernizing%20and%20Strengthening%20Min%20of%20Sustainable%20Development%20St%20%20Lucia-1%20v1%201.pdf

Element 8: Contribution to hydrology

8.1. Where relevant, standard products such as quantitative precipitation estimation and forecasts are produced on a routine basis according to the requirements of the hydrological community.

The existing partial hydrological services and products in St. Lucia are provided by the Water Resources Management Agency of St. Lucia (WRMA). WRMA collects hydrological observations and fulfills some of the requirements for a hydrological service (e.g. for monitoring), but not for forecasting floods and flash floods.

Though the SLMS issues floods forecasts and warnings in a cooperation with WRMA, these are issued from the point of view of meteorologists, rather than that of hydrologists. Thus, the forecasts and warnings include information about excessive precipitation (so, pure meteorological information), but without a hydrological component (regarding the state of the water bodies, runoffs, return periods, etc.).

8.2. SOPs in place to formalize the relation between Met Service and Hydrology Agency, showing evidence that the whole value chain is addressed.

Yes, there are a MoU and well-based working relations between SLMS and WRMA.

8.3. Data sharing agreements (between local and national agencies and across international borders as required) on hydrological data in place or under development.

Yes, see 8.2.

8.4 Joint projects/initiatives with hydrological community designed to build hydrometeorological cooperation.

World Bank - Disaster Vulnerability Reduction Project (2014-2023): "The Disaster Vulnerability Reduction Project for Saint Lucia aimed to reduce urgent disaster vulnerability and increase long-term climate resilience in Saint Lucia by addressing the multi-faceted risks associated with hydro-meteorological events.

The project consisted of five components, the first one being the risk reduction and adaption measures. This component supported structural and non-structural flood and landslide risk reduction interventions and climate adaption measures to improve Saint Lucia's resilience against current and future climate shocks.

The second involved technical assistance for improved assessment and application of disaster and climate risk information in decision-making, as well as capacity building for open systems and platforms to create, share, analyse, and use disaster risk and climate change data and information for improved decision making and engineering design for risk reduction and climate change adaption.

The third component covered a climate adaption financing facility designed to establish a pilot financing mechanism to promote increased climate resilience.

The fourth was an emergency response component supporting emergency recovery and reconstruction subprojects.

Finally, the last component supported the strengthening the institutional capacity for project management and implementation activities."

See: https://projects.worldbank.org/en/projects-operations/project-detail/P127226

Summary score, recommendations, and comments for Element 8

The CHD Element 8 score for the "Contribution to Hydrology" assessed as Maturity Level 4 on the CHD scale, reflecting "The meteorological, hydrological and water resources sectors have a high-level formal agreement in place and an established working relationship and data sharing take place, but institutions still tend to develop products and services in isolation".

Recommendations:

a. Keep up close relationship between SLMS and WRMA and strengthen it in different ways through regular face to face meetings, cooperation via projects and joint trainings wherever possible. Another option would be for the two institutions to reach a formalized agreement on joint maintenance and operation of the meteorological observational networks of both entities.

b. The Water and Sewerage Act should be updated to formally include the role of the St. Lucia Meteorological Service (SLMS). Currently, the Act only contains a brief section on emergency situations, focusing solely on water shortages or contamination, with no provisions for responding to events such as heavy rainfall. Moreover, it lacks any mention of coordination with SLMS. In practice, SLMS collaborates with WRMA to provide relevant information to NEMO, which then disseminates it to the public—yet this process is not reflected in the legislation. Formalizing this cooperation and expanding the scope of the Act would enhance preparedness and response.

c. St. Lucia functionally lacks a real hydrological service. The government should decide where such a service should be established, as part of the SLMS or as part of WRMA, with adequately trained staff and technical infrastructure. Such a component would be the operational arm issuing hydro-based forecasts and warnings. Since the SLMS is already an operational service, it is advisable to set it as part of it.

Element 9: Product dissemination and outreach

9.1. Channels used for user-centered communication and ability to support those channels (for example, does the NMHS operate its own television, video or audio production facilities? Does it effectively use cutting-edge techniques?).

The SLMS operates its own website, which should get modernized, with a design enhanced to facilitate user access to the products provided by the service. SLMS is also active on social media platforms (Facebook, Instagram). They also issue a newsletter, which is especially effective thanks to the wide use of this mean of information delivery in St. Lucia and the country's small population.

The SLMS does not operate its own TV, video or audio production facilities, but can present on the national TV and Radio broadcasts. Communication is also being carried out through NEMO.

9.2. Education and awareness initiatives in place.

The SLMS plans school visits (e.g. either Met staff going to school or vice versa). Furthermore, an educational program is in preparation, through which every secondary school should get a small Weather Station, work with it and maintain it.

9.3. Special measures in place to reach marginalized communities and indigenous people.

SLMS organizes school visits to its facilities, as well as sporadic meetings with communities.

Summary score, recommendations, and comments for Element 9

The CHD Element 9 score for the "Product Dissemination and Outreach" assessed as Maturity Level 2 on the CHD scale, reflecting, "Traditional communication channels and a basic dedicated website is used to disseminate forecasts and basic information.".

Recommendations:

a. The SLMS should not spend its limited resources on establishing its own TV, radio or audio production facilities.

b. The SLMS should make its different products more accessible for marginalized populations (such as the visually and audibly challenged, color-blind people, older people, etc.).

c. SLMS should get the possibility to run a business WhatsApp channel, as this offers the opportunity to reach a large part of the population quickly. This could be advertised on other social platforms.

d. SLMS should get the possibility to upgrade its homepage with graphs, charts, etc. As at the moment, its text based only and therefore outdated.

e. The lack of "visitable" facilities affects its outreach capabilities. Most of the employees of SLMS sit in the main two airports, which are not the most

accessible and inviting places. SLMS may require a separate facility or small visiting centre at a more accessible place (but in turn, it requires also additional personal and infrastructure).

Element 10: Use and national value of products and services

10.1. Formalized platform to engage with users in order to co-design improved services.

The SLMS is an active member of the Flood and Drought Committee, which meets regularly. Additionally, strong informal working relationships with various government entities contribute to service improvements, though these collaborations are not systematically structured.

10.2. Independent user satisfaction surveys are conducted, and the results used to inform service improvement.

Surveys are currently not conducted but are planned to commence soon.

10.3. Quality management processes that satisfy key user needs and support continuous improvement.

Since the SLMS is the provider of meteorological services for Aviation, it has implemented an ISO QMS process, according to ICAO Annex 3 requirements. However, ISO was implemented only for the services provided for aviation.

Summary score, recommendations, and comments for Element 10

The CHD Element 10 score for the "Use and National Value of Products and Services" assessed as Maturity Level 3 on the CHD scale, reflecting "Service development draws on regular dialogue with major stakeholders".

Recommendations:

a. Keep up periodic meetings with all the main stakeholders, in which current services should be discussed, and improvements should be sought after, together with clear goals and timetables. Each user should designate a focal point to facilitate collaboration with SLMS. This would help improve services, assess their quality and effectiveness, and implement necessary enhancements.

b. In case additional funds are to be found, it is highly recommended to work towards the implementation of a fully ISO-compliant QMS for all SLMS services and products.

Annex 1 Consultations (including experts and stakeholder consultations)

Meteorological Service:

Name	Unit	Role
Andre Joyeux	Management	Manager
Venantius Descartes	Management	Manager
Vigil Saltibus	Met Service	Meteorologist
Govinda Augustin	Met Service	Chief technician
Glenn Antoine	Met Service	Forecaster

Stakeholders:

Title	Name	Organization
Mrs.	Lilian Ramjeawan	WFP
Mrs.	Greta Aubke	WFP
Mr.	Ernest Wagner	WRMA
Mrs	Emilyn Jean	Solid waste management
Mr	Ian Frederick	Ministry of Education
Mr	Maurice Norville	WASCO
Mr	Caron Charlemagne	Chamber of commerce/Massy Supermarkets
Dr	Sementha Tisson	Ministry of Environmental Health
Mr.	Remy Avril	SLASPA
Ms.	Lenita Joseph	DIPT
Ms.	Tanzia Touissant	Ministry of Equity
Ms.	Kennisha Jeffrey	NEMO1
MR.	Vernon Francois	NEMO2
Dr.	Auria King	Ministry of Agriculture

Annex 2 Urgent needs reported

As mentioned in the executive summary.

Annex 3 Information supplied through WMO

1. WMO Monitoring System Data
2. WMO EW4All Rapid Assessment for Pillar-2
3. WMO Hydrology Survey
4. Data from Checklist for Climate Services Implementation

Annex 4 List of materials used

1. Country Hydromet Diagnostics, published by WMO, 2023
2. CHD Operational Guidance for SOFF, 2023
3. CMO Members Legislative Assessment Report, 2022
4. CMO Members Policy Appraisal Report, 2022

Annex 5 List of Abbreviations

Abbreviation	**Full Name**
ASL	Above Sea Level
AWS	Automatic Weather Stations
CCRIF	Caribbean Catastrophe Risk Insurance Facility
CHD	Country Hydromet Diagnostics
CDEMA	Caribbean Disaster Emergency Management Agency
CIMH	Caribbean Institute for Meteorology and Hydrology
CMO	Caribbean Meteorological Organisation
CREWS	Climate Risk and Early Warning Systems
ECMWF	European Centre for Medium-range Weather Forecasts
EUMETSAT	European Organization for the Exploitation of Meteorological Satellites
EW4all	Early Warnings for all
FAO	Food and Agriculture Organization
GBON	Global Basic Observing Network
GDPFS	Global Data processing and Forecasting System
GISC	Global Information System Centre
ICT	Information and Communication technologies
NCAR	National Center for Atmospheric Research
NEMO	National Emergency Management Organisation
NMHS	National Meteorological and Hydrological Service
NWP	Numerical Weather Prediction
OECD	Organization for Economic Co-operation and Development
RTC	Regional Training Centre
RTH	Regional Telecommunication Hub
SOFF	Systematic Observation Funding Facilities
TAFOR	Terminal Aerodrome Forecasts
UNDP	United Nations Development Programme
UNDRR	United Nations Office for Disaster Risk Reduction
WFP	World Food Programme
WMO	World Meteorological Organization
WRMA	The Water Resource Management Agency of St. Lucia