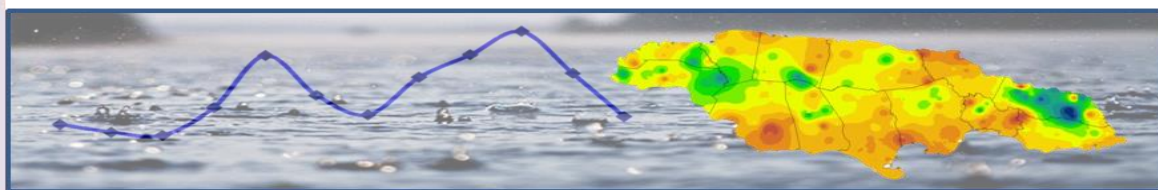




Preliminary Monthly Rainfall Summary



November 2016

Introduction

This rainfall summary is prepared by the Climate Branch of the Meteorological Service, Jamaica. The Meteorological Service maintains a network of over two hundred (200) rainfall stations located across the island. Rainfall is usually read at 7:00 a.m. and reported for the previous 24 hours. These readings are done by a cadre of paid but mainly voluntary dedicated observers.

General

Jamaica's bimodal rainfall pattern consists of two peak periods with higher values of rainfall and corresponding periods of lower rainfall. The primary peak occurs in October and the secondary in May. The lowest amounts are at a minimum during the period February to March and the month of July. This is based on long-term reports but deviations from this pattern do occur year to year.

A comparison of the old 30-year mean (1951-1980) with the 1971-2000 mean by the Meteorological Service has shown that the island's rainfall patterns and values have not changed significantly for the current thirty-year (1971-2000) period. The main changes noted are that of wetter dry periods and drier wet periods. This has however not affected the

overall rainfall pattern for the island as seen in Figure 1 below.

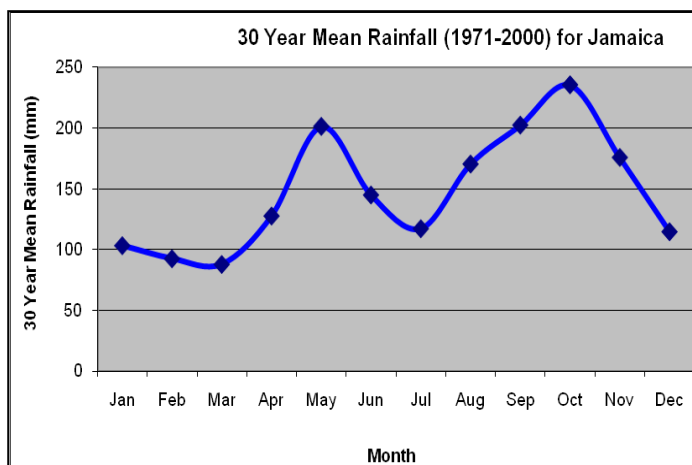


Figure 1: Precipitation Pattern from 1971-2000 for Jamaica.

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Island Monthly Rainfall

For November 2016, eight (8) of thirteen (13) parishes¹ recorded below-normal rainfall. Overall, the island’s average rainfall was 175 mm which corresponds to nearly 100% of the 30-year (1971-2000) monthly mean. In general, all western and most central parishes received below-normal rainfall while, most eastern parishes received rainfall totals above their 30-year monthly means for November.

Cumulative (accumulated) mean rainfall for Jamaica between January and November 2016 was 1,672 mm, or 101% of the 30-year (1971-2000) mean, that is, 1% above what is normal for the eleven month period.

Parish Mean Rainfall for November 2016 and November 2015							
		NOV	NOV	NOV	% OF 30 YR NORMAL		
Parishes	KEY	2016	2015	30 YR NORMAL (1971-2000)	2016	2016	2016
					SEP	OCT	NOV
Hanover	HAN	28	113	141	90	52	20
Westmoreland	WES	17	137	136	97	71	12
Manchester	MAN	63	133	141	59	115	45
St. Elizabeth	STE	77	102	124	65	117	62
Clarendon	CLA	71	66	111	43	103	64
St. Catherine	STC	127	154	115	61	138	110
Trelawny	TRE	86	100	121	128	182	71
St. James	STJ	79	72	114	94	109	70
St. Ann	STA	239	196	168	145	247	142
St. Mary	STM	307	176	260	58	225	118
Portland	POR	751	531	475	69	193	158
St. Thomas	STT	215	240	217	24	64	99
Kgn. & St. And.	KSA	222	100	160	41	101	138
Jamaica	JAM	175	163	176	72	126	100

Table 1: Parish Mean Rainfall for November 2016 and November 2015 (rainfall in mm).

¹ Note that Kingston and St. Andrew (KSA) are combined and reported as one.



Assessment of Parish Rainfall

Eight of thirteen parishes recorded rainfall below their respective 30-year (1971-2000) means, with two of this eight recording 20% or less of their normal rainfall for November. The other five parishes recorded rainfall above their 30-year means. The parish rainfall figures indicate the following:

- The parishes recording below-normal rainfall were **St. Thomas (99%)**, **Trelawny (71%)**, **St. James (70%)**, **Clarendon (64%)**, **St. Elizabeth (62%)**, **Manchester (45%)**, **Hanover (20%)**, and **Westmoreland (12%)**.
- **Portland** recorded the highest average rainfall of **751 mm (representing 158% of its monthly mean)**.
- **St. Mary** recorded the second-highest average rainfall of **307 mm** which was **above-normal (118%) for November**.
- The parishes recording above-normal rainfall were **St. Catherine (110%)**, **St. Mary (118%)**, **Kingston & St. Andrew (138%)**, **St. Ann (142%)** and **Portland (158%)**.
- **Hanover (28 mm)** and **Westmoreland (12 mm)** received the lowest average rainfall.

Meteorological Drought Methodology and Index

Locally, the onset and the duration of a meteorological drought is determined by comparing the average rainfall over a period of two consecutive months with the 30-year historical averages (normal) for a similar bi-monthly period for each parish and the island. The percentage value that is generated is used to quantify the thresholds of the drought index (see Table 2). This index is similar to that used by the Australian Meteorological Service, except that bi-monthly periods are used locally instead of eight consecutive weeks.

The Drought Index is calculated as follows:

$$\text{Drought Index} = \{(\text{Month 1} + \text{Month 2}) / (\text{Normal month 1} + \text{Normal month 2})\} \times 100$$

Drought is defined as a long period of weather without rain (Heinemann English Dictionary). The more precise definitions for specific areas of concern that are most commonly used are:

- ❑ *Agricultural drought* – a period when soil moisture is inadequate to meet the demands for crops to initiate and sustain plant growth.
- ❑ *Hydrological drought* – period of below average or normal stream-flow and/or depleted reservoir storage.
- ❑ *Meteorological drought* – a period of well-below average or normal precipitation (rainfall) that spans from a few months to a few years.



Percentage of Normal for 2 Consecutive Months	Drought Condition or Status
20% or less	Extreme Drought
21% to 40%	Severe Drought
41% to 60%	Normal Drought
Above 60%	No Drought

Table 2: Meteorological Drought Index

Island Drought Assessment

<u>Drought Indices (%) for August to November 2016</u>			
Parishes	Aug/Sep	Sep/Oct	Oct/Nov
Hanover	87	70	41
Westmoreland	83	84	51
Manchester	82	91	90
St. Elizabeth	73	93	100
Clarendon	74	76	90
St. Catherine	78	101	127
Trelawny	121	157	134
St. James	101	101	95
St. Ann	137	208	195
St. Mary	73	149	160
Portland	102	143	173
St. Thomas	60	45	79
Kgn. & St. And.	50	73	116
Jamaica	84	101	115

Table 3: Parish Drought Indices (%) for August to November 2016

Based on the indices, two parishes, **Hanover** and **Westmoreland** experienced normal drought conditions for the October/November bi-monthly period. This was the first time in 2016 that these two parishes were experiencing drought conditions. **St. Thomas** which experienced drought conditions the last 2 bi-monthly periods, joined the other parishes that were above drought conditions in this period.

**Precipitation Outlook: December 2016 to February 2017**

The forecast for the December to February period shows an increase in the rainfall amounts above the average with the greater chance of this occurring in December and January. This is mainly due to favourable environmental conditions at the start of the dry season.

With this forecast there should be no immediate drought concerns for the island, during the early part of the dry season. This however could change mid-way the dry season and therefore, for those areas experiencing dry conditions at the end of the primary rainfall season, close monitoring of conditions is being recommended.

Table 4 below, shows the precipitation outlook for selected stations across Jamaica as analysed by the Climate Predictability Tool. Fifteen (15) of the seventeen (17) stations are indicating higher probabilities for above-normal rainfall for the December 2016 to February 2017 period while, Manley is indicating below normal activity and Frome normal activity.



Stations	Below (B) %	Normal (N) %	Above (A)%
Manley (Kingston)	40	35	25
Sangster (St. James)	25	35	40
Savanna-la-mar (Westmoreland)	25	35	40
Beckford Kraal (Clarendon)	30	20	50
Serge Island (St. Thomas)	25	35	40
Cave Valley (St. Ann)	35	20	45
Tulloch Estate (St. Catherine)	25	35	40
Y.S. Estate (St. Elizabeth)	30	20	50
Hampstead (St. Mary)	25	30	45
Orange Valley (Trelawny)	30	20	50
Langley (Kingston)	25	35	40
Mount Peto (Hanover)	30	20	50
Shirley Castle (Portland)	25	35	40
Suttons (Manchester)	35	25	40
Potsdam (St. Elizabeth)	25	35	40
Frome (Westmoreland)	25	40	35
Worthy Park (St. Catherine)	30	20	50
<p>Key A: Above-normal rainfall means greater than 66 percentile of the rank data N: Near-normal rainfall means between 33 and 66 percentile of the rank data B: Below-normal rainfall means below 33 percentile of the rank data</p>			

Table 4: Precipitation Outlook for Selected Stations for December 2016 to February 2017

Forecast Verification for December 2015 to February 2016

For the same period last year, the models predicted above normal rainfall for most stations across the island. A comparison with actual conditions indicates that the model did fairly well with 35%-65% accuracy.

**Summary**

Eight parishes recorded rainfall that was less than their respective 30-year (1971-2000) means, while five parishes recorded rainfall of more than 100% of their 30-year means. Two parishes recorded rainfall well below (20% or less) of their 30-year means. Altogether, Jamaica received rainfall that was just about what is normal (100%) for the month. Meanwhile, the cumulative mean rainfall for the island between January and November 2016 was at 101%.

Hanover and Westmoreland experienced normal drought conditions for the October/November bi-monthly period, while the other eleven parishes experienced no drought. With a forecast of near-normal to above normal rainfall going into the start of the dry season, there should not be any immediate concerns for drought conditions across the island. However we are recommending some level of monitoring for those areas over western and some southern parishes which received less than expected rainfall during the wet season.