



2009



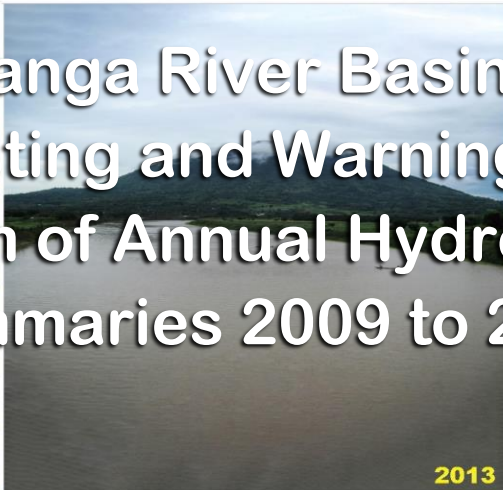
2010



2011



2012



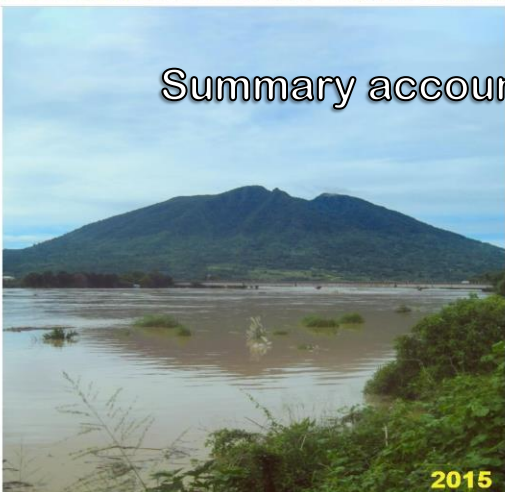
2013



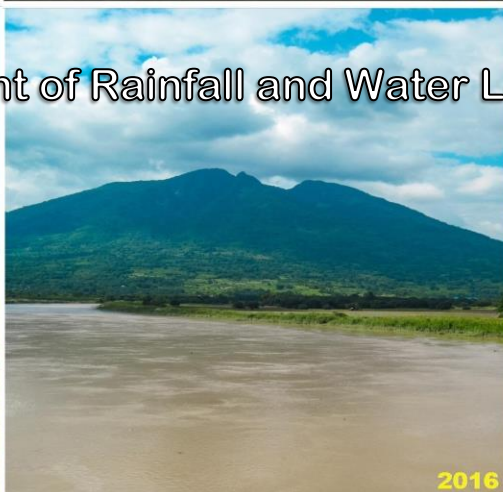
2014

Pampanga River Basin Flood Forecasting and Warning Center Compendium of Annual Hydrological Data Summaries 2009 to 2020

Summary account of Rainfall and Water Levels of PRFFWC



2015



2016



2017



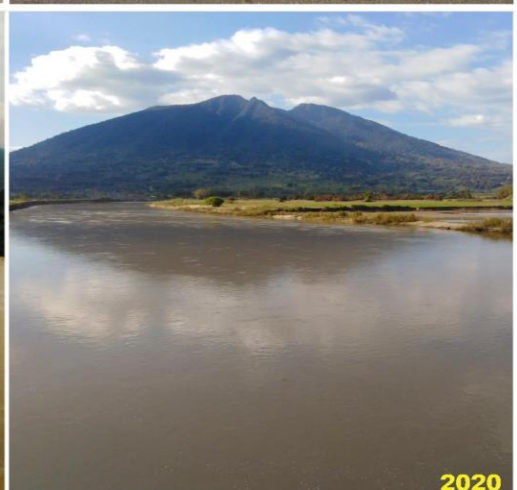
2018



(June 2021)



2019



2020



Front / Back Covers:

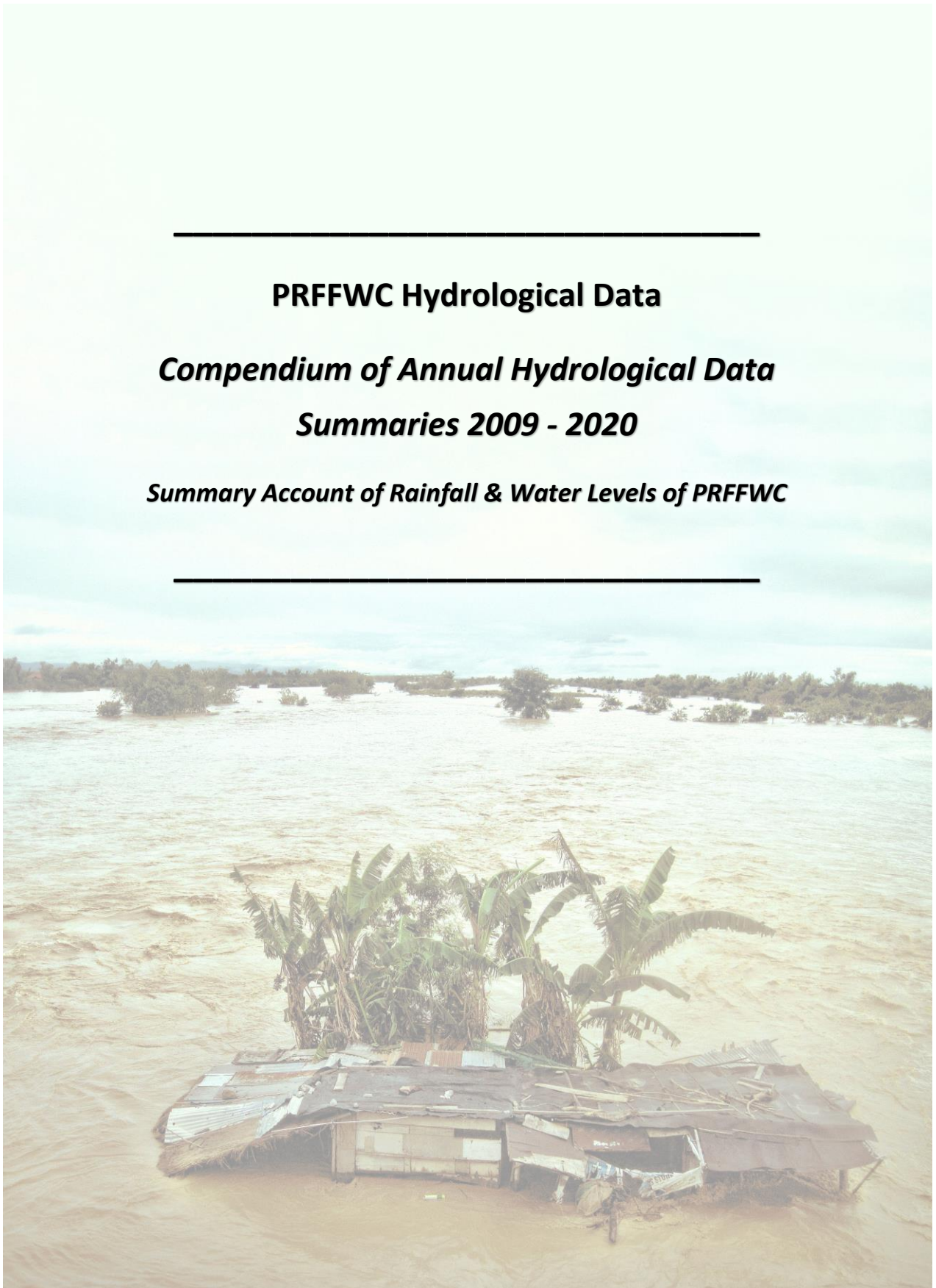
PRFFWC Hydrological Data Summary yearbook covers from 2009 to 2020

PRFFWC

PRFFWC Hydrological Data

Compendium of Annual Hydrological Data Summaries 2009 - 2020

Summary Account of Rainfall & Water Levels of PRFFWC



Acronyms & Abbreviations:

- AHDS – annual hydrological data summary
- CSFP – City of San Fernando, Pampanga
- D/S - downstream
- D/T - downtime
- FFWS – Flood Forecasting & Warning System
- FM – Flood Marker
- HMD – Hydro-Meteorology Division
- HMTS – Hydro-Met Telemetry Section
- LB – Left Bank
- LST – local standard time
- NIA-UPRIIS – National Irrigation Administration – Upper Pampanga River Integrated Irrigation System
- NCR-PRSD – National Capital Region – PAGASA Regional Services Division
- PAGASA – Philippine Atmospheric, Geophysical and Astronomical Services Administration
- PRB – Pampanga River Basin
- PRFFWC – Pampanga River Basin Flood Forecasting & Warning Center
- Q - discharge
- Racc – accumulated rainfall
- RB – Right Bank
- RIDF – Rainfall Intensity Duration Frequency
- RI – Recurrence Interval (or Return period)
- RR – Rainfall
- SG or S.G. – Staff Gauge
- “SHINe” – School Hydrological Information Network
- TBM – Temporary benchmark
- U/S - upstream
- WL – Water Level
- X-sect – cross-section

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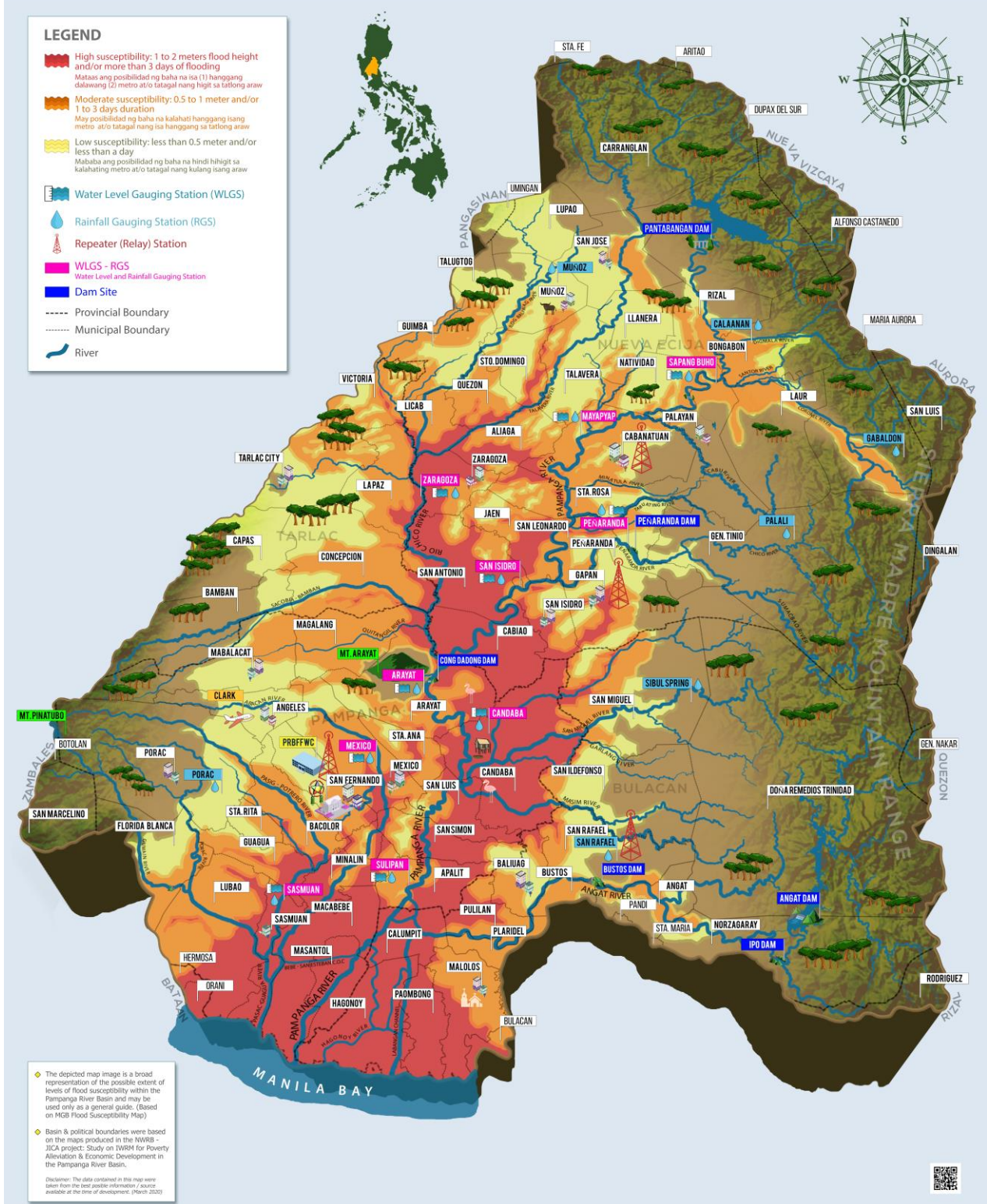
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The PRFFWC Telemetry Tower located in the City of San Fernando, Pampanga

PAMPANGA RIVER BASIN FLOOD SUSCEPTIBILITY MAP (ANTAS NG PAGBAHA SA PAMPANGA RIVER BASIN)



A generalized Flood Susceptibility Geopictorial Map of the Pampanga River Basin with locations of the PRFFWC telemetry stations and the towns that are within the basin (as of Feb. 2020).

Overview

- Compendium is defined as a brief summary of a larger work. A collection, a compilation.
- The AHDS of the PRFFWC presents the daily, monthly, and annual RR, the average daily and maximum WL of all telemetry stations within the PRB as monitored and handled by the PRFFWC.
- The first set of AHDS produced were from the validated series of available dataset of PRFFWC, the period 2009 to 2020.
- This compendium report presents a further analysis of the validated data (RR & WL) of the PRFFWC in its AHDS Yearbooks 2009 to 2020 into another usable and sought after level of hydrological information.
- The supervisory terminal dataset of the PRFFWC system was the main data series considered for AHDS database buildup.
- The main source for complementing breaks / gaps in the supervisory terminal data series were the telemetry stations' data loggers.
- No attempts were made to fill-in gaps and breaks in the data series when there are no data available in the loggers except only those with relatively short gap periods, e.g. by simple eye-fit for WL.
- Obvious and suspected data errors were directly deleted from the data series. However, these were done after doing some data consistency check, field survey, and / or field station instrument validation. A sound knowledge of the hydrological aspects of the various river systems within the basin is also a big basis for error tracking.
- A PRFFWC special program with Bulacan Province the "School Hydrological Information Network or SHINe" RR observations in year 2020 of some school beneficiaries were also included in this report (Annex D).
- In general, this report underscores the importance of having a managed hydrological dataset.
- For further information and clarification please connect with us via our e-mail add: prffwc@gmail.com

Station Profile

Table 1.0 Rainfall and Water Level Stations of the PRFFWC

Station	Station Number	Station Type RR (rainfall) WL (Water Level)	Location	Coordinates (estimated)
	(DEC) 6301 XX			
Muñoz	61	Telemetered RR	Within the compound of the Philippine Carabao Center in the Science City of Muñoz, N.E.	15°44'17"N, 120°57'38"E
Sapang Buho	62	Telemetered RR & WL	@ LB of Pampanga River in Bgy. Sapang Buho, Palayan City, Nueva Ecija	15°35'39"N, 121°07'09"E
Gabalton	63	Telemetered RR	Around 450 meters above the natural ground elevation of Bgy. Malinao, Gabaldon, N.E.	15°29'55"N, 121°21'20"E
Zaragoza	64	Telemetered RR & WL	Along the Zaragoza – La Paz road (RB-D/S of the Rio Chico Bridge)	15°26'36"N, 120°45'03"E
Mayapyap	65	Telemetered RR & WL (defunct since 2015)	@ RB-D/S of Gen. Luna Bridge, (Bgys. Mayapyap & Valdefuente) Cabanatuan City, Nueva Ecija	15°30'52"N, 120°57'20"E
Mayapyap (NIA-UPRIIS)		Telemetered RR (transferred Oct. 2019)	In the front lawn of the NIA-UPRIIS Compound, Cabanatuan City	15°28'33"N, 120°57'30"E
Peñaranda	66	Telemetered RR & WL	@ LB-D/S side of the bridge, around 550 meters D/S of Peñaranda River Irrigation Dam at Bgy. Uno, Poblacion, Peñaranda, N.E.	15°21'14"N, 121°00'20"E
Calaanan	67	Telemetered RR	Inside the Pesa Elementary School compound, Purok 2, Bgy. Pesa, Bongabon, N.E.	15°38'53"N, 121°11'09"E
Palali	68	Telemetered RR	Within Nueva Ecija Stock Farm in Bgy. Nazareth, Gen. Tinio, N.E.	15°22'50"N, 121°9'41"E
San Isidro	71	Telemetered RR & WL	@ the RB-D/S side of the San Isidro-Jaen Bridge, San Isidro, N.E.	15°18'49"N, 120°54'09"E
Arayat	72	Telemetered RR & WL	@ RB-D/S side of San Agustin Bridge, Arayat, Pampanga	15°10'06"N, 120°46'56"E
Candaba	73	Telemetered RR & WL	Along Candaba-San Miguel road (Dukma) at Bgy. Paralaya, Candaba, Pampanga	15°06'56"N, 120°51'01"E
Sibul Spring	74	Telemetered RR	Bgy. Sibul, San Miguel, Bulacan	15°10'05"N, 121°03'33"E
Sasmuan	75	Telemetered RR & WL	Bgy. Sta. Lucia (Poblacion), Sasmuan, Pampanga	14°56'11"N, 120°37'23"E
Sulipan	76	Telemetered RR & WL	@ RB of Pampanga River at Bgy. Sulipan, Apalit, Pampanga	14°56'21"N, 120°45'39"E
Mexico	77	Telemetered RR & WL	LB-D/S of Mexico Bridge No. 2, Bgy. Sto. Rosario, Mexico, Pampanga	15°04'05"N, 120°43'51"E
Porac	78	Telemetered RR	Within the municipal compound property, Bgy. Cangatba, Porac, Pampanga	15°04'48"N, 120°32'43"E
San Rafael	90	Telemetered RR (Repeater)	NIA compound, Bgy. Sabang, Baliwag, Bulacan	14°58'05"N, 120°54'52"E
Cabanatuan	89	Repeater station (Mayapyap RR now located here)	Within the NIA-UPRIIS Compound, Cabanatuan City	15°28'33"N, 120°57'30"E
PRFFWC (CSFP)		Digital tipping-bucket / manually recorded	PRFFWC area compound besides DOST-3, DMGC, Bgy. Maimpis, CSFP	15°04'04"N, 120°39'22"E

Scope and Limitations

1. This report covers the 18 rainfall stations, 17 are telemetry-based and 1 manually observed, and the 10 water level stations of the PRFFWC.
2. The generated dataset in this report were based from the AHDS yearbooks 2009 to 2020. Reference information with regards to the AHDS dataset are provided in their respective yearbooks.
3. Units for some of the hydrological elements:
 - a. Rainfall – millimeters (mm)
 - b. Water Level (River Stage) – meters (m)
 - c. Cross-sectional area – square meter (m²)
 - d. River Discharge – cubic meters per second or cumecs (m³/sec)
 - e. Rainfall day – rain-days
4. The minimum rainfall amount for telemetry stations is 1 mm; for the rainfall observations in PRFFWC in the City of San Fernando (PRFFWC-CSFP), Pampanga, the minimum RR tip is 0.25 mm; for WL, all values are in meters.
5. Rain-day is considered as a day with at least 1 mm of rainfall for telemetry stations; and at least 0.25 mm for PRFFWC-CSFP station;
6. Red-colored values in this report indicate incomplete data series for that referred period.
7. The hydrological data summary presented in this yearbook are the monthly and annual total rainfall and the respective averages (2009-2020) for each period per station (this can be referred to as a part of a “provisional normal”); the monthly, annual total and their respective averages of rainfall and rain-days per station; the monthly and annual averages of water level for each station, the monthly maximum stage and the annual peak recorded for each year per station. Further, the PRFFWC RR stations IDF curves and WL stations recurrence intervals.

Disclaimer:

The dataset summary presented herein have been processed and validated through several steps using the best possible means available to the PRFFWC at its time of processing. However, still it is possible that results may contain inadvertent errors such as typographical in nature, errors resulting from possible misuse of excel formulae, and other similar factors. The summary information in this report may be revised as new analyses emerge.

Users noting any errors that they may have encountered in this report are requested to inform the PRFFWC. Furthermore, and as a caveat, users may freely use the information contained herein at their own risk.

Some Definitions (from *WMO Guidelines on the Calculation of Climate Normals, 2017 Edition, WMO-No. 1203*):

The Technical Regulations (WMO, 2016b) make the following definitions:

- **Period averages.** Averages of climatological data computed for any period of at least ten years starting on 1 January of a year ending with the digit 1.
- **Normals.** Period averages computed for a uniform and relatively long period comprising at least three consecutive ten-year periods.
- **Climatological standard normals.** Averages of climatological data computed for the following consecutive periods of 30 years: 1 January 1981–31 December 2010, 1 January 1991–31 December 2020, and so forth

In addition, in accordance with *The Role of Climatological Normals in a Changing Climate (WMO, 2007)*, the following definitions are used:

- **Average.** The mean of monthly values of climatological data over any specified period of time (not necessarily starting in a year ending with the digit 1). In some sources, this is also referred to as “provisional normal”.
- **Element.** An aspect of climate that can be statistically described, such as temperature, precipitation or vapour pressure.
- **Parameter.** A statistical descriptor of a climate element. This is commonly the arithmetic mean, but it can also include values such as the standard deviation, percentile points, number of exceedances of a threshold or extreme values

RIDF (from *Civil & Environmental Engineering Department, Colorado State University*)

Intensity-Duration-Frequency (IDF) curves describe the relationship between rainfall intensity, rainfall duration, and return period (or its inverse, probability of exceedance). IDF curves are commonly used in the design of hydrologic, hydraulic, and water resource systems. IDF curves are obtained through frequency analysis of rainfall observations.

Return Period

A return period, also known as recurrence interval (sometimes repeat interval) is an estimate of an event, such as flood or a river discharge flow to occur. A recurrence interval refers to the past occurrence of random events. Forecasting refers to the future likelihood of random events. These are often confused because the recurrence interval (calculated from the past event) is used to gauge the future probability of an event.

Will a 100-year flood occur once every 100 years?

The name is misleading: a “100-year flood” does not happen only once every 100 years. Statistically, a 100-year flood has approximately a 63 percent chance of occurring in any 100-year period, not 100 percent. A 100-year event has a 1 percent chance of occurring in any given year.

A. RAINFALL Summary Presentation



Station: **Muñoz**

Monthly Point Rainfall (millimeters)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year Total
2009			38.0	163.0	205.0	351.0	386.0	473.0	413.0	427.0	7.0	3.0	2466.0
2010	0.0	0.0	5.0	30.0	136.0	137.0	443.0	237.0	196.0	239.0	101.0	29.0	1553.0
2011	56.0	0.0	1.0	3.0	239.0	143.0	219.0	335.0	418.0	277.0	135.0	71.0	1897.0
2012	33.0	9.0	23.0	6.0	238.0	335.0	376.0	482.0	258.0	113.0	15.0	5.0	1893.0
2013	0.0	4.0	11.0	85.0	69.0	244.0	336.0	554.0	366.0	99.0	35.0	6.0	1809.0
2014	0.0	0.0	20.0	78.0	97.0	183.0	410.0	247.0	401.0	209.0	29.0	46.0	1720.0
2015	14.0	0.0	0.0	0.0	157.0	191.0	315.0	253.0	365.0	402.0	4.0	401.0	2102.0
2016	9.0	0.0	1.0	26.0	242.0	105.0	255.0	496.0	157.0	492.0	49.0	17.0	1849.0
2017	14.0	20.0	7.0	16.0	247.0	219.0	255.0	297.0	105.0	78.0	175.0	4.0	1437.0
2018	8.0	0.0	17.0	59.0	142.0	353.0	648.0	423.0	386.0	243.0	0.0	29.0	2308.0
2019	36.0	0.0	0.0	24.0	161.0	185.0	249.0	493.0	335.0	88.0	161.0	24.0	1756.0
2020	0.0	1.0	5.0	6.0	184.0	159.0	175.0	304.0	316.0	491.0	118.0	138.0	1897.0

Annual Average (2010-2020) **1838.3**Period Average (Jan 01, 2011 to Dec 31, 2020) **1866.8**

Monthly Average	15.5	3.1	10.7	41.3	176.4	217.1	338.9	382.8	309.7	263.2	69.1	64.4
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Monthly Rain Days

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year Total
2009			4	10	12	21	27	18	23	12	1	1	129
2010	0	0	1	3	5	16	23	23	16	13	11	1	112
2011	3	0	1	2	11	15	22	19	20	16	8	8	125
2012	2	3	3	2	16	22	23	27	21	7	3	2	131
2013	0	1	2	5	12	15	17	20	24	8	6	3	113
2014	0	0	2	4	8	16	19	16	16	13	4	5	103
2015	1	0	0	0	12	11	20	19	18	9	2	7	99
2016	2	0	1	2	13	14	17	24	12	20	6	6	117
2017	3	1	1	2	11	14	17	18	15	10	7	2	101
2018	3	0	3	2	10	22	24	28	16	8	0	6	122
2019	2	0	0	4	12	12	18	24	21	7	9	5	114
2020	0	1	1	1	13	10	14	20	16	19	11	12	118

Annual Average (2010-2020) **114**Period Average (Jan 01, 2011 to Dec 31, 2020) **114**

Monthly Average	1	1	2	3	11	16	20	21	18	12	6	5
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Station: **Sapang Buho**

Monthly Point Rainfall (millimeters)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year Total
2009			37.0	251.0	125.0	236.0	312.0	358.0	484.0	401.0	31.0	2.0	2237.0
2010	0.0	0.0	0.0	30.0	39.0	223.0	276.0	256.0	125.0	173.0	63.0	2.0	1187.0
2011	49.0	0.0	3.0	7.0	218.0	344.0	317.0	252.0	468.0	218.0	205.0	119.0	2200.0
2012	3.0	13.0	43.0	14.0	140.0	422.0	383.0	543.0	429.0	176.0	27.0	8.0	2201.0
2013	4.0	7.0	16.0	2.0	120.0	307.0	207.0	338.0	269.0	133.0	50.0	57.0	1510.0
2014	0.0	0.0	31.0	30.0	106.0	216.0	454.0	235.0	321.0	131.0	33.0	40.0	1597.0
2015	26.0	0.0	0.0	0.0	167.0	126.0	228.0	342.0	327.0	536.0	0.0	398.0	2150.0
2016	4.0	1.0	4.0	16.0	110.0	95.0	148.0	315.0	292.0	404.0	81.0	31.0	1501.0
2017	30.0	35.0	3.0	22.0	190.0	185.0	206.0	348.0	241.0	86.0	189.0	31.0	1566.0
2018	18.0	0.0	0.0	0.0	75.0	280.0	545.0	460.0	362.0	160.0	0.0	63.0	1963.0
2019	23.0	0.0	0.0	8.0	247.0	252.0	313.0	391.0	286.0	36.0	97.0	28.0	1681.0
2020	0.0	0.0	2.0	0.0	109.0	106.0	140.0	173.0	265.0	406.0	190.0	118.0	1509.0

Annual Average (2010-2020) **1733.2**Period Average (Jan 01, 2011 to Dec 31, 2020) **1787.8**

Monthly Average	14.3	5.1	11.6	31.7	137.2	232.7	294.1	334.3	322.4	238.3	80.5	74.8
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Monthly Rain Days

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year Total
2009			1	14	12	19	23	16	24	13	3	1	126
2010	0	0	0	3	6	15	18	24	14	12	10	1	103
2011	4	0	2	2	12	14	19	22	24	11	10	6	126
2012	3	4	4	3	12	20	23	30	21	9	2	4	135
2013	2	1	3	1	11	14	19	21	22	6	8	7	115
2014	0	0	2	1	6	16	23	18	19	12	4	5	106
2015	1	0	0	0	11	9	19	19	19	7	0	7	92
2016	2	1	1	2	10	14	17	27	19	20	9	10	132
2017	5	3	1	3	11	15	20	20	21	13	12	6	130
2018	4	0	0	0	5	21	27	26	16	8	0	7	114
2019	2	0	0	2	14	15	20	27	21	8	8	5	122
2020	0	0	1	0	10	9	14	20	14	20	13	13	114

Annual Average (2010-2020) **117**Period Average (Jan 01, 2011 to Dec 31, 2020) **119**

Monthly Average	2	1	1	3	10	15	20	23	20	12	7	6
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Station: **Gabaldon**

Monthly Point Rainfall (millimeters)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year Total
2009			51.0	195.0	268.0	338.0	293.0	325.0	510.0	659.0	80.0	3.0	2722.0
2010	41.0	0.0	25.0	29.0	45.0	274.0	540.0	321.0	237.0	209.0	276.0	12.0	2009.0
2011	97.0	1.0	61.0	13.0	271.0	474.0	295.0	329.0	873.0	333.0	581.0	234.0	3562.0
2012	26.0	121.0	114.0	26.0	160.0	320.0	417.0	603.0	297.0	511.0	46.0	88.0	2729.0
2013	29.0	107.0	14.0	15.0	61.0	389.0	484.0	533.0	298.0	317.0	577.0	172.0	2996.0
2014	0.0	11.0	83.0	43.0	32.0	195.0	500.0	311.0	514.0	152.0	100.0	163.0	2104.0
2015	46.0	4.0	21.0	8.0	157.0	112.0	406.0	191.0	318.0	819.0	34.0	1047.0	3163.0
2016	94.0	34.0	15.0	14.0	85.0	217.0	158.0	350.0	237.0	574.0	366.0	206.0	2350.0
2017	135.0	131.0	50.0	32.0	182.0	146.0	373.0	478.0	301.0	170.0	627.0	80.0	2705.0
2018	79.0	15.0	3.0	24.0	18.0	193.0	460.0	352.0	388.0	157.0	17.0	224.0	1930.0
2019	147.0	21.0	2.0	14.0	296.0	133.0	345.0	375.0	253.0	92.0	136.0	268.0	2082.0
2020	28.0	31.0	2.0	14.0	268.0	206.0	156.0	283.0	288.0	1057.0	835.0	373.0	3541.0

Annual Average (2010-2020) **2651.9**Period Average (Jan 01, 2011 to Dec 31, 2020) **2716.2**

Monthly Average	65.6	43.3	36.8	35.6	153.6	249.8	368.9	370.9	376.2	420.8	306.3	239.2
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Monthly Rain Days

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year Total
2009			8	18	14	20	25	20	23	16	11	2	157
2010	2	0	4	4	4	16	19	26	19	17	17	2	130
2011	6	1	3	3	10	21	19	22	27	14	17	13	156
2012	5	8	9	4	18	22	23	30	24	15	8	10	176
2013	8	9	5	1	11	15	23	23	24	13	17	12	161
2014	0	2	3	3	3	18	23	20	17	14	5	9	117
2015	2	3	4	4	14	14	22	18	19	14	11	13	138
2016	3	6	4	7	14	16	16	29	17	23	15	19	169
2017	9	5	2	3	15	16	26	20	19	18	18	12	163
2018	7	4	2	7	3	20	26	25	18	13	6	18	149
2019	7	3	1	1	16	14	25	28	21	7	15	11	149
2020	5	5	2	5	8	9	15	23	13	27	19	17	148

Annual Average (2010-2020) **151**Period Average (Jan 01, 2011 to Dec 31, 2020) **153**

Monthly Average	5	4	4	5	11	17	22	24	20	16	13	12
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Station: **Zaragoza**

Monthly Point Rainfall (millimeters)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year Total
2009			4.0	170.0	204.0	349.0	389.0	271.0	386.0	264.0	55.0	0.0	2092.0
2010	0.0	0.0	0.0	72.0	68.0	105.0	345.0	184.0	159.0	249.0	120.0	0.0	1302.0
2011	8.0	2.0	12.0	2.0	188.0	358.0	318.0	233.0	396.0	214.0	144.0	125.0	2000.0
2012	13.0	10.0	29.0	8.0	141.0	271.0	503.0	467.0	263.0	190.0	8.0	1.0	1904.0
2013	0.0	6.0	29.0	60.0	79.0	196.0	260.0	583.0	298.0	97.0	111.0	27.0	1746.0
2014	0.0	0.0	3.0	89.0	94.0	128.0	344.0	220.0	268.0	198.0	16.0	21.0	1381.0
2015	25.0	0.0	0.0	8.0	197.0	118.0	394.0	383.0	188.0	256.0	5.0	212.0	1786.0
2016	4.0	0.0	0.0	4.0	170.0	141.0	188.0	371.0	212.0	382.0	49.0	15.0	1536.0
2017	9.0	4.0	0.0	4.0	152.0	117.0	309.0	466.0	228.0	48.0	117.0	30.0	1484.0
2018	4.0	1.0	20.0	1.0	102.0	287.0	318.0	382.0	579.0	101.0	0.0	29.0	1824.0
2019	14.0	0.0	3.0	43.0	104.0	132.0	330.0	263.0	220.0	148.0	65.0	45.0	1367.0
2020	2.0	1.0	0.0	71.0	197.0	134.0	213.0	234.0	201.0	288.0	126.0	77.0	1544.0

Annual Average (2010-2020) **1624.9**Period Average (Jan 01, 2011 to Dec 31, 2020) **1657.2**

Monthly Average	7.2	2.2	8.3	44.3	141.3	194.7	325.9	338.1	283.2	202.9	68.0	48.5
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Monthly Rain Days

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year Total
2009			2	11	14	22	26	24	22	14	3	0	138
2010	0	0	0	3	5	16	24	20	13	11	7	0	99
2011	1	1	3	1	14	18	20	20	20	11	7	7	123
2012	3	5	3	3	11	20	27	27	20	11	3	1	134
2013	0	1	4	2	7	14	21	21	24	8	7	4	113
2014	0	0	2	5	9	18	21	14	14	9	1	4	97
2015	2	0	0	1	8	9	21	19	14	9	1	7	91
2016	2	0	0	1	12	16	13	24	17	16	6	6	113
2017	2	1	0	2	12	13	25	22	16	9	8	2	112
2018	2	1	2	1	8	22	20	20	16	5	0	5	102
2019	2	0	1	3	15	12	18	25	15	14	8	6	119
2020	1	1	0	3	7	9	13	18	14	21	11	9	107

Annual Average (2010-2020) **110**Period Average (Jan 01, 2011 to Dec 31, 2020) **111**

Monthly Average	1	1	1	3	10	16	21	21	17	12	5	4
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Station: **Mayapyap**

Monthly Point Rainfall (millimeters)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year Total
2009			34.0	161.0	161.0	237.0	393.0	309.0	417.0	331.0	21.0	3.0	2067.0
2010	0.0	0.0	1.0	55.0	10.0	168.0	147.0						381.0
2011	37.0	2.0	11.0	9.0	199.0	393.0	199.0	198.0	409.0	233.0	161.0	164.0	2015.0
2012	40.0	13.0	30.0	2.0	100.0	432.0	262.0	535.0	252.0	189.0	16.0	7.0	1878.0
2013	0.0	7.0	26.0	8.0	72.0	291.0	206.0	463.0	238.0	18.0			1329.0
2014							313.0	203.0	237.0	83.0	25.0	43.0	904.0
2015	15.0	4.0	0.0	0.0	49.0								68.0
2016													0.0
2017													0.0
2018													0.0
2019										26.0	106.0	55.0	187.0
2020	6.0	0.0	5.0	22.0	368.0	301.0	265.0	207.0	244.0	379.0	199.0	132.0	2128.0

Annual Average (2010-2020)

Period Average (Jan 01, 2011 to Dec 31, 2020)

Monthly Average	16.3	4.3	15.3	36.7	137.0	303.7	255.0	319.2	299.5	179.9	88.0	67.3
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Monthly Rain Days

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year Total
2009			2	8	11	20	23	21	21	15	2	2	125
2010	0	0	1	4	4	17	6						32
2011	2	1	5	1	14	19	19	21	19	14	9	7	131
2012	6	4	6	1	14	21	25	27	19	12	3	3	141
2013	0	1	3	3	14	16	22	23	10	1			93
2014							15	15	10	10	3	4	57
2015	2	1	0	0	7								10
2016													0
2017													0
2018													0
2019										4	9	4	17
2020	1	0	2	4	8	12	13	17	17	20	10	12	116

Annual Average (2010-2020)

Period Average (Jan 01, 2011 to Dec 31, 2020)

Monthly Average	2	1	3	3	10	18	18	21	16	11	6	5
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Note: Red colored values indicate incomplete data / info for that respective period.

Mayapyap RR, after being defunct since May 2015, was restored on Oct 2019 but at a different location in the front lawn inside the compound of the NIA-UPRIIS in Cabanatuan City.

Station: **Peñaranda**

Monthly Point Rainfall (millimeters)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year Total
2009			13.0	226.0	134.0	346.0	524.0	247.0	476.0	360.0	32.0	9.0	2367.0
2010	5.0	0.0	5.0	48.0	32.0	192.0	439.0	256.0	151.0	155.0	58.0	2.0	1343.0
2011	34.0	3.0	38.0	7.0	243.0	319.0	236.0	256.0	410.0	194.0	241.0	188.0	2169.0
2012	8.0	23.0	57.0	12.0	235.0	313.0	314.0	436.0	289.0	236.0	15.0	12.0	1950.0
2013	1.0	19.0	56.0	66.0	112.0	286.0	322.0	381.0	270.0	229.0	211.0	24.0	1977.0
2014	0.0	0.0	12.0	68.0	119.0	124.0	316.0	324.0	442.0	183.0	44.0	37.0	1669.0
2015	18.0	1.0	2.0	19.0	210.0	135.0	386.0	284.0	209.0	377.0	8.0	403.0	2052.0
2016	8.0	5.0	0.0	43.0	222.0	140.0	140.0	401.0	175.0	326.0	92.0	19.0	1571.0
2017	35.0	5.0	23.0	86.0	111.0	154.0	178.0	410.0	170.0	107.0	229.0	52.0	1560.0
2018	15.0	0.0	7.0	40.0	49.0	274.0	315.0	256.0	301.0	146.0	1.0	52.0	1456.0
2019	28.0	0.0	0.0	11.0	216.0	125.0	322.0	295.0	240.0	49.0	195.0	60.0	1541.0
2020	4.0	3.0	0.0	0.0	170.0	244.0	188.0	155.0	307.0	473.0	227.0	144.0	1915.0

Annual Average (2010-2020) 1745.7

Period Average (Jan 01, 2011 to Dec 31, 2020) 1786.0

Monthly Average	14.2	5.4	17.8	52.2	154.4	221.0	306.7	308.4	286.7	236.3	112.8	83.5
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Monthly Rain Days

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year Total
2009			3	15	16	19	25	16	22	12	3	2	133
2010	1	0	2	3	5	14	24	21	14	10	10	2	106
2011	3	1	7	2	10	14	24	22	21	12	12	9	137
2012	3	5	3	5	17	19	24	25	17	14	4	4	140
2013	1	3	6	4	10	15	17	23	25	10	13	7	134
2014	0	0	2	4	9	11	23	18	18	14	3	5	107
2015	1	1	1	3	11	12	17	19	15	6	2	6	94
2016	2	1	0	1	12	17	12	23	12	14	10	7	111
2017	5	2	2	5	14	12	26	18	17	12	13	5	131
2018	4	0	1	3	6	23	21	19	15	9	1	10	112
2019	2	0	0	4	14	18	24	27	18	8	8	7	130
2020	1	1	0	0	8	14	12	17	15	18	12	11	109

Annual Average (2010-2020) 119

Period Average (Jan 01, 2011 to Dec 31, 2020) 121

Monthly Average	2	1	2	4	11	16	21	21	17	12	8	6
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Station: **Calaanan**

Monthly Point Rainfall (millimeters)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year Total
2009			49.0	248.0	99.0	415.0	441.0	294.0	585.0	526.0	17.0	3.0	2677.0
2010	6.0	0.0	1.0	56.0	79.0	162.0	357.0	255.0	186.0	243.0	125.0	5.0	1475.0
2011	49.0	6.0	13.0	13.0	152.0	392.0	296.0	221.0	616.0	284.0	246.0	101.0	2389.0
2012	4.0	22.0	87.0	10.0	127.0	497.0	417.0	567.0	413.0	220.0	30.0	21.0	2415.0
2013	4.0	24.0	4.0	0.0	91.0	244.0	334.0	473.0	280.0	240.0	138.0	34.0	1866.0
2014	0.0	0.0	72.0	7.0	95.0	190.0	369.0	227.0	393.0	212.0	55.0	72.0	1692.0
2015	30.0	1.0	1.0	1.0	171.0	109.0	286.0	323.0	324.0	568.0	3.0	514.0	2331.0
2016	20.0	0.0	4.0	2.0	153.0	139.0	160.0	349.0	416.0	526.0	87.0	61.0	1917.0
2017	41.0	48.0	9.0	26.0	219.0	98.0	322.0	474.0	238.0	103.0	331.0	40.0	1949.0
2018	42.0	0.0	3.0	6.0	4.0	410.0	768.0	526.0	336.0	160.0	17.0	64.0	2336.0
2019	31.0	0.0	0.0	0.0	309.0	178.0	337.0	426.0	347.0	64.0	140.0	79.0	1911.0
2020	2.0	27.0	1.0	26.0	145.0	139.0	142.0	289.0	306.0	584.0	313.0	148.0	2122.0

Annual Average (2010-2020) 2036.6**Period Average (Jan 01, 2011 to Dec 31, 2020) 2092.8**

Monthly Average	20.8	11.6	20.3	32.9	137.0	247.8	352.4	368.7	370.0	310.8	125.2	95.2
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Monthly Rain Days

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year Total
2009			3	13	10	20	26	17	27	14	4	1	135
2010	2	0	1	3	9	18	22	24	13	12	13	1	118
2011	4	1	3	2	12	16	21	19	21	14	13	11	137
2012	1	3	6	3	19	20	23	29	23	11	4	4	146
2013	2	5	2	0	14	14	16	19	22	11	10	7	122
2014	0	0	3	2	6	17	24	16	16	15	3	6	108
2015	1	1	1	1	10	8	21	18	18	10	2	7	98
2016	2	0	2	1	13	18	12	25	19	17	13	13	135
2017	7	3	1	3	13	14	22	20	16	12	13	7	131
2018	4	0	2	2	2	20	25	26	14	9	4	8	116
2019	3	0	0	0	18	14	23	26	22	9	9	7	131
2020	1	4	1	1	10	8	13	24	15	21	13	11	122

Annual Average (2010-2020) 124**Period Average (Jan 01, 2011 to Dec 31, 2020) 125**

Monthly Average	2	2	2	3	11	16	21	22	19	13	8	7
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Station: **Palali**

Monthly Point Rainfall (millimeters)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year Total
2009			31.0	255.0	175.0	316.0	369.0	295.0	531.0	441.0	30.0	8.0	2451.0
2010	2.0	0.0	13.0	25.0	46.0	330.0	351.0	361.0	268.0	212.0	101.0	5.0	1714.0
2011	61.0	5.0	34.0	40.0	242.0	377.0	314.0	300.0	596.0	197.0	267.0	141.0	2574.0
2012	5.0	24.0	31.0	36.0	148.0	236.0	505.0	471.0	416.0	296.0	25.0	23.0	2216.0
2013	3.0	26.0	23.0	35.0	109.0	315.0	412.0	406.0	253.0	314.0	291.0	96.0	2283.0
2014	0.0	2.0	32.0	23.0	162.0	173.0	249.0	191.0	451.0	224.0	49.0	44.0	1600.0
2015	34.0	4.0	1.0	17.0	171.0	84.0	422.0	417.0	250.0	537.0	16.0	731.0	2684.0
2016	6.0	13.0	17.0	24.0	81.0	317.0	183.0	380.0	183.0	345.0	102.0	49.0	1700.0
2017	42.0	36.0	78.0	20.0	168.0	89.0	216.0	345.0	213.0	126.0	258.0	59.0	1650.0
2018	23.0	7.0	17.0	8.0	11.0	253.0	507.0	235.0	225.0	97.0	3.0	68.0	1454.0
2019	24.0	1.0	0.0	2.0	422.0	113.0	311.0	316.0	329.0	92.0	131.0	211.0	1952.0
2020	3.0	6.0	40.0	12.0	183.0	154.0	162.0	225.0	147.0	630.0	253.0	173.0	1988.0

Annual Average (2010-2020) 1983.2**Period Average (Jan 01, 2011 to Dec 31, 2020) 2010.1**

Monthly Average	18.5	11.3	26.4	41.4	159.8	229.8	333.4	328.5	321.8	292.6	127.2	134.0
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Monthly Rain Days

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year Total
2009			3	15	14	17	26	20	24	13	5	2	139
2010	1	0	4	4	5	15	20	25	20	15	12	2	123
2011	4	1	5	2	11	20	20	26	22	13	12	10	146
2012	3	5	4	3	13	19	27	27	22	13	4	5	145
2013	1	4	5	2	8	16	20	21	24	12	14	10	137
2014	0	2	2	2	7	18	21	16	20	20	5	7	120
2015	3	2	1	2	12	9	20	20	20	11	4	10	114
2016	2	2	3	3	11	22	14	24	15	20	9	14	139
2017	7	4	3	4	12	16	26	21	22	15	13	7	150
2018	4	2	4	3	2	19	27	22	19	12	3	13	130
2019	2	1	0	1	15	12	23	27	23	10	9	6	129
2020	2	2	5	3	10	12	16	21	14	24	15	14	138

Annual Average (2010-2020) 134**Period Average (Jan 01, 2011 to Dec 31, 2020) 135**

Monthly Average	3	2	3	4	10	16	22	23	20	15	9	8
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Station: **San Isidro**

Monthly Point Rainfall (millimeters)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year Total
2009			7.0	240.0	163.0	304.0	346.0	186.0	423.0	342.0	25.0	6.0	2042.0
2010	5.0	0.0	0.0	54.0	15.0	97.0	313.0	390.0	101.0	178.0	48.0	1.0	1202.0
2011	19.0	21.0	27.0	4.0	222.0	343.0	189.0	214.0	358.0	159.0	159.0	118.0	1833.0
2012	59.0	15.0	51.0	2.0	180.0	172.0	314.0	413.0	322.0	225.0	12.0	11.0	1776.0
2013	0.0	19.0	75.0	45.0	81.0	218.0	293.0	368.0	216.0	180.0	65.0	20.0	1580.0
2014	0.0	0.0	3.0	56.0	87.0	100.0	245.0	206.0	422.0	74.0	37.0	15.0	1245.0
2015	17.0	0.0	0.0	28.0	110.0	110.0	334.0	390.0	145.0	309.0	7.0	256.0	1706.0
2016	12.0	4.0	0.0	68.0	194.0	148.0	114.0	333.0	306.0	312.0	58.0	7.0	1556.0
2017	15.0	8.0	0.0	64.0	106.0	181.0	246.0	375.0	240.0	123.0	149.0	46.0	1553.0
2018	10.0	3.0	37.0	44.0	92.0	187.0	257.0	229.0	317.0	169.0	1.0	48.0	1394.0
2019	19.0	0.0	0.0	21.0	141.0	229.0	331.0	230.0	230.0	45.0	87.0	46.0	1379.0
2020	7.0	4.0	0.0	43.0	212.0	131.0	164.0	226.0	317.0	349.0	262.0	131.0	1846.0

Annual Average (2010-2020) **1551.8**Period Average (Jan 01, 2011 to Dec 31, 2020) **1586.8**

Monthly Average	14.8	6.7	16.7	55.8	133.6	185.0	262.2	296.7	283.1	205.4	75.8	58.8
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Monthly Rain Days

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year Total
2009			3	11	13	18	23	13	21	12	4	2	120
2010	2	0	0	3	1	16	24	24	13	9	10	1	103
2011	2	1	4	1	10	17	21	22	17	10	12	8	125
2012	3	4	5	2	12	20	24	25	20	10	3	5	133
2013	0	2	4	3	8	16	21	20	23	6	9	4	116
2014	0	0	2	4	7	14	23	14	14	7	5	6	96
2015	2	0	0	1	9	6	21	21	15	7	1	7	90
2016	2	2	0	1	10	17	14	24	17	15	9	6	117
2017	4	2	0	4	11	12	22	18	13	12	11	4	113
2018	6	2	1	3	7	20	20	20	15	5	1	8	108
2019	1	0	0	3	10	17	20	22	18	6	8	7	112
2020	1	2	0	3	12	10	14	17	11	20	11	11	112

Annual Average (2010-2020) **111**Period Average (Jan 01, 2011 to Dec 31, 2020) **112**

Monthly Average	2	1	2	3	9	15	21	20	16	10	7	6
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Station: **Arayat**

Monthly Point Rainfall (millimeters)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year Total
2009			4.0	142.0	249.0	299.0	261.0	207.0	508.0	410.0	26.0	4.0	2110.0
2010	8.0	0.0	0.0	98.0	156.0	130.0	223.0	265.0	123.0	215.0	99.0	1.0	1318.0
2011	11.0	0.0	29.0	8.0	155.0	503.0	261.0	289.0	438.0	269.0	163.0	126.0	2252.0
2012	8.0	9.0	87.0	5.0	213.0	122.0	384.0	535.0	436.0	216.0	27.0	5.0	2047.0
2013	6.0	33.0	7.0	106.0	62.0	210.0	321.0	394.0	199.0	360.0	48.0	17.0	1763.0
2014	0.0	1.0	2.0	14.0	80.0	166.0	300.0	201.0	382.0	59.0	30.0	26.0	1261.0
2015	8.0	0.0	0.0	14.0	34.0	141.0	400.0	283.0	309.0	258.0	0.0	201.0	1648.0
2016	5.0	0.0	0.0	23.0	265.0	76.0	194.0	481.0	192.0	341.0	56.0	45.0	1678.0
2017	8.0	0.0	1.0	30.0	104.0	53.0	272.0	407.0	139.0	109.0	149.0	27.0	1299.0
2018	10.0	0.0	45.0	7.0	62.0	350.0	438.0	458.0	343.0	148.0	20.0	40.0	1921.0
2019	7.0	0.0	0.0	62.0	171.0	133.0	247.0	437.0	234.0	96.0	156.0	75.0	1618.0
2020	0.0	21.0	1.0	1.0	127.0	130.0	192.0	227.0	242.0	252.0	205.0	111.0	1509.0

Annual Average (2010-2020) **1664.9**Period Average (Jan 01, 2011 to Dec 31, 2020) **1699.6**

Monthly Average	6.5	5.8	14.7	42.5	139.8	192.8	291.1	348.7	295.4	227.8	81.6	56.5
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Monthly Rain Days

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year Total
2009			1	10	14	18	23	20	19	16	3	2	126
2010	1	0	0	2	5	18	20	23	11	13	9	1	103
2011	2	0	3	1	11	15	20	24	17	13	10	7	123
2012	1	3	4	2	17	17	22	26	23	10	4	2	131
2013	3	3	2	3	9	16	23	19	20	10	7	2	117
2014	0	1	1	3	7	16	23	16	18	9	3	6	103
2015	1	0	0	1	5	14	17	16	16	8	0	9	87
2016	1	0	0	2	8	13	14	23	14	14	8	6	103
2017	3	0	1	5	10	12	19	18	16	11	13	2	110
2018	4	0	3	2	5	20	26	23	14	7	1	9	114
2019	1	0	0	4	10	10	20	21	20	6	14	5	111
2020	0	1	1	1	8	13	11	17	13	18	14	13	110

Annual Average (2010-2020) **110**Period Average (Jan 01, 2011 to Dec 31, 2020) **111**

Monthly Average	2	1	1	3	9	15	20	21	17	11	7	5
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Station: **Candaba**

Monthly Point Rainfall (millimeters)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year Total
2009			2.0	113.0	271.0	308.0	286.0	154.0	407.0	206.0	17.0	1.0	1765.0
2010	5.0	0.0	1.0	77.0	56.0	118.0	131.0	331.0	98.0	236.0	80.0	1.0	1134.0
2011	16.0	0.0	25.0	15.0	127.0	353.0	67.0	118.0	372.0	141.0	214.0	108.0	1556.0
2012	13.0	11.0	35.0	36.0	270.0	131.0	266.0	427.0	369.0	195.0	27.0	8.0	1788.0
2013	10.0	44.0	8.0	19.0	44.0	129.0	279.0	453.0	201.0	178.0	55.0	20.0	1440.0
2014	0.0	1.0	4.0	66.0	57.0	118.0	316.0	220.0	339.0	164.0	72.0	22.0	1379.0
2015	12.0	0.0	1.0	1.0	9.0	176.0	416.0	253.0	370.0	84.0	2.0	217.0	1541.0
2016	6.0	0.0	0.0	16.0	121.0	123.0	170.0	501.0	165.0	223.0	55.0	34.0	1414.0
2017	15.0	2.0	0.0	23.0	97.0	134.0	348.0	221.0	122.0	91.0	151.0	25.0	1229.0
2018	19.0	0.0	16.0	0.0	51.0	60.0	322.0	392.0	248.0	150.0	26.0	69.0	1353.0
2019	6.0	0.0	0.0	28.0	141.0	123.0	212.0	238.0	208.0	41.0	88.0	46.0	1131.0
2020	0.0	14.0	0.0	5.0	92.0	120.0	173.0	223.0	157.0	319.0	169.0	133.0	1405.0

Annual Average (2010-2020) **1397.3**Period Average (Jan 01, 2011 to Dec 31, 2020) **1423.6**

Monthly Average	9.3	6.5	7.7	33.3	111.3	157.8	248.8	294.3	254.7	169.0	79.7	57.0
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Monthly Rain Days

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year Total
2009			1	9	13	21	20	15	20	11	4	1	115
2010	1	0	1	3	6	17	16	22	11	12	9	1	99
2011	4	0	4	2	13	15	8	16	18	12	13	7	112
2012	2	4	5	4	17	13	21	23	20	10	5	1	125
2013	4	2	1	2	9	14	21	20	21	11	8	4	117
2014	0	1	1	4	7	13	23	15	18	13	4	4	103
2015	1	0	1	1	4	14	16	18	16	7	2	8	88
2016	4	0	0	2	9	12	14	27	12	16	12	10	118
2017	5	2	0	5	11	16	21	18	15	10	13	2	118
2018	4	0	2	0	6	19	22	24	19	13	4	11	124
2019	1	0	0	4	15	16	20	22	20	8	13	4	123
2020	0	2	0	1	7	14	12	23	13	20	12	13	117

Annual Average (2010-2020) **113**Period Average (Jan 01, 2011 to Dec 31, 2020) **115**

Monthly Average	2	1	1	3	10	15	18	20	17	12	8	6
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Station: **Sibul Springs**

Monthly Point Rainfall (millimeters)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year Total
2009			9.0	315.0	205.0	291.0	423.0	344.0	535.0	316.0	52.0	8.0	2498.0
2010	6.0	0.0	2.0	138.0	13.0	263.0	436.0	342.0	252.0	188.0	172.0	4.0	1816.0
2011	57.0	23.0	86.0	13.0	197.0	561.0	272.0	262.0	532.0	179.0	342.0	250.0	2774.0
2012	18.0	20.0	70.0	31.0	320.0	199.0	489.0	482.0	437.0	274.0	25.0	18.0	2383.0
2013	10.0	50.0	93.0	25.0	161.0	425.0	420.0	411.0	376.0	350.0	226.0	50.0	2597.0
2014	0.0	1.0	17.0	8.0	106.0	229.0	360.0	296.0	448.0	193.0	73.0	52.0	1783.0
2015	22.0	3.0	0.0	10.0	134.0	174.0	619.0	402.0	257.0	416.0	13.0	422.0	2472.0
2016	7.0	3.0	1.0	7.0	257.0	296.0	244.0	534.0	155.0	339.0	93.0	103.0	2039.0
2017	49.0	9.0	10.0	60.0	217.0	176.0	323.0	260.0	270.0	145.0	220.0	135.0	1874.0
2018	40.0	7.0	7.0	25.0	86.0	610.0	338.0	455.0	353.0	105.0	8.0	107.0	2141.0
2019	15.0	3.0	5.0	34.0	212.0	224.0	463.0	372.0	341.0	55.0	171.0	136.0	2031.0
2020	0.0	32.0	1.0	5.0	288.0	213.0	202.0	199.0	301.0	507.0	324.0	263.0	2335.0

Annual Average (2010-2020) **2204.1**Period Average (Jan 01, 2011 to Dec 31, 2020) **2242.9**

Monthly Average	20.4	13.7	25.1	55.9	183.0	305.1	382.4	363.3	354.8	255.6	143.3	129.0
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Monthly Rain Days

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year Total
2009			4	13	16	18	27	22	20	11	5	2	138
2010	3	0	2	4	5	20	24	26	14	14	12	2	126
2011	8	2	5	4	11	17	22	23	22	15	15	12	156
2012	6	8	7	3	18	20	26	23	21	11	7	5	155
2013	3	4	5	5	11	18	24	22	24	11	12	8	147
2014	0	1	2	2	8	16	25	18	19	19	4	6	120
2015	1	1	0	2	10	12	23	23	19	16	8	10	125
2016	4	2	1	3	14	20	16	26	12	15	12	15	140
2017	8	3	2	5	15	17	23	23	18	19	19	7	159
2018	5	3	3	3	5	19	26	21	21	7	3	13	129
2019	4	2	1	2	15	15	26	23	20	8	13	7	136
2020	0	4	1	2	12	15	18	23	14	20	13	14	136

Annual Average (2010-2020) **139**Period Average (Jan 01, 2011 to Dec 31, 2020) **140**

Monthly Average	4	3	3	4	12	17	23	23	19	14	10	8
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Station: **Sasmuan**

Monthly Point Rainfall (millimeters)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year Total
2009			27.0	89.0	343.0	413.0	186.0	175.0	645.0	135.0	35.0	0.0	2048.0
2010	2.0	0.0	3.0	75.0	27.0	143.0	219.0	279.0	111.0	280.0	135.0	7.0	1281.0
2011	19.0	0.0	12.0	18.0	89.0	691.0	432.0	405.0	379.0	203.0	138.0	80.0	2466.0
2012	36.0	15.0	2.0	18.0	140.0	156.0	526.0	1046.0	358.0	249.0	7.0	5.0	2558.0
2013	9.0	60.0	58.0	57.0	34.0	220.0	231.0	955.0	278.0	192.0	47.0	29.0	2170.0
2014	0.0	1.0	1.0	173.0	99.0	142.0	303.0	313.0	283.0	62.0	8.0	16.0	1401.0
2015	9.0	6.0	4.0	17.0	6.0	193.0	370.0	436.0	156.0	166.0	3.0	198.0	1564.0
2016	0.0	0.0	8.0	11.0	102.0	62.0	281.0	727.0	169.0	244.0	23.0	41.0	1668.0
2017	6.0	3.0	11.0	4.0	18.0	69.0	569.0	232.0	234.0	134.0	75.0	26.0	1381.0
2018	21.0	0.0	47.0	38.0	175.0	491.0	486.0	746.0	270.0	121.0	0.0	33.0	2428.0
2019	1.0	1.0	2.0	47.0	32.0	169.0	234.0	390.0	263.0	37.0	68.0	61.0	1305.0
2020	16.0	12.0	3.0	104.0	143.0	136.0	320.0	152.0	268.0	220.0	222.0	73.0	1669.0

Annual Average (2010-2020) **1808.3**Period Average (Jan 01, 2011 to Dec 31, 2020) **1861.0**

Monthly Average	10.8	8.9	14.8	54.3	100.7	240.4	346.4	488.0	284.5	170.3	63.4	47.4
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Monthly Rain Days

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year Total
2009			4	7	10	18	13	15	20	11	3	0	101
2010	2	0	1	3	4	17	18	24	6	12	10	2	99
2011	4	0	2	3	5	18	19	18	19	11	10	8	117
2012	4	3	2	4	11	18	25	26	22	8	3	2	128
2013	1	2	3	3	4	15	20	21	20	10	6	4	109
2014	0	1	1	9	7	16	24	15	14	8	1	5	101
2015	2	2	1	2	4	12	18	18	14	10	2	6	91
2016	0	0	1	1	6	9	13	24	14	16	6	7	97
2017	3	2	1	1	3	11	24	16	15	6	8	3	93
2018	5	0	3	3	7	19	17	21	13	7	0	9	104
2019	1	1	2	7	5	12	17	23	19	4	8	3	102
2020	2	3	1	3	9	13	17	16	16	16	11	10	117

Annual Average (2010-2020) **105**Period Average (Jan 01, 2011 to Dec 31, 2020) **106**

Monthly Average	2	1	2	4	6	15	19	20	16	10	6	5
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Station: **Sulipan**

Monthly Point Rainfall (millimeters)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year Total
2009			23.0	182.0	401.0	332.0	148.0	175.0	529.0	157.0	53.0	1.0	2001.0
2010	2.0	0.0	3.0	49.0	37.0	85.0	167.0	235.0	68.0	250.0	143.0	36.0	1075.0
2011	32.0	3.0	13.0	18.0	217.0	562.0	356.0	245.0	428.0	147.0	253.0	173.0	2447.0
2012	5.0	25.0	18.0	77.0	163.0	137.0	451.0	717.0	374.0	168.0	9.0	11.0	2155.0
2013	31.0	72.0	6.0	36.0	27.0	171.0	283.0	682.0	161.0	227.0	136.0	18.0	1850.0
2014	5.0	0.0	8.0	38.0	37.0	117.0	256.0	210.0	188.0	78.0	1.0		938.0
2015	8.0	0.0	3.0	25.0	20.0	230.0	338.0	334.0	167.0	296.0	5.0	187.0	1613.0
2016	0.0	0.0	0.0	3.0	126.0	129.0	254.0	439.0	97.0	289.0	42.0	70.0	1449.0
2017	24.0	2.0	3.0	13.0	64.0	162.0	404.0	273.0	213.0	158.0	95.0	29.0	1440.0
2018	26.0	1.0	6.0	8.0	70.0	369.0	526.0	404.0	169.0	104.0	1.0	27.0	1711.0
2019	0.0	0.0	0.0	74.0	27.0	158.0	275.0	156.0	99.0	76.0	64.0	41.0	970.0
2020	9.0	13.0	17.0	8.0	131.0	202.0	336.0	195.0	176.0	274.0	311.0	178.0	1850.0

Annual Average (2010-2020) **1590.7**Period Average (Jan 01, 2011 to Dec 31, 2020) **1642.3**

Monthly Average	12.9	10.5	8.3	44.3	110.0	221.2	316.2	338.8	222.4	185.3	92.8	70.1

Monthly Rain Days

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year Total
2009			4	9	18	18	18	19	19	10	4	1	120
2010	1	0	1	3	4	16	18	22	7	11	10	4	97
2011	5	1	2	3	11	15	14	21	20	11	16	10	129
2012	2	7	4	6	16	15	20	22	22	8	3	3	128
2013	5	3	3	2	5	17	23	22	19	12	8	2	121
2014	1	0	4	5	2	10	19	14	14	4	1		74
2015	2	0	1	2	3	12	19	20	17	10	4	8	98
2016	0	0	0	2	10	13	17	25	14	15	10	13	119
2017	5	2	1	1	9	15	26	18	13	12	14	3	119
2018	6	1	2	2	7	18	24	20	16	8	1	10	115
2019	0	0	0	4	8	16	22	14	13	6	10	5	98
2020	3	1	2	3	8	18	14	15	14	19	13	12	122

Annual Average (2010-2020) **111**Period Average (Jan 01, 2011 to Dec 31, 2020) **112**

Monthly Average	3	1	2	4	8	15	20	19	16	11	8	6

Station: **Mexico**

Monthly Point Rainfall (millimeters)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year Total
2009			0.0	86.0	396.0	251.0	274.0	180.0	528.0	196.0	27.0	4.0	1942.0
2010	2.0	0.0	11.0	75.0	20.0	79.0	170.0	294.0	162.0	245.0	140.0	2.0	1200.0
2011	8.0	5.0	31.0	6.0	152.0	513.0	317.0	268.0	496.0	184.0	226.0	105.0	2311.0
2012	1.0	18.0	61.0	50.0	155.0	132.0	391.0	569.0	490.0	197.0	34.0	6.0	2104.0
2013	5.0	54.0	0.0	58.0	22.0	165.0	164.0	545.0	243.0	300.0	48.0	20.0	1624.0
2014	0.0	1.0	1.0	13.0	37.0	154.0	306.0	360.0	411.0	127.0	32.0	18.0	1460.0
2015	11.0	0.0	0.0	0.0	42.0	135.0	494.0	268.0	296.0	230.0	1.0	100.0	1577.0
2016	0.0	0.0	0.0	11.0	110.0	61.0	273.0	712.0	92.0	222.0	48.0	33.0	1562.0
2017	11.0	0.0	3.0	7.0	92.0	61.0	488.0	393.0	149.0	123.0	84.0	16.0	1427.0
2018	15.0	0.0	26.0	8.0	42.0	93.0	418.0	494.0	251.0	134.0	0.0	19.0	1500.0
2019	1.0	0.0	0.0	29.0	21.0	84.0	173.0	244.0	224.0	65.0	77.0	53.0	971.0
2020	0.0	4.0	14.0	0.0	73.0	175.0	220.0	133.0	112.0	254.0	178.0	101.0	1264.0

Annual Average (2010-2020) **1545.5**Period Average (Jan 01, 2011 to Dec 31, 2020) **1580.0**

Monthly Average	4.9	7.5	12.3	28.6	96.8	158.6	307.3	371.7	287.8	189.8	74.6	39.8
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Monthly Rain Days

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year Total
2009			0	9	19	18	18	15	21	10	4	1	115
2010	1	0	1	2	3	16	20	21	11	15	7	2	99
2011	3	1	3	1	7	17	15	21	23	10	12	6	119
2012	1	5	6	2	14	14	23	25	18	9	6	1	124
2013	2	2	0	4	7	15	19	21	22	12	7	4	115
2014	0	1	1	4	9	18	22	14	19	7	4	5	104
2015	1	0	0	0	4	10	21	17	19	8	1	7	88
2016	0	0	0	2	9	11	15	20	10	15	9	8	99
2017	2	0	1	1	7	7	20	19	12	9	9	2	89
2018	2	0	3	3	7	29	24	22	15	7	0	7	119
2019	1	0	0	2	4	14	16	21	18	4	9	3	92
2020	0	1	1	0	8	14	18	16	12	20	8	11	109

Annual Average (2010-2020) **105**Period Average (Jan 01, 2011 to Dec 31, 2020) **106**

Monthly Average	1	1	1	3	8	15	19	19	17	11	6	5
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Station: **Porac**

Monthly Point Rainfall (millimeters)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year Total
2009			36.0	50.0	414.0	507.0	328.0	348.0	884.0	149.0	24.0	4.0	2744.0
2010	2.0	0.0	13.0	62.0	53.0	190.0	186.0	323.0	163.0	323.0	164.0	13.0	1492.0
2011	4.0	57.0	8.0	6.0	126.0	881.0	397.0	129.0	419.0	223.0	143.0	71.0	2464.0
2012	50.0	9.0	22.0	22.0	153.0	278.0	287.0	766.0	345.0	177.0	5.0	2.0	2116.0
2013	3.0	42.0	5.0	66.0	103.0	292.0	203.0	961.0	302.0	254.0	49.0	45.0	2325.0
2014	0.0	54.0	0.0	17.0	101.0	200.0	334.0	327.0	194.0	26.0	34.0	12.0	1299.0
2015	4.0	0.0	0.0	16.0	90.0	87.0	743.0	314.0	204.0	166.0	0.0	131.0	1755.0
2016	0.0	1.0	2.0	61.0	83.0	139.0	245.0	504.0	277.0	274.0	58.0	22.0	1666.0
2017	9.0	20.0	3.0	2.0	74.0	54.0	454.0	580.0	300.0	139.0	83.0	5.0	1723.0
2018	9.0	0.0	99.0	12.0	45.0	554.0	557.0	559.0	313.0	139.0	0.0	19.0	2306.0
2019	3.0	1.0	1.0	152.0	232.0	145.0	357.0	432.0	367.0	107.0	98.0	50.0	1945.0
2020	2.0	10.0	0.0	19.0	137.0	116.0	161.0	218.0	285.0	228.0	185.0	85.0	1446.0

Annual Average (2010-2020) **1867.0**Period Average (Jan 01, 2011 to Dec 31, 2020) **1904.5**

Monthly Average	7.8	17.6	15.8	40.4	134.3	286.9	354.3	455.1	337.8	183.8	70.3	38.3
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Monthly Rain Days

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year Total
2009			2	10	17	19	19	17	23	11	4	1	123
2010	1	0	1	4	7	13	17	21	9	13	7	4	97
2011	2	1	3	2	9	18	18	12	19	10	11	5	110
2012	3	2	5	4	13	18	18	24	16	9	3	1	116
2013	2	3	2	3	9	16	20	21	21	15	7	6	125
2014	0	1	0	3	7	19	28	14	15	10	3	2	102
2015	1	0	0	1	6	8	21	19	21	8	0	6	91
2016	0	1	1	2	7	15	11	26	16	13	6	4	102
2017	5	4	1	1	10	11	19	24	16	9	9	1	110
2018	3	0	6	1	7	19	21	23	19	6	0	7	112
2019	2	1	1	8	13	10	21	22	20	7	12	5	122
2020	1	2	0	2	8	15	15	17	17	22	8	10	117

Annual Average (2010-2020) **109**Period Average (Jan 01, 2011 to Dec 31, 2020) **111**

Monthly Average	2	1	2	3	9	15	19	20	18	11	6	4
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Station: **San Rafael**

Monthly Point Rainfall (millimeters)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year Total
2009			6.0	183.0	248.0	417.0	246.0	232.0	631.0	211.0	72.0	0.0	2246.0
2010	0.0	0.0	7.0	62.0	63.0	204.0	186.0	380.0	151.0	244.0	128.0	14.0	1439.0
2011	25.0	1.0	28.0	2.0	92.0	30.0	337.0	314.0	588.0	198.0	328.0	150.0	2093.0
2012	13.0	47.0	146.0	42.0	274.0	225.0	567.0	698.0	313.0	244.0	15.0	17.0	2601.0
2013	23.0	64.0	17.0	20.0	56.0	443.0	236.0	535.0	229.0	258.0	62.0	25.0	1968.0
2014	0.0	0.0	5.0	34.0	51.0	343.0	390.0	198.0	322.0	88.0	29.0	43.0	1503.0
2015	21.0	2.0	0.0	42.0	73.0	188.0	447.0	426.0	160.0	339.0	11.0	203.0	1912.0
2016	1.0	0.0	0.0	5.0	192.0	156.0	197.0	517.0	139.0	314.0	72.0	60.0	1653.0
2017	13.0	0.0	0.0	71.0	0.0	46.0	383.0	309.0	240.0	161.0	152.0	41.0	1416.0
2018	43.0	6.0	22.0	0.0	118.0	367.0	420.0	510.0	282.0	156.0	11.0	95.0	2030.0
2019	2.0	0.0	9.0	21.0	86.0	228.0	378.0	368.0	202.0	78.0	154.0	86.0	1612.0
2020	0.0	24.0	0.0	14.0	149.0	159.0	281.0	116.0	209.0	395.0	336.0	200.0	1883.0

Annual Average (2010-2020) **1828.2**Period Average (Jan 01, 2011 to Dec 31, 2020) **1867.1**

Monthly Average	12.8	13.1	20.0	41.3	116.8	233.8	339.0	383.6	288.8	223.8	114.2	77.8
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Monthly Rain Days

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year Total
2009			2	12	15	21	18	19	19	10	5	0	121
2010	0	0	1	3	9	19	21	25	12	14	10	3	117
2011	6	1	2	1	6	2	20	22	18	14	17	12	121
2012	3	7	10	6	20	18	22	21	20	10	4	3	144
2013	3	2	5	3	12	17	19	23	21	11	10	3	129
2014	0	0	1	4	6	19	26	13	18	10	5	7	109
2015	3	1	0	4	6	14	20	21	17	13	5	11	115
2016	1	0	0	1	7	13	18	27	16	17	10	16	126
2017	2	0	0	1	0	10	26	19	17	12	13	5	105
2018	8	1	3	0	7	19	22	22	20	10	2	12	126
2019	2	0	1	5	10	17	21	20	19	11	11	5	122
2020	0	3	0	3	9	16	19	16	14	19	11	13	123

Annual Average (2010-2020) **122**Period Average (Jan 01, 2011 to Dec 31, 2020) **122**

Monthly Average	3	1	2	4	9	15	21	21	18	13	9	8
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Station: **PRFFWC (CSFP)**

Monthly Point Rainfall (millimeters)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year Total
2009				114.8	443.7	284.2	218.2	294.9	656.1	173.7	27.7	1.5	2214.9
2010	6.1	0.0	27.7	54.9	15.7	133.4	158.0	262.9	136.4	277.6	148.1	3.0	1223.8
2011	19.3	56.1	17.8	4.3	241.3	716.5	249.7	298.5	397.0	203.7	193.0	98.6	2495.8
2012	4.3	17.5	40.1	52.1	120.1	187.2	454.9	630.9	351.3	223.3	29.2	8.1	2119.1
2013	6.6	43.2	3.6	22.4	50.5	184.7	220.2	575.3	245.9	207.5	54.6	46.5	1660.9
2014	0.1	9.9	3.0	19.8	101.6	178.8	275.3	390.9	297.7	60.2	32.5	21.6	1391.6
2015	8.9	1.8	0.1	1.8	116.3	191.5	589.5	252.0	205.5	237.2	0.5	188.0	1793.1
2016	0.0	1.0	1.8	17.5	115.3	57.4	191.5	871.5	99.3	208.0	58.4	30.5	1652.3
2017	10.9	0.3	2.5	11.9	124.2	51.6	459.5	401.8	184.4	108.5	125.5	11.9	1493.0
2018	14.0	0.0	39.6	58.7	62.0	348.0	463.0	522.5	367.8	129.8	2.3	37.3	2045.0
2019	3.6	0.3	0.0	27.9	150.1	84.6	280.9	429.8	327.7	73.2	85.9	65.5	1529.3
2020	5.3	9.1	0.0	13.5	104.4	182.6	304.5	153.9	186.2	246.6	183.1	94.5	1483.9

Annual Average (2010-2020) **1717.1**Period Average (Jan 01, 2011 to Dec 31, 2020) **1766.4**

Monthly Average	7.2	12.7	12.4	33.3	137.1	216.7	322.1	423.7	287.9	179.1	78.4	50.6
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Monthly Rain Days

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year Total
2009				9	21	19	22	16	21	14	4	1	127
2010	2	0	1	2	3	16	18	23	11	15	10	2	103
2011	4	2	3	3	12	19	15	24	24	12	14	6	138
2012	4	4	5	3	14	18	27	26	18	10	6	2	137
2013	4	4	4	4	9	18	23	23	24	12	10	6	141
2014	1	4	2	5	8	22	26	18	21	12	5	5	129
2015	2	1	2	1	7	13	22	18	19	12	1	9	107
2016	0	3	2	2	13	15	13	27	12	17	12	9	125
2017	7	1	1	4	12	10	25	21	20	13	14	3	131
2018	6	0	7	3	9	20	24	25	19	9	3	10	135
2019	2	1	0	8	14	9	20	24	20	6	14	5	123
2020	2	3	0	3	11	14	21	17	20	23	12	14	140

Annual Average (2010-2020) **128**Period Average (Jan 01, 2011 to Dec 31, 2020) **131**

Monthly Average	3	2	2	4	11	16	21	22	19	13	9	6
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Monthly Mean Rainfall

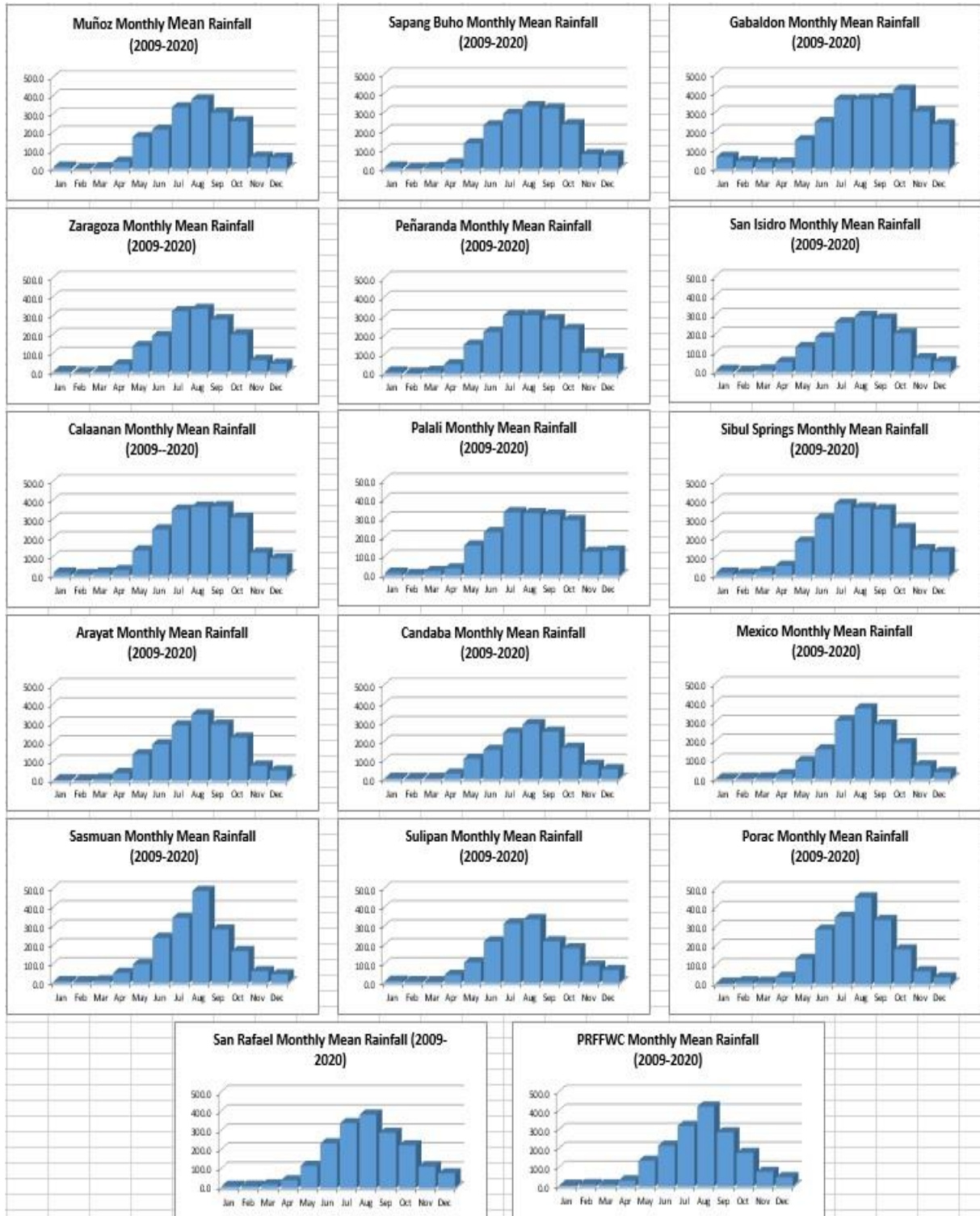


Figure 1. Monthly Mean Rainfall hietograph of each rainfall station of PRFFWC (excluding Mayapyap station) within the Pampanga River Basin covering the years 2009 to 2020.

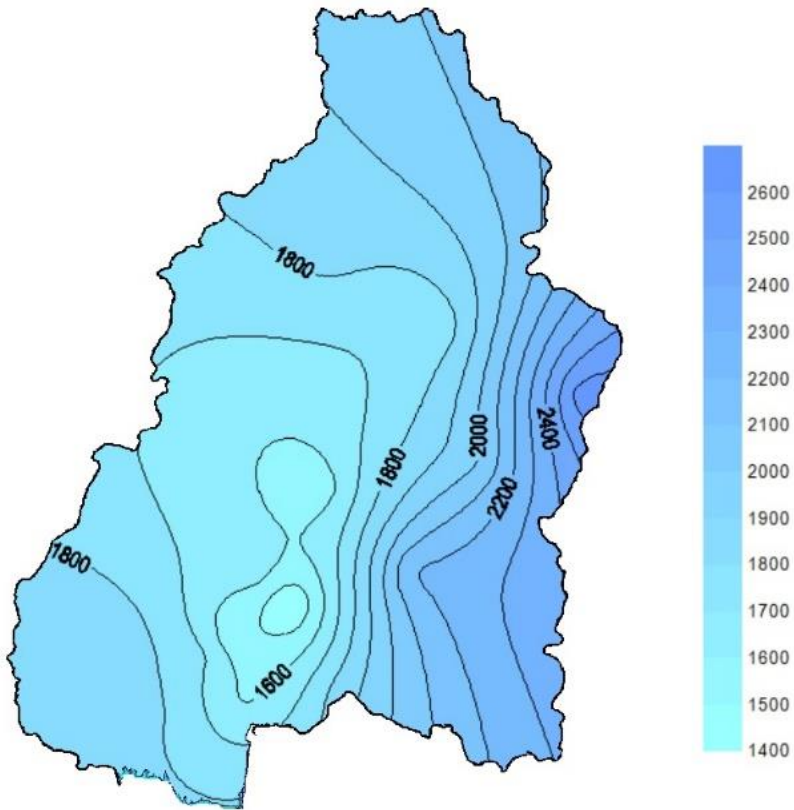
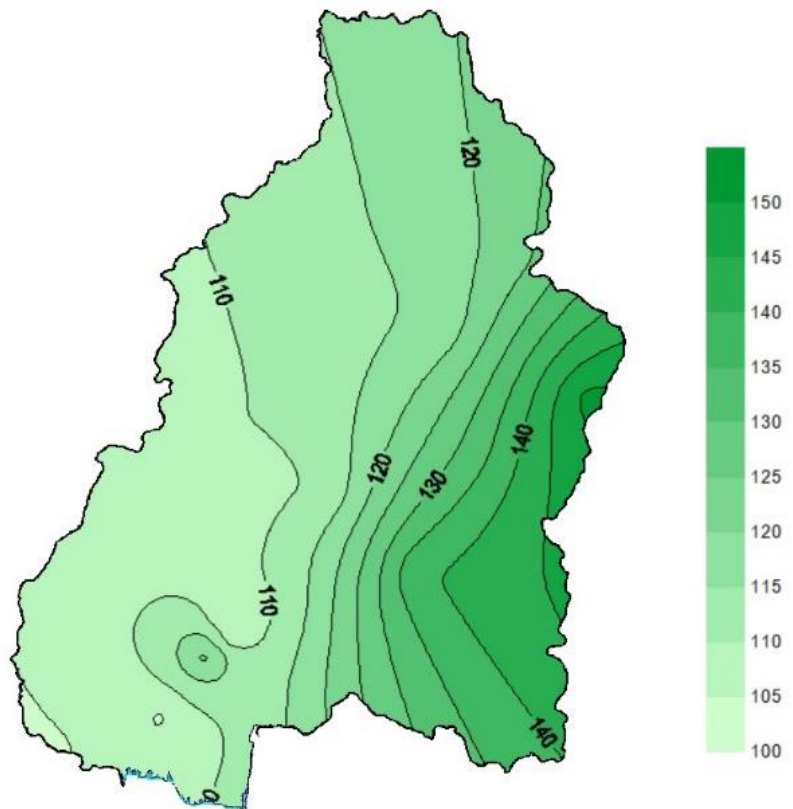


Figure 2.0 Estimated Annual Mean (2010 to 2020) Rainfall distribution (Isohyets) in the Pampanga River Basin

Figure 2.1 Estimated annual mean (2010 to 2020) rainfall days distribution in the Pampanga River Basin



PRFFWC Rainfall (station) IDF Curves

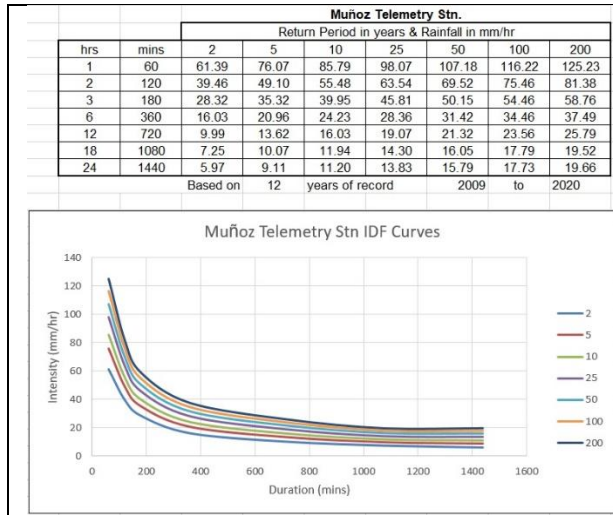


Figure 3.0

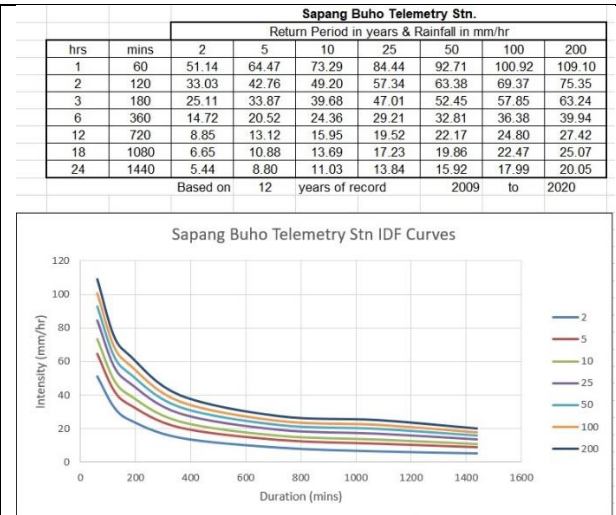


Figure 3.1

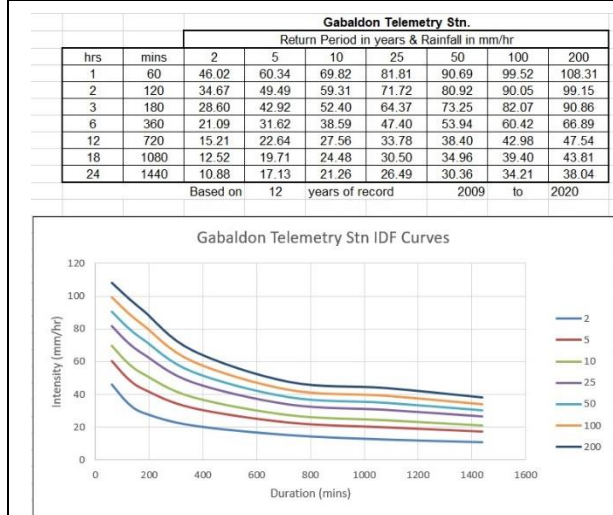


Figure 3.2

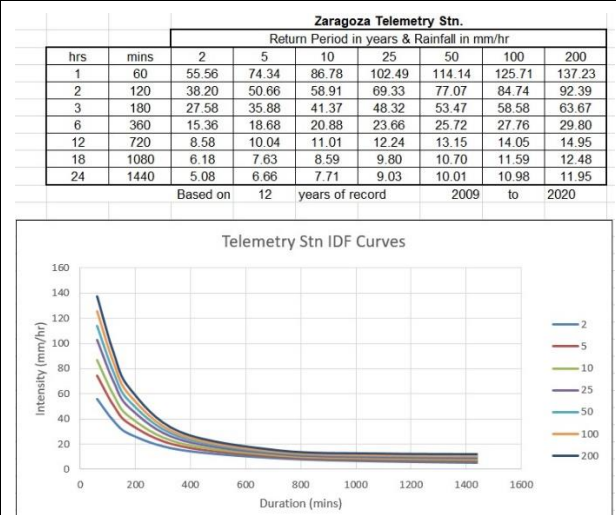


Figure 3.3

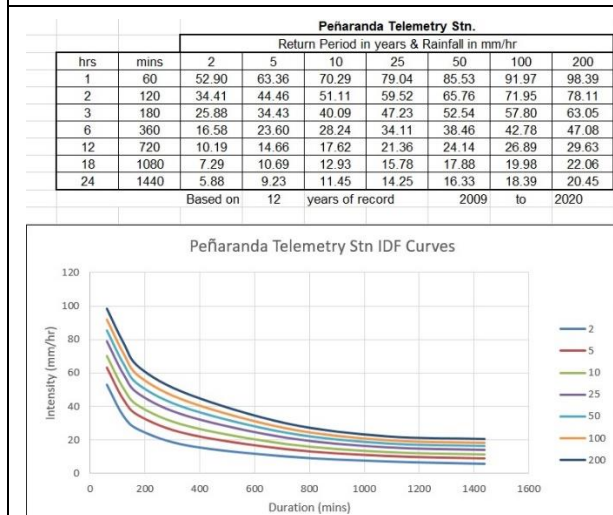


Figure 3.4

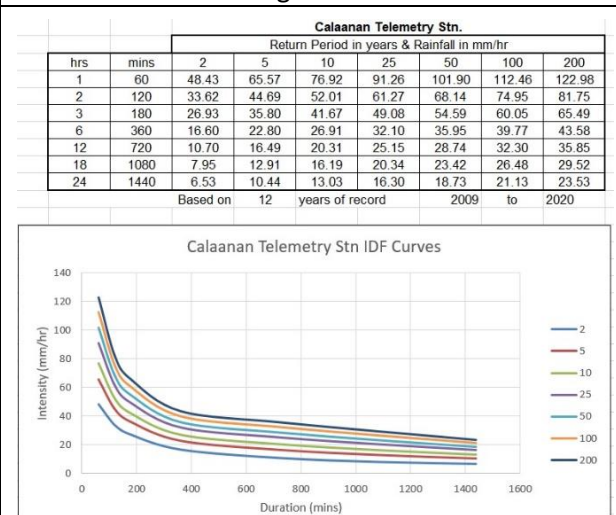


Figure 3.5

Palali Telemetry Stn.		Return Period in years & Rainfall in mm/hr							
hrs	mins	2	5	10	25	50	100	200	
1	60	52.41	71.08	83.44	99.05	110.64	122.13	133.59	
2	120	34.79	53.46	65.82	81.44	93.03	104.53	115.99	
3	180	26.75	43.97	55.37	69.78	80.47	91.07	101.64	
6	360	16.89	30.67	39.79	51.31	59.86	68.35	76.81	
12	720	10.62	21.68	29.00	38.25	45.11	51.92	58.71	
18	1080	7.87	16.69	22.53	29.91	35.38	40.81	46.23	
24	1440	6.57	13.47	18.03	23.80	28.08	32.33	36.56	
		Based on 12 years of record 2009 to 2020							

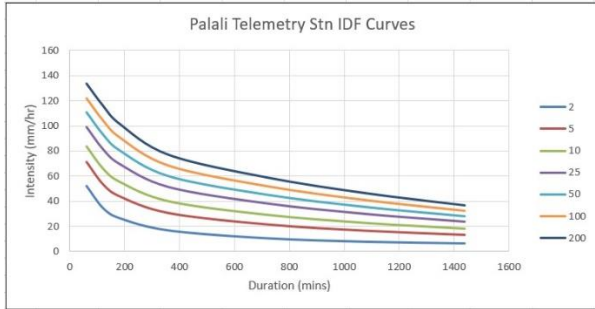


Figure 3.6

San Isidro Telemetry Stn.		Return Period in years & Rainfall in mm/hr							
hrs	mins	2	5	10	25	50	100	200	
1	60	52.01	67.07	77.04	89.64	98.99	108.27	117.51	
2	120	35.74	47.89	55.93	66.09	73.63	81.12	88.57	
3	180	26.17	35.35	41.43	49.11	54.80	60.46	66.09	
6	360	15.78	19.92	22.67	26.14	28.71	31.27	33.81	
12	720	9.11	11.83	13.64	15.92	17.61	19.29	20.96	
18	1080	6.51	8.87	10.44	12.42	13.89	15.34	16.79	
24	1440	5.16	7.08	8.36	9.97	11.17	12.35	13.54	
		Based on 12 years of record 2009 to 2020							

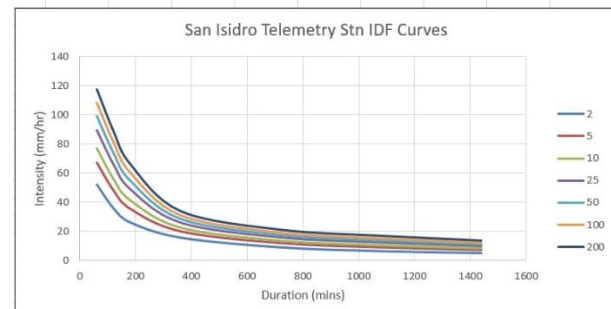


Figure 3.7

Arayat Telemetry Stn.		Return Period in years & Rainfall in mm/hr							
hrs	mins	2	5	10	25	50	100	200	
1	60	58.13	75.67	87.29	101.97	112.85	123.66	134.43	
2	120	38.25	52.38	61.74	73.56	82.34	91.04	99.72	
3	180	26.94	38.20	45.66	55.07	62.06	68.99	75.90	
6	360	15.61	21.96	28.17	31.49	35.44	39.35	43.26	
12	720	9.80	13.31	15.64	18.58	20.77	22.93	25.09	
18	1080	7.31	10.04	11.85	14.13	15.82	17.50	19.18	
24	1440	5.90	8.14	9.62	11.49	12.87	14.25	15.62	
		Based on 12 years of record 2009 to 2020							

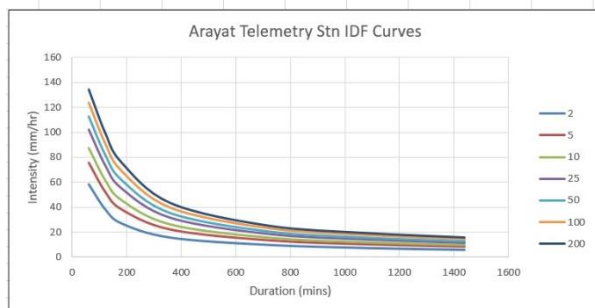


Figure 3.8

Candaba Telemetry Stn.		Return Period in years & Rainfall in mm/hr							
hrs	mins	2	5	10	25	50	100	200	
1	60	42.12	54.94	63.43	74.15	82.11	90.00	97.87	
2	120	28.91	37.23	42.73	49.69	54.85	59.97	65.07	
3	180	21.41	29.07	34.14	40.55	45.30	50.02	54.72	
6	360	12.36	17.08	20.20	24.15	27.07	29.98	32.87	
12	720	7.58	10.28	12.06	14.32	16.00	17.66	19.32	
18	1080	5.64	8.01	9.58	11.56	13.03	14.49	15.94	
24	1440	4.74	6.58	7.79	9.33	10.47	11.61	12.74	
		Based on 12 years of record 2009 to 2020							

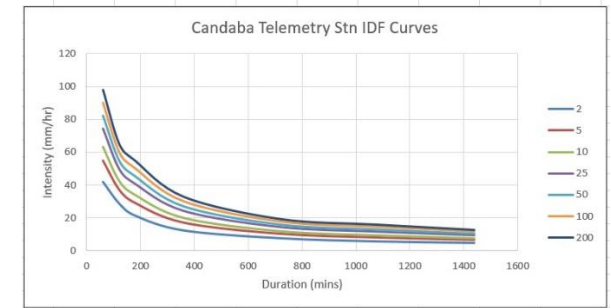


Figure 3.9

Sibul Springs Telemetry Stn.		Return Period in years & Rainfall in mm/hr							
hrs	mins	2	5	10	25	50	100	200	
1	60	55.10	66.68	74.35	84.04	91.23	98.37	105.48	
2	120	40.37	55.23	65.06	77.49	86.71	95.86	104.98	
3	180	32.29	44.84	53.16	63.66	71.45	79.19	86.89	
6	360	20.16	29.03	34.90	42.32	47.82	53.28	58.73	
12	720	11.41	16.30	19.53	23.62	26.66	29.67	32.67	
18	1080	8.29	11.83	14.18	17.14	19.34	21.52	23.70	
24	1440	6.81	10.07	12.23	14.97	16.99	19.01	21.01	
		Based on 12 years of record 2009 to 2020							

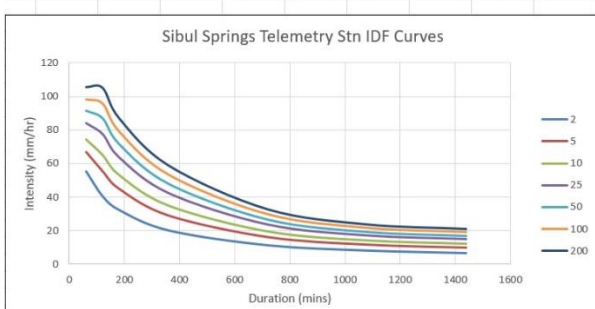


Figure 3.10

Sasmuan Telemetry Stn.		Return Period in years & Rainfall in mm/hr							
hrs	mins	2	5	10	25	50	100	200	
1	60	42.28	53.08	60.24	69.28	75.99	82.64	89.28	
2	120	30.15	37.49	42.35	48.49	53.04	57.56	62.07	
3	180	23.17	30.70	35.68	41.98	46.85	51.28	55.90	
6	360	15.35	21.41	25.42	30.48	34.24	37.97	41.68	
12	720	9.52	13.59	16.28	19.68	22.21	24.72	27.22	
18	1080	7.67	11.76	14.47	17.90	20.44	22.96	25.48	
24	1440	6.37	10.12	12.60	15.73	18.06	20.36	22.66	
		Based on 12 years of record 2009 to 2020							

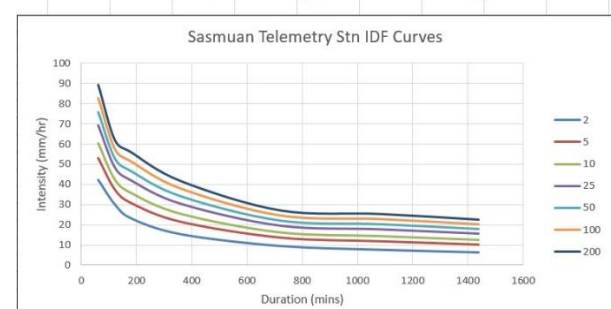


Figure 3.11

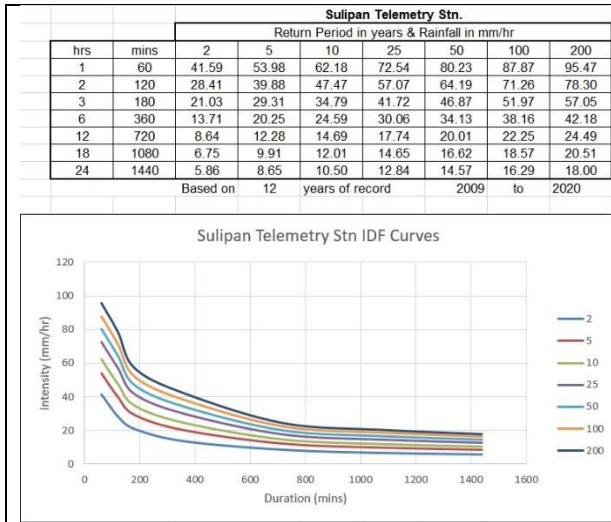


Figure 3.12

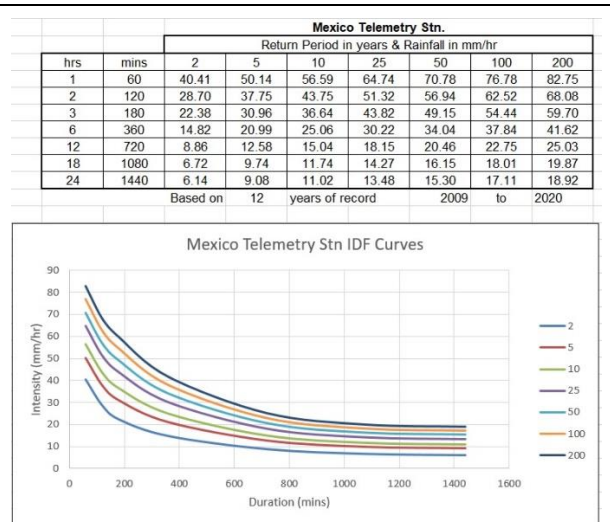


Figure 3.13

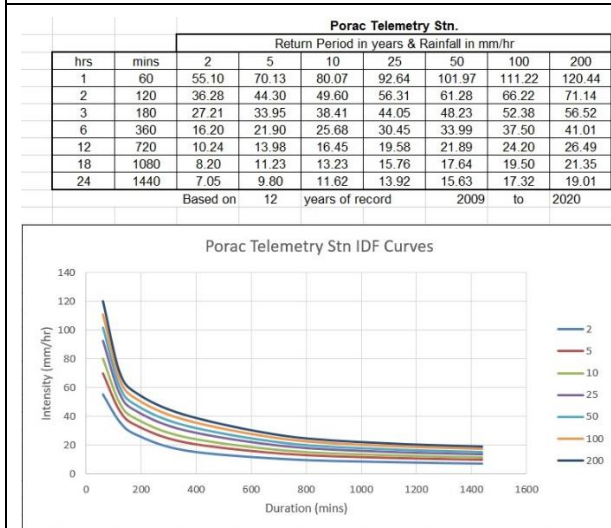


Figure 3.14

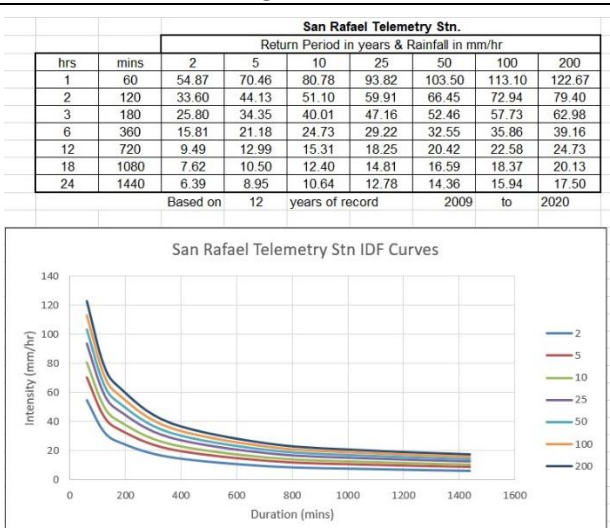


Figure 3.15

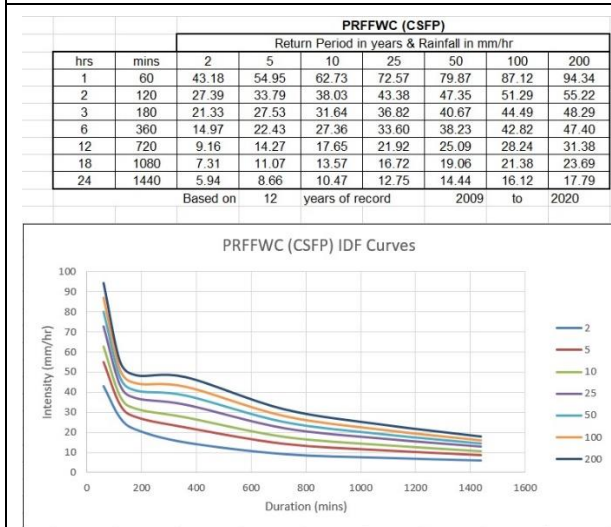


Figure 3.16

Lifted from WMO Guide to Hydrological Practices, 5th Ed. 1994: Data Acquisition & Processing, Analysis, Forecasting & other Applications (WMO-No. 168)

Rainfall-frequency values for durations of less than one hour are often obtained by indirect estimation. Rainfall data for such short durations are seldom readily available in convenient form for the compilation of annual or partial duration series for direct frequency analysis. Average ratios of rainfall amounts for 5, 10, 15 and 30 minutes to 1-hour amounts, computed from hundreds of station-years of records, are often used to estimate rainfall-frequency data for these short durations. These ratios, which have an average error of less than 10 per cent, are as follows:

Duration (minutes)	5	10	15	30
Ratio (n minutes to 60 minutes)	0.29	0.45	0.57	0.79

Thus, for example, if the 10-year 1-hour rainfall is 70 mm, the 10-year 15-minute rainfall is 57 per cent of 70, or 40 mm.

These ratios can yield erroneous results in some regions. For example, in regions where most of the rainfall occurs in connection with thunderstorms, the above ratios would tend to yield values that are too low. However, in regions where most of the rainfall results from orographic influences with little severe convective activity, the ratios might tend to yield values that are too high.

B. WATER LEVEL Summary Presentation



Station: **Sapang Buho**

Monthly Average WL (meters) for indicated year

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Ave
2009			0.06	0.15	0.26	0.28	0.34	0.60	1.10	2.25	0.41	0.17	0.56
2010	0.12	0.12	0.08	0.01	0.01	0.02	0.22	0.18	0.06	0.11	0.26	0.01	0.10
2011	0.03	0.00	0.02	0.01	0.00	0.26	0.16	0.29	0.74	0.83	0.80	0.28	0.29
2012	0.00	0.03	0.02	0.00	0.03	0.15	0.46	1.61	1.28	0.59	0.24	0.12	0.38
2013	0.05	0.12	0.00	0.00	0.00	0.03	0.18	0.72	0.43	0.48	0.45	0.16	0.22
2014	0.07	0.10	0.10	0.00	0.00	0.00	0.18	0.27	0.72	0.21	0.02	0.07	0.15
2015	0.01	0.04	0.04	0.00	0.18	0.01	0.18	0.27	0.35	1.20	0.28	0.92	0.29
2016	0.46	0.36	0.36	0.13	0.01	0.11	0.20	0.48	0.56	1.04	0.60	0.53	0.40
2017	0.57	0.46	0.38	0.20	0.19	0.32	0.38	0.75	0.66	0.38	0.90	0.24	0.45
2018	0.12	0.04	0.01	0.00	0.00	0.23	0.71	0.96	0.97	0.50	0.12	0.19	0.32
2019	0.37	0.11	0.11	0.00	0.09	0.11	0.33	0.62	0.66	0.15	0.11	0.14	0.23
2020	0.01	0.01	0.00	0.00	0.09	0.07	0.07	0.21	0.28	0.98	1.05		0.25

Annual Average (2010-2020) 0.28

Monthly Average	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
	0.16	0.13	0.10	0.04	0.07	0.13	0.28	0.58	0.65	0.73	0.44	0.26

Monthly Maximum WL (meters)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year Max
2009			0.36	0.99	1.32	1.45	1.40	4.17	3.30	6.29	1.46	0.35	6.29
2010	0.56	0.19	0.31	0.01	0.01	0.42	3.69	0.98	0.53	0.88	2.50	0.09	3.69
2011	0.96	0.06	0.67	0.05	0.09	3.47	2.18	1.90	7.17	4.83	3.71	1.81	7.17
2012	0.03	0.86	0.77	0.20	0.14	0.92	2.47	2.72	2.21	4.38	0.73	0.49	4.38
2013	0.36	1.19	0.07	0.00	0.07	1.49	1.87	4.69	1.80	5.26	3.01	1.35	5.26
2014	0.12	0.16	0.92	0.00	0.04	0.04	1.36	2.04	4.54	0.75	0.41	0.65	4.54
2015	0.12	0.12	0.12	0.00	0.07	0.10	0.83	0.93	1.51	8.08	0.54	6.84	8.08
2016	1.20	0.48	0.45	0.47	0.32	0.47	0.90	1.66	1.34	5.30	2.37	0.80	5.30
2017	1.11	1.42	1.04	0.51	1.06	0.83	1.49	3.33	2.00	0.83	4.07	0.51	4.07
2018	0.45	0.10	0.09	0.00	0.52	0.96	3.08	2.34	5.13	1.81	0.61	1.18	5.13
2019	2.94	0.18	0.17	0.07	0.76	0.85	1.00	1.32	2.64	0.61	0.79	2.04	2.94
2020	0.05	0.07	0.28	0.02	1.44	0.57	0.65	0.85	1.05	4.21	5.89		5.89

Pampanga River at Sapang Buho Station

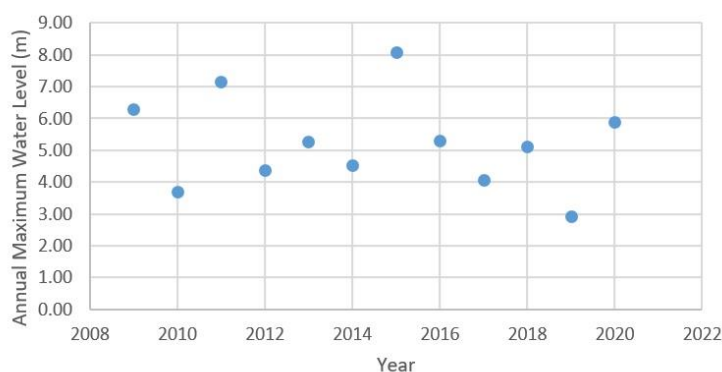


Figure 4.0

Station: **Zaragoza**

Monthly Average WL (meters) for indicated year

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Ave
2009			0.53	0.96	1.47	2.51	3.35	3.34	3.66	3.37	0.34	0.14	1.97
2010	0.35	0.26	0.31	0.17	0.09	0.27	3.02	2.55	2.36	1.84	1.11	0.34	1.06
2011	0.36	0.28	0.27	0.25	0.46	1.31	3.12	2.97	3.31	2.87	1.34	1.30	1.49
2012	0.59	0.56	0.66	0.21	0.08	1.79	3.61	3.98	3.06	1.64	0.43	0.11	1.39
2013	0.50	0.34	0.83	0.60	0.33	1.31	2.02	3.45	3.29	2.04	0.15	0.31	1.27
2014	0.54	0.38	0.42	0.21	0.07	0.74	2.17	1.62	2.83	1.59	0.31	0.35	0.94
2015	0.36	0.34	0.34	0.34	0.23	0.33	2.53	2.68	2.61	2.45	0.27	1.52	1.17
2016	1.11	1.08	0.94	1.04	1.11	1.30	1.12	2.54	2.29	1.84	0.22	0.35	1.24
2017	0.33	0.44	0.17	0.24	0.51	0.46	1.01	2.00	1.81	1.08	1.02	0.35	0.78
2018	0.42	0.25	0.20	0.29	0.37	1.24	3.10	3.18	3.47	2.43	1.76	1.44	1.51
2019	1.33	1.17	0.96	1.19	1.47	2.71	3.63	3.15	3.45	1.63	0.53	0.50	1.81
2020	0.27	0.15	0.23	0.22	0.97	0.50	1.03	2.29	1.55	2.86	2.08	0.63	1.06

Annual Average (2010-2020) 1.25

Monthly Average	0.56	0.48	0.49	0.48	0.60	1.21	2.48	2.81	2.81	2.14	0.80	0.61
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Monthly Maximum WL (meters)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year Max
2009			1.03	2.46	3.22	3.75	4.27	4.45	4.18	5.47	1.42	0.37	5.47
2010	0.53	0.49	0.54	0.45	0.13	1.43	3.58	3.50	3.74	4.84	2.72	0.06	4.84
2011	1.67	0.82	0.68	0.57	1.81	4.67	4.50	4.26	5.21	5.18	2.93	2.21	5.21
2012	1.11	1.15	1.85	1.12	0.10	2.70	4.22	4.64	3.59	3.13	2.26	0.34	4.64
2013	0.84	0.67	1.31	1.04	1.14	2.68	3.33	4.32	3.88	3.34	0.40	0.73	4.32
2014	0.74	0.66	0.96	0.64	0.20	1.80	3.07	2.59	4.37	3.23	0.50	0.61	4.37
2015	0.69	0.35	0.38	0.43	0.81	0.35	4.63	4.21	4.11	4.25	0.89	5.22	5.22
2016	0.83	0.63	0.67	0.37	1.98	2.37	0.98	3.96	3.31	2.90	0.64	0.51	3.96
2017	1.03	1.53	0.53	0.44	1.81	1.72	2.48	2.96	2.66	3.06	2.76	0.63	3.06
2018	1.00	0.47	0.77	0.43	0.71	2.92	4.51	3.90	4.85	3.98	3.90	1.65	4.85
2019	2.44	1.45	1.18	2.59	2.05	4.05	4.81	4.03	4.52	3.76	1.32	0.70	4.81
2020	0.56	0.36	0.47	0.40	2.30	1.20	2.67	3.12	3.28	4.32	3.85	1.98	4.32

Rio Chico River at Zaragoza Station

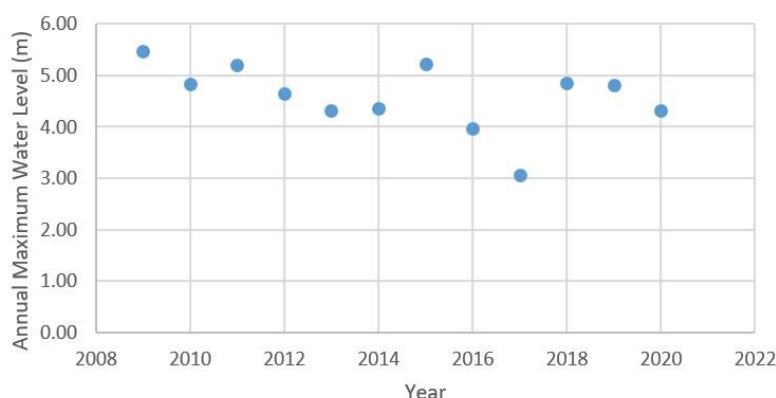


Figure 4.1

Station: **Peñaranda**

Monthly Average WL (meters) for indicated year

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Ave
2009			0.04	0.18	0.22	0.10	0.17	0.19	0.36	0.44	0.09	0.00	0.18
2010	0.03	0.00	0.00	0.00	0.00	0.00	0.06	0.14	0.05	0.07	0.19	0.00	0.04
2011	0.02	0.00	0.03	0.00	0.00	0.15	0.03	0.20	0.28	0.13	0.26	0.12	0.10
2012	0.00	0.02	0.02	0.01	0.00	0.00	0.11	0.22	0.17	0.20	0.01	0.03	0.07
2013	0.01	0.06	0.00	0.00	0.00	0.02	0.13	0.27	0.07	0.12	0.24	0.03	0.08
2014	0.00	0.00	0.01	0.00	0.00	0.00	0.02	0.08	0.20	0.02	0.01	0.06	0.03
2015	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.07	0.01	0.27	0.00	0.32	0.06
2016	0.04	0.00	0.00	0.00	0.00	0.01	0.00	0.08	0.00	0.10	0.12	0.03	0.03
2017	0.04	0.00	0.00	0.00	0.00	0.00	0.02	0.03	0.04	0.01	0.22	0.02	0.03
2018	0.01	0.00	0.00	0.00	0.00	0.00	0.05	0.05	0.07	0.00	0.00	0.03	0.02
2019	0.07	0.00	0.00	0.00	0.00	0.00	0.01	0.02	0.07	0.00	0.00	0.09	0.02
2020	0.01	0.00	0.00	0.00	0.02	0.00	0.00	0.01	0.01	0.22	0.22	0.16	0.05

Annual Average (2010-2020) 0.05

Monthly Average	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
	0.02	0.01	0.01	0.02	0.02	0.02	0.06	0.11	0.11	0.13	0.11	0.07

Monthly Maximum WL (meters)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year Max
2009			0.69	1.68	1.14	0.68	1.80	1.49	3.03	3.00	1.51	0.13	3.03
2010	0.89	0.00	0.11	0.25	0.05	0.01	1.62	1.25	0.73	0.44	2.57	0.11	2.57
2011	0.74	0.00	0.91	0.14	0.00	2.62	0.85	1.95	6.01	1.90	2.24	1.76	6.01
2012	0.00	1.01	0.87	0.18	0.03	0.00	1.37	1.68	1.12	3.00	0.43	0.72	3.00
2013	0.39	0.72	0.24	0.00	0.02	0.99	1.67	2.82	0.76	6.69	3.02	1.05	6.69
2014	0.00	0.00	0.59	0.00	0.00	0.00	0.95	1.41	2.87	0.57	0.61	1.68	2.87
2015	0.00	0.00	0.00	0.00	0.00	0.00	1.48	1.16	0.52	7.63	0.00	5.72	7.63
2016	0.96	0.00	0.00	0.00	0.00	0.98	0.01	2.39	0.19	3.08	1.75	0.80	3.08
2017	0.67	0.24	0.79	0.00	0.28	0.49	0.59	1.39	1.29	0.43	2.79	0.66	2.79
2018	0.37	0.00	0.00	0.00	0.00	0.65	0.90	0.65	2.79	0.11	0.00	1.01	2.79
2019	1.41	0.00	0.00	0.00	0.10	0.00	0.71	0.41	1.34	0.23	0.28	2.23	2.23
2020	0.55	0.13	0.00	0.07	2.24	0.47	0.28	0.49	0.73	3.15	4.02	1.96	4.02

Peñaranda River at Peñaranda Stn

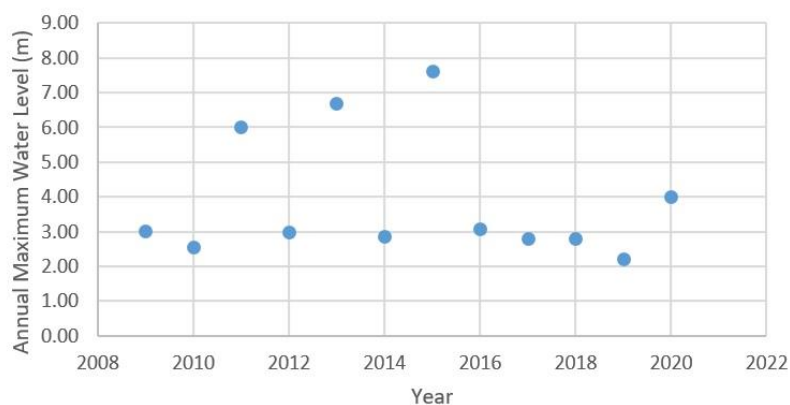


Figure 4.2

Station: **San Isidro**

Monthly Average WL (meters) for indicated year

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Ave
2009			0.01	0.07	0.06	0.09	0.04	0.50	1.05	2.25	0.11	0.00	0.42
2010	0.00	0.00	0.00	0.00	0.00	0.00	0.06	0.00	0.00	0.01	0.06	0.00	0.01
2011	0.00	0.00	0.00	0.00	0.00	0.27	0.05	0.05	0.73	0.48	0.35	0.07	0.17
2012	0.00	0.00	0.00	0.00	0.00	0.00	0.12	0.81	0.29	0.29	0.00	0.00	0.13
2013	0.00	0.00	0.00	0.00	0.00	0.00	0.06	0.42	0.01	0.31	0.21	0.00	0.08
2014	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.42	0.00	0.00	0.00	0.04
2015	0.00	0.00	0.00	0.00	0.11	0.00	0.03	0.01	0.00	0.99	0.00	0.84	0.16
2016	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.36	0.04	0.00	0.03
2017	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.08	0.00	0.00	0.31	0.00	0.03
2018	0.00	0.00	0.00	0.00	0.00	0.00	0.19	0.06	0.26	0.02	0.00	0.00	0.04
2019	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.08	0.00	0.00		0.01
2020													

Annual Average (2010-2020) 0.07

Monthly Average	0.01	0.00	0.00	0.01	0.02	0.03	0.05	0.18	0.26	0.43	0.10	0.09
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Monthly Maximum WL (meters)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year Max
2009			0.19	1.68	1.32	1.44	2.15	4.06	4.49	7.06	1.34	0.00	7.06
2010	0.00	0.00	0.00	0.00	0.00	0.00	1.83	0.15	0.00	0.48	1.54	0.00	1.83
2011	0.00	0.00	0.00	0.00	0.00	4.08	1.60	0.99	7.75	4.38	2.85	1.56	7.75
2012	0.00	0.00	0.00	0.00	0.00	0.00	1.71	3.29	1.77	3.94	0.00	0.00	3.94
2013	0.00	0.00	0.00	0.00	0.00	0.02	1.10	4.43	0.41	6.57	4.81	0.00	6.57
2014	0.00	0.00	0.00	0.00	0.00	0.00	0.31	0.87	4.13	0.00	0.00	0.04	4.13
2015	0.00	0.00	0.00	0.00	0.00	0.00	0.81	0.34	0.00	8.24	0.00	7.80	8.24
2016	0.21	0.00	0.00	0.00	0.00	0.00	0.00	1.19	0.00	5.14	1.25	0.00	5.14
2017	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.22	0.13	3.91	0.00	0.00	3.91
2018	0.00	0.00	0.00	0.00	0.00	0.00	2.28	1.09	4.69	0.87	0.00	0.00	4.69
2019	1.73	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.28	0.00	0.00		2.28
2020										2.85			2.85

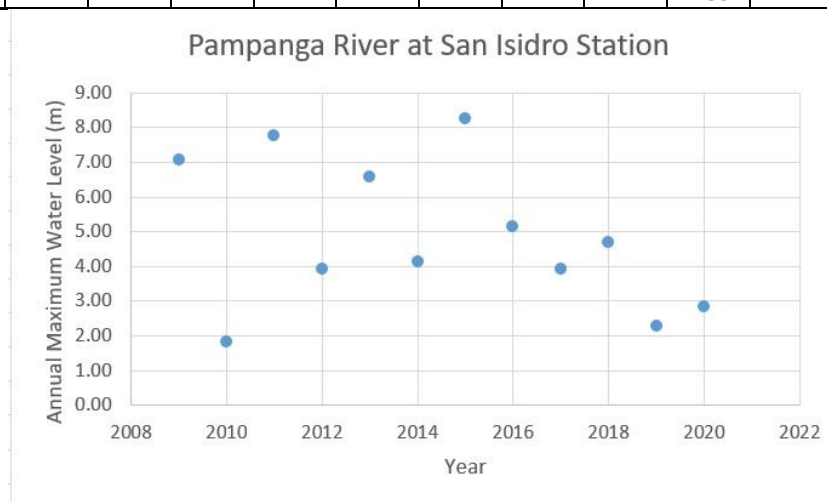


Figure 4.3

Station: **Arayat**

Monthly Average WL (meters) for indicated year

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Ave
2009			0.96	1.40	1.79	1.44	4.15	4.30	5.72	6.73	1.87	0.93	2.93
2010	0.95	0.68	0.70	0.41	0.35	0.59	2.67	2.91	2.47	2.79	2.37	0.78	1.47
2011	0.86	0.57	0.69	0.32	0.61	2.61	3.30	3.67	10.59	3.60	2.30	3.29	2.70
2012		1.03	1.13	0.62	0.61	1.93	4.49	7.05	5.41	3.31	1.50	0.80	2.53
2013	0.86	0.92	0.84	0.55	0.57	1.23	2.27	5.47	4.17	3.58	2.29	1.03	1.98
2014	0.70	0.64	0.82	0.39	0.23	0.80	2.56	2.68	5.06	2.67	0.64	0.79	1.50
2015	0.41	0.33	0.42	0.31	0.44	0.22	2.68	2.98	2.99	5.03	1.41	3.43	1.72
2016	1.27	0.59	0.72	0.38	0.47	1.42	1.69	3.92	2.72	5.05	1.96	1.23	1.79
2017	1.34	0.86	0.67	0.38	0.56	1.10	1.88	3.84	2.93	1.85	3.15	1.02	1.63
2018	0.76	0.52	0.65	0.45	0.43	1.84	4.29	5.90	5.48	2.03	1.13	0.80	2.03
2019	1.26	0.56	0.63	0.52	0.76	0.99	2.01	3.60	4.31	1.66	1.23	1.28	1.57
2020	0.69	0.51	0.51	0.34	0.79	0.77	0.85	1.98	1.82	4.47	4.50	2.66	1.66

Values in red have incomplete data for that month **Annual Average (2010-2020) 1.87**

Monthly Average	0.91	0.66	0.73	0.50	0.64	1.25	2.74	4.03	4.47	3.56	2.03	1.50
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Monthly Maximum WL (meters)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year Max
2009			3.31	5.21	5.60	2.86	6.66	8.21	8.35	9.66	4.69	3.78	9.66
2010	2.79	1.14	2.03	3.96	1.59	2.43	6.42	4.96	4.64	6.52	5.98	2.12	6.52
2011	3.56	1.65	2.74	1.04	2.13	8.37	6.54	5.76	10.60		4.52	6.02	10.60
2012		4.41	3.33	2.65	3.24	3.87	7.71	9.24	7.66	8.02	3.74	2.70	9.24
2013	4.12	3.47	1.74	1.14	1.50	4.08	6.09	8.39	2.61	8.78	7.87	3.12	8.78
2014	1.21	1.15	2.48	1.05	0.95	1.84	5.53	5.63	8.53	4.51	3.55	3.62	8.53
2015	1.30	0.96	0.80	0.79	0.89	0.94	5.99	5.87	4.90	10.00	3.84	9.98	10.00
2016	4.97	1.50	1.53	1.28	2.00	3.49	3.53	7.34	4.16	8.68	5.50	3.45	8.68
2017	3.18	3.24	2.60	0.95	2.38	2.53	5.01	7.68	5.00	3.64	7.81	2.55	7.81
2018	4.07	1.11	1.17	1.10	3.27	4.19	9.04	8.00	9.16	5.57	5.09	3.39	9.16
2019	6.14	1.19	1.00	2.48	2.30	3.52	4.26	5.47	7.29	3.45	4.06	4.62	7.29
2020	2.11	1.39	0.96	0.95	4.14	3.03	1.25	3.80	5.11	8.01	8.81	7.10	8.81

Pampanga River at Arayat Station

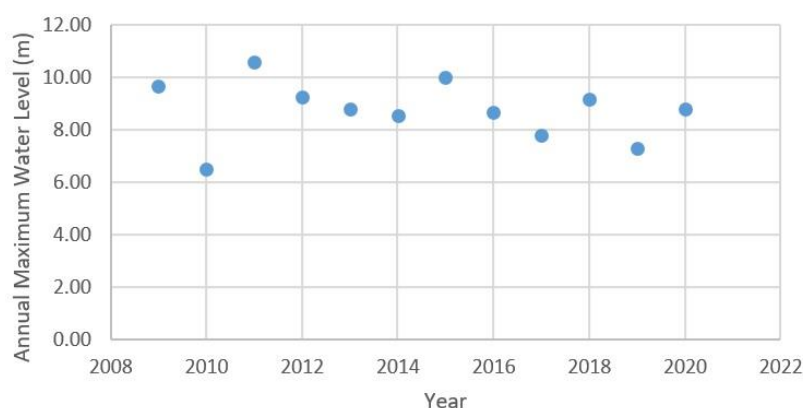


Figure 4.4

Station: **Candaba**

Monthly Average WL (meters) for indicated year

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Ave
2009			0.77	2.04	2.88	4.01	4.31	4.52	5.23	5.92	2.84	1.77	3.43
2010	1.23	1.06	1.18	0.95	1.25	1.70	2.98	3.92	3.36	3.40	3.26	1.88	2.18
2011	1.80	1.29	1.52	0.92	1.45	3.45	3.75	3.97	4.08	4.81	3.98	3.38	2.87
2012	1.94	1.72	1.38	1.14	2.29	2.52	4.07	5.66	4.97	3.60	3.11	1.80	2.85
2013	1.80	1.58	1.22	1.00	1.17	2.26	3.58	5.02	3.96	4.19	3.04	2.19	2.58
2014	0.93	0.96	1.03	0.90	0.91	1.36	2.93	3.17	4.70	2.90	1.61	1.64	1.92
2015	0.87	0.70	0.62	0.64	1.41	0.86	3.25	3.31	3.25	4.65	1.86	3.35	2.06
2016	1.62	1.10	0.90	0.81	1.41	2.36	2.55	4.16	2.69	4.26	2.28	2.05	2.18
2017	1.63	1.19	1.04							3.13	3.63	3.05	2.28
2018						3.43	4.00	4.64	4.49	3.12	3.27	2.92	3.70
2019	3.30						3.47	3.76	3.92	2.91	3.28	2.05	3.24
2020	1.39	1.38	1.07	0.96	1.27	1.36	1.73	3.38		4.80	4.75	4.00	2.37

Annual Average (2010-2020) 2.57

Monthly Average	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
	1.65	1.22	1.07	1.04	1.56	2.33	3.33	4.14	4.06	3.97	3.08	2.51

Monthly Maximum WL (meters)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year Max
2009			2.02	3.87	4.09	4.93	5.20	6.15	6.71	7.32	4.19	2.60	7.32
2010	2.52	1.81	2.07	1.97	2.33	2.69	3.84	4.32	4.26	4.81	4.63	2.66	4.81
2011	2.62	1.94	2.82	1.64	2.88	6.24	5.65	4.78	7.62	7.24	5.38	4.76	7.62
2012	2.81	3.04	2.66	2.40	3.10	3.24	5.62	6.93	5.77	5.78	4.90	2.63	6.93
2013	2.73	2.88	2.24	1.80	2.20	3.46	4.41	6.30	5.26	6.48	4.88	3.01	6.48
2014	2.04	1.84	1.92	1.55	1.66	2.34	4.14	4.42	6.14	3.78	2.31	2.54	6.14
2015	2.00	1.40	1.23	1.28	1.38	1.51	4.86	4.90	3.94	7.13	3.55	6.94	7.13
2016	3.01	1.70	1.51	1.32	2.75	2.85	3.16	5.64	3.77	5.89	3.39	2.53	5.89
2017	2.42	1.83	1.98							3.46	4.95	3.25	4.95
2018						4.52	6.06	6.08	6.37	3.91	3.94	2.94	6.37
2019	4.19						4.35	4.57	5.12	3.26	3.62	3.59	5.12
2020	1.90	2.19	1.65	1.50	2.83	2.79	3.52	3.72		5.87	6.34	4.79	6.34

Candaba WL Telemetry Station

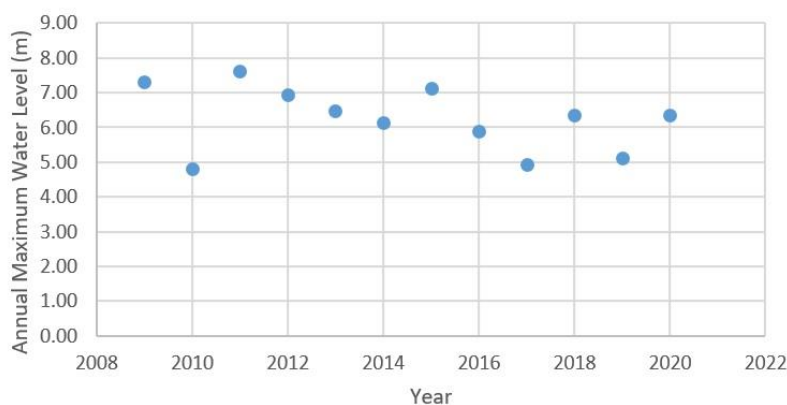


Figure 4.5

Station: **Sasmuan**

Monthly Average WL (meters) for indicated year

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Ave
2009			1.77	1.90	2.08	2.25	2.22	2.29	2.50	2.32	1.98	1.84	2.11
2010	1.76	1.75	1.76	1.82	1.93	1.98	2.05	2.13	2.11	2.20	2.12	1.98	1.97
2011	1.91	1.87	1.85	1.90	1.98	2.27	2.25	2.24	2.29	2.32	2.10	2.02	2.08
2012	1.90	1.93	1.96	2.00	2.07	2.14	2.21	2.54	2.27	2.13	1.98	1.94	2.09
2013	1.87	1.87	1.93	2.02	2.06	2.12	2.11	2.34	2.26	2.22	2.01	1.95	2.06
2014	1.85	1.86	1.86	1.99	2.09	2.16	2.19	2.19	2.25	2.19	2.15	2.13	2.07
2015	2.10	2.10	2.11	2.13	1.59	2.16	2.29	2.27	2.26	2.29	2.21	2.23	2.14
2016	2.16	2.13	2.15	2.17	2.22	2.25	2.31	2.49	2.38	2.42	2.33	2.32	2.28
2017	2.30	2.24	2.21	2.22	2.26	2.28	2.37	2.42	2.49	2.47	2.37	2.38	2.33
2018	2.27	2.39	2.20	2.17	2.24	2.71	2.70	2.65	2.58	2.48	2.39	2.37	2.43
2019	2.32	2.28	2.27	2.23	2.28	2.31	2.41	2.59	2.77	2.73	2.76	2.71	2.47
2020	2.57	2.55	2.43	2.41	2.45	2.49	2.53	2.52	2.51	2.49	2.51	2.48	2.49

Annual Average (2010-2020) 2.22

Monthly Average	2.09	2.09	2.04	2.08	2.10	2.26	2.30	2.39	2.39	2.36	2.24	2.19
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Monthly Maximum WL (meters)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year Max
2009			2.27	2.29	2.56	2.80	2.77	2.89	3.03	2.73	2.45	2.33	3.03
2010	2.33	2.25	2.18	2.21	2.38	2.45	2.62	2.73	2.60	2.70	2.63	2.49	2.73
2011	2.46	2.35	2.24	2.34	2.55	3.22	2.85	2.82	3.09	2.93	2.51	2.55	3.22
2012	2.44	2.40	2.40	2.46	2.61	2.80	2.95	3.17	2.67	2.67	2.58	2.62	3.17
2013	2.64	2.52	2.43	2.58	2.68	2.80	2.77	3.06	2.71	2.88	2.60	2.61	3.06
2014	2.62	2.50	2.41	2.49	2.71	2.64	2.68	2.62	2.70	2.59	2.60	2.68	2.71
2015	2.63	2.60	2.54	2.55	2.58	2.51	2.67	2.67	2.70	2.81	2.65	2.79	2.81
2016	1.95	1.97	1.92	1.90	1.98	1.99	2.14	2.25	2.78	2.94	2.75	2.89	2.94
2017	2.81	2.71	2.69	2.60	2.67	2.69	2.82	3.09	3.21	3.17	3.05	3.34	3.34
2018	2.77	3.04	2.80	2.57	3.26	3.35	3.40	3.03	2.97	3.47	2.75	3.05	3.47
2019	2.74	3.09	2.66	2.69	2.67	2.75	2.85	2.94	3.39	3.46	3.50	3.48	3.50
2020	3.03	3.06	2.95	2.66	2.73	2.79	2.84	2.86	2.85	2.89	2.83	2.83	3.06

Pasac River at Sasmuan station

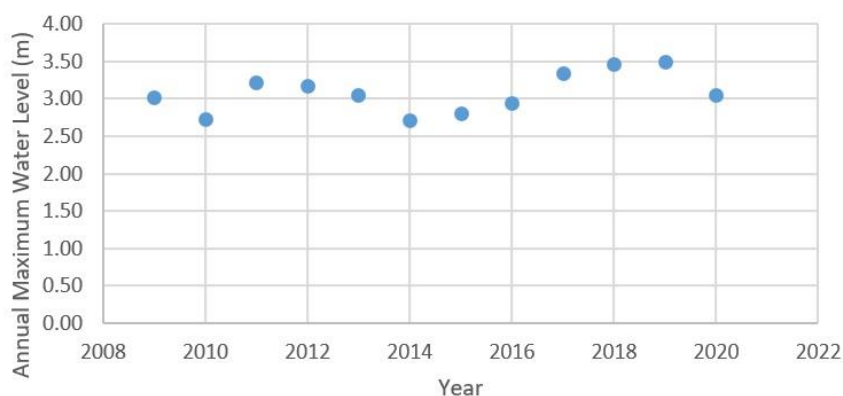


Figure 4.6

Station: **Sulipan**

Monthly Average WL (meters) for indicated year

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Ave
2009			0.90	1.60	1.70	1.97	2.13	2.28	2.80	3.34	1.04	0.76	1.85
2010	0.69	0.69	0.70	0.74	0.84	0.89	1.09	1.20	1.12	1.30	1.16	0.94	0.95
2011	0.89	0.86	0.85	0.87	0.93	1.37	1.42	1.46	1.71	2.20	1.44	1.23	1.27
2012	0.94	0.98	1.01	1.03	1.10	1.23	1.65	2.78	2.07	1.49	1.10	1.00	1.37
2013	0.93	0.96	0.97	1.07	1.13	1.24	1.33	2.17	1.71	1.77	1.31	1.05	1.30
2014	0.94	0.92	0.92	1.09	1.10	1.21	1.42	1.42	2.02	1.33	1.09	1.06	1.21
2015	0.99	0.95	0.95	0.99	0.61	1.12	1.47	1.45	1.37	2.14	1.08	1.83	1.24
2016	1.14	1.03	1.10	1.13	1.31	1.44	1.57	2.08	1.72	2.25	1.58	1.53	1.49
2017	1.45	1.37	1.32	1.37	1.49	1.57	1.73	1.95	1.86	1.75	1.90	1.59	1.61
2018	1.51	1.44	1.45	1.48	1.54	1.77	2.29	2.63	2.51	1.72	1.60	1.52	1.79
2019	1.55	1.47	1.51	1.55	1.58	1.67	1.85	2.08	2.21	1.76	1.77	1.67	1.72
2020	1.56	1.51	1.55	1.59	1.67	1.72	1.77	1.87	1.85	2.33	2.50	2.08	1.83

Annual Average (2010-2020) 1.43

Monthly Average	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
	1.14	1.11	1.10	1.21	1.25	1.43	1.64	1.95	1.91	1.95	1.46	1.35

Monthly Maximum WL (meters)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year Max
2009			1.55	2.54	2.49	2.98	3.02	3.49	3.99	4.73	2.32	1.64	4.73
2010	1.69	1.53	1.41	1.41	1.60	1.72	2.01	2.02	1.91	2.22	1.91	1.80	2.22
2011	1.74	1.57	1.41	1.54	1.71	2.80	2.50	2.33	4.85	4.66	2.27	2.36	4.85
2012	1.56	1.59	1.51	1.51	1.68	1.98	2.77	3.95	2.68	2.58	1.74	1.52	3.95
2013	1.58	1.54	1.31	1.58	1.77	2.01	2.10	3.26	2.26	3.18	2.38	1.58	3.26
2014	1.71	1.31	1.26	1.57	1.98	1.85	2.11	2.08	3.13	1.86	1.62	1.56	3.13
2015	1.55	1.29	1.16	1.65	1.46	2.08	2.12	2.14	1.77	4.29	1.59	4.13	4.29
2016	1.43	1.15	1.20	1.24	1.62	1.75	1.83	2.67	2.10	3.24	2.05	2.05	3.24
2017	2.05	1.80	1.57	1.82	2.12	2.16	2.30	2.60	2.31	2.39	2.74	2.15	2.74
2018	2.07	2.06	1.91	1.90	2.03	2.45	3.38	3.34	3.52	2.30	2.23	2.20	3.52
2019	2.29	2.01	1.88	1.95	2.08	2.14	2.48	2.58	2.76	2.14	2.15	2.15	2.76
2020	2.16	2.03	2.03	1.96	2.13	2.27	2.35	2.44	2.48	3.17	3.99	2.90	3.99

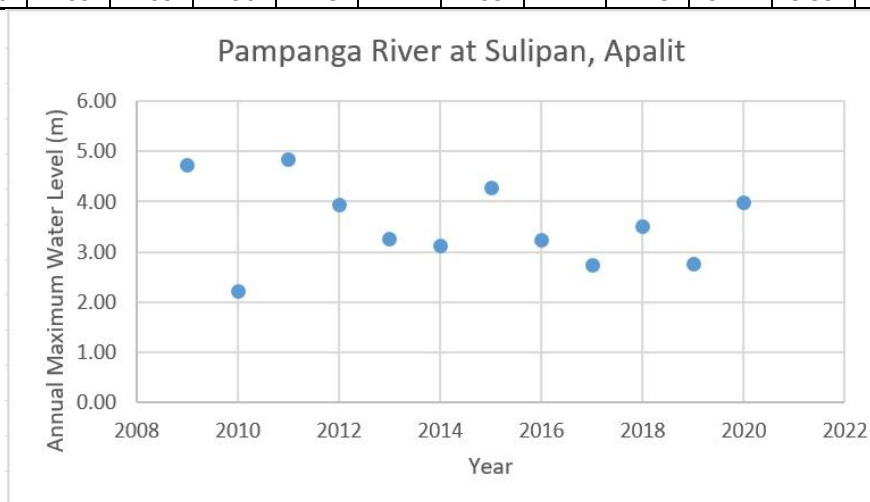


Figure 4.7

Station: **Mexico**

Monthly Average WL (meters) for indicated year

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Ave
2009			0.00	0.00	0.19	0.51	0.79	0.88	1.30	1.36	0.46	0.13	0.56
2010	0.00	0.00	0.00	0.01	0.00	0.01	0.01	0.04	0.04	0.27	0.16	0.00	0.05
2011	0.00	0.00	0.00	0.00	0.00	0.36	0.56	0.66	0.64	1.11	0.51	0.17	0.33
2012	0.00	0.00	0.01	0.00	0.00	0.00	0.24	1.31	1.11	0.88	0.44	0.07	0.34
2013	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.43	0.35	0.56	0.13	0.08	0.13
2014	0.03	0.01	0.03	0.03	0.02	0.01	0.10	0.18	0.42	0.09	0.04	0.07	0.09
2015	0.11	0.02	0.00	0.09	0.19	0.05	0.26	0.16	0.11	0.17	0.14	0.21	0.13
2016	0.05	0.04	0.02	0.01	0.24	0.01	0.02	0.62	0.06	0.40	0.00	0.00	0.12
2017	0.00	0.03	0.01	0.04	0.04	0.00	0.03	0.24	0.07	0.02	0.01	0.02	0.04
2018	0.02	0.07	0.19	0.08	0.07	0.16	0.37	0.81	0.91	0.25	0.17	0.17	0.27
2019	0.17	0.12	0.06	0.06	0.07	0.04	0.04	0.17	0.60	0.16	0.13	0.02	0.14
2020	0.03	0.02	0.01	0.03	0.02	0.00	0.03	0.05	0.01	0.06	0.22	0.00	0.04

Annual Average (2010-2020) 0.15

Monthly Average	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
	0.04	0.03	0.03	0.03	0.07	0.10	0.21	0.46	0.47	0.45	0.20	0.08

Monthly Maximum WL (meters)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year Max
2009			0.23	0.40	3.54	2.26	2.13	2.42	3.11	2.29	1.32	0.23	3.54
2010	0.06	0.00	0.03	0.41	0.00	1.18	0.71	0.57	0.83	2.61	2.11	0.00	2.61
2011	0.00	0.52	0.49	0.00	0.27	2.72	2.17	1.42	3.30	2.42	1.55	0.72	3.30
2012	0.40	0.00	1.18	0.00	0.56	0.59	1.97	3.46	3.53	2.99	0.79	0.23	3.53
2013	0.00	0.00	0.00	0.00	0.14	0.00	0.90	2.61	1.47	3.11	0.46	0.34	3.11
2014	0.24	0.13	0.18	0.45	0.62	0.34	0.70	1.11	1.17	0.80	0.18	0.26	1.17
2015	0.22	0.09	0.00	0.48	0.87	0.50	3.03	1.39	0.76	1.57	0.27	1.62	3.03
2016	0.22	0.21	0.21	0.08	0.92	0.22	0.93	2.02	0.44	1.19	0.28	0.00	2.02
2017	0.00	0.15	0.09	0.43	0.85	0.33	0.46	1.74	1.29	0.66	0.59	0.11	1.74
2018	0.12	0.20	0.64	0.77	0.99	1.80	1.70	2.45	2.12	0.93	0.24	0.27	2.45
2019	0.26	0.25	0.12	1.75	0.76	0.43	1.17	1.17	1.69	1.11	0.69	0.38	1.75
2020	0.16	0.21	0.15	0.97	0.63	0.06	0.96	1.29	0.32	1.06	2.27	0.33	2.27

Abacan River at Mexico Station

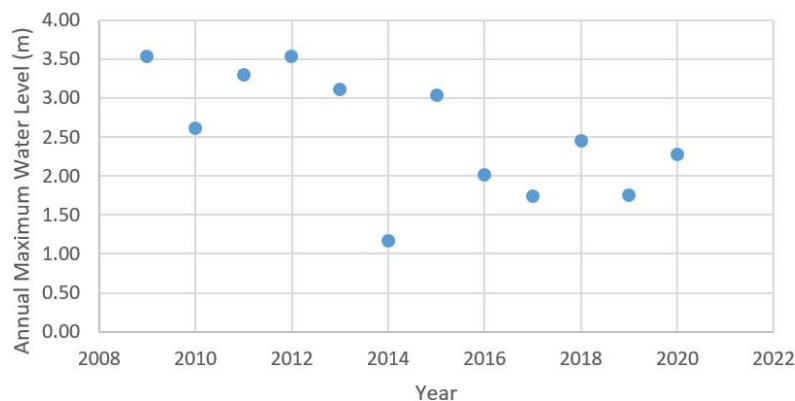
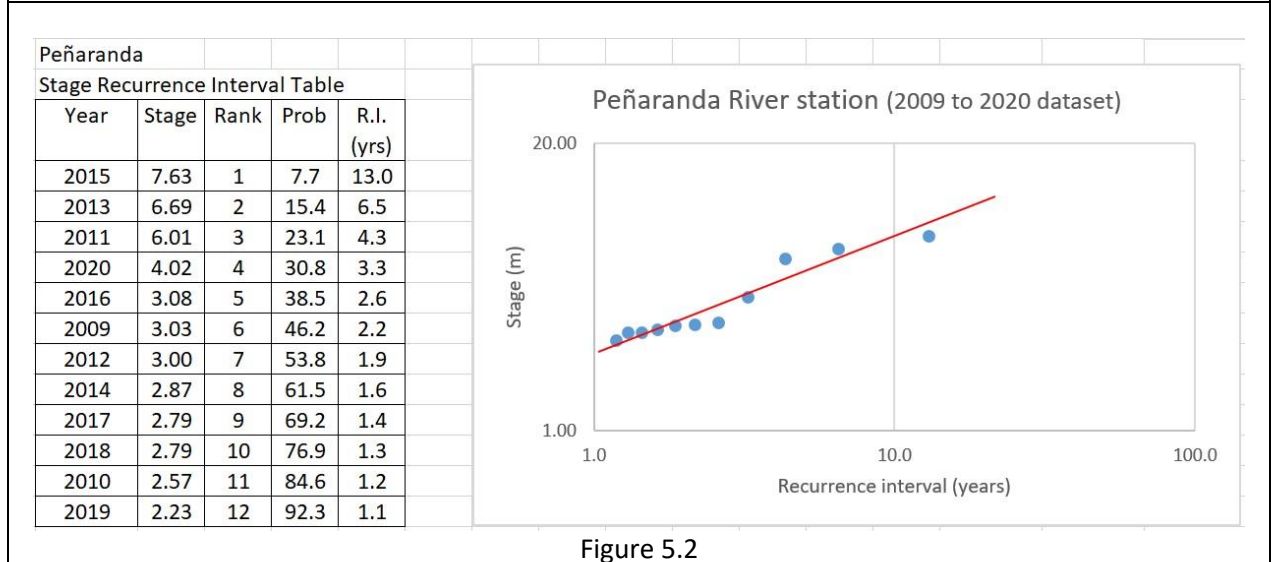
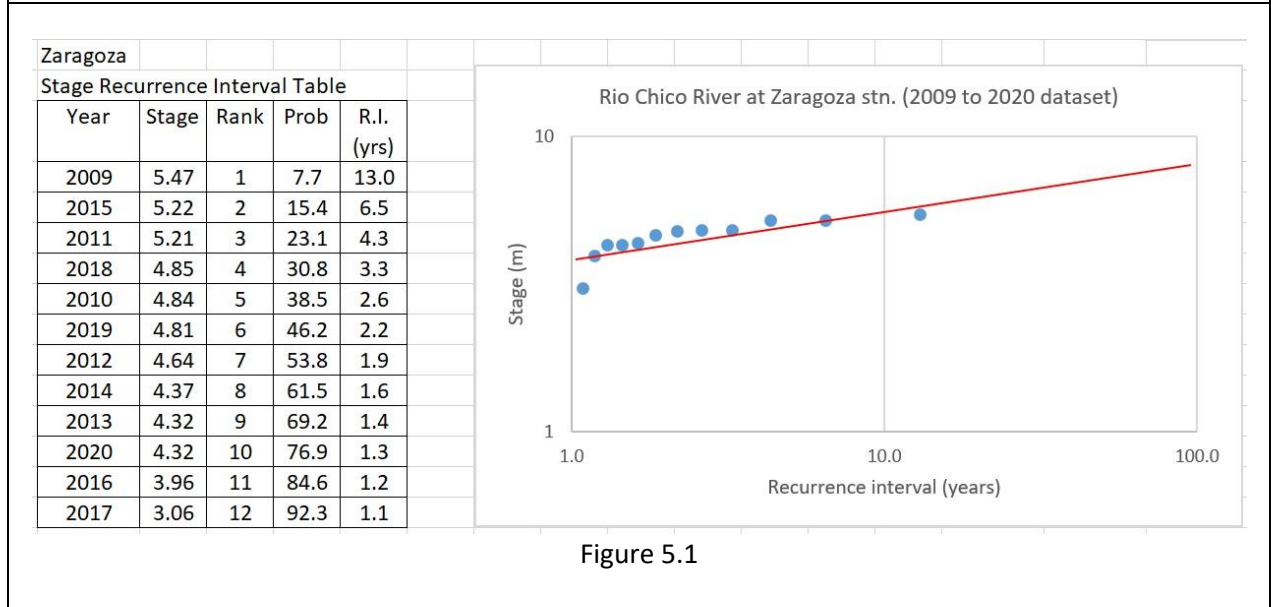
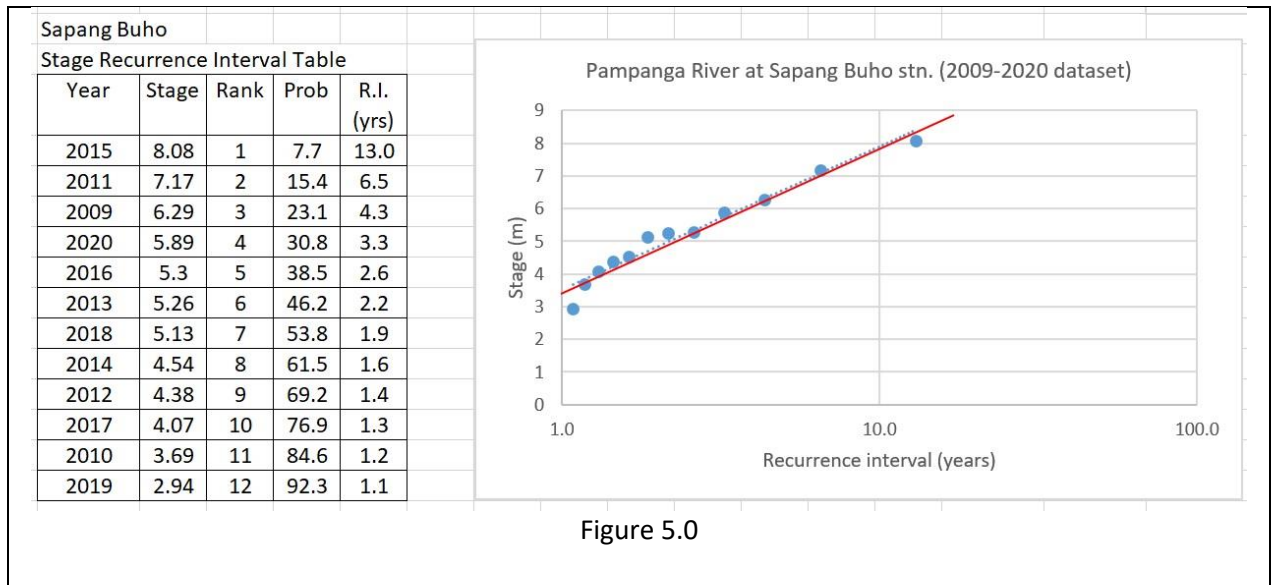


Figure 4.8

PRFFWC WL (station) Recurrence Interval



San Isidro

Stage Recurrence Interval Table

Year	Stage	Rank	Prob	R.I. (yrs)
2015	8.24	1	7.7	13.0
2011	7.75	2	15.4	6.5
2009	7.06	3	23.1	4.3
2013	6.57	4	30.8	3.3
2016	5.14	5	38.5	2.6
2018	4.69	6	46.2	2.2
2014	4.13	7	53.8	1.9
2012	3.94	8	61.5	1.6
2017	3.91	9	69.2	1.4
2020	2.85	10	76.9	1.3
2019	2.28	11	84.6	1.2
2010	1.83	12	92.3	1.1

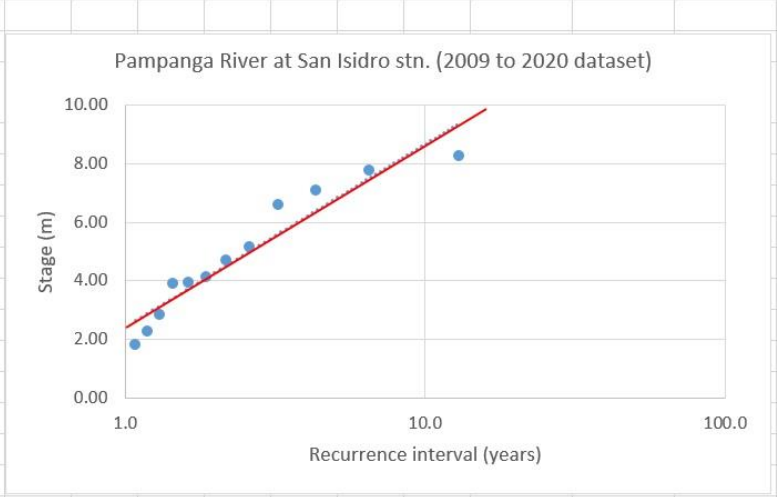


Figure 5.3

Arayat

Stage Recurrence Interval Table

Year	Stage	Rank	Prob	R.I. (yrs)
2011	10.60	1	7.7	13.0
2015	10.00	2	15.4	6.5
2009	9.66	3	23.1	4.3
2012	9.24	4	30.8	3.3
2018	9.16	5	38.5	2.6
2020	8.81	6	46.2	2.2
2013	8.78	7	53.8	1.9
2016	8.68	8	61.5	1.6
2014	8.53	9	69.2	1.4
2017	7.81	10	76.9	1.3
2019	7.29	11	84.6	1.2
2010	6.52	12	92.3	1.1

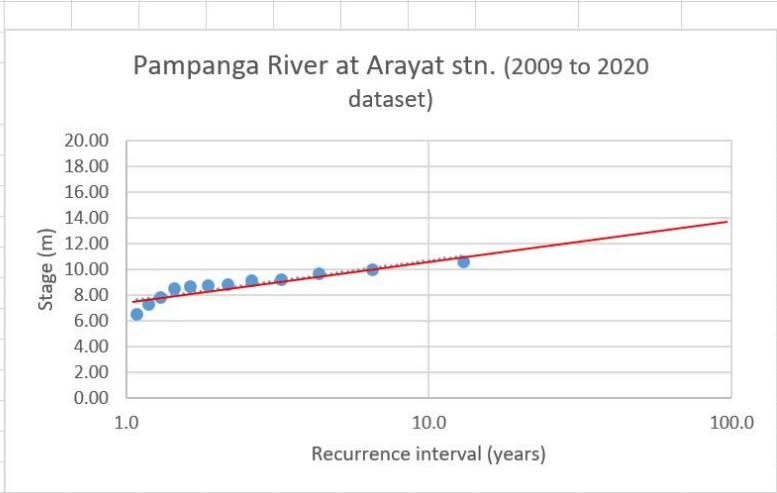


Figure 5.4

Candaba

Stage Recurrence Interval Table

Year	Stage	Rank	Prob %	R.I. (yrs)
2011	7.62	1	8	13.0
2009	7.32	2	15	6.5
2015	7.13	3	23	4.3
2012	6.93	4	31	3.3
2013	6.48	5	38	2.6
2018	6.37	6	46	2.2
2020	6.34	7	54	1.9
2014	6.14	8	62	1.6
2016	5.89	9	69	1.4
2019	5.12	10	77	1.3
2017	4.95	11	85	1.2
2010	4.81	12	92	1.1

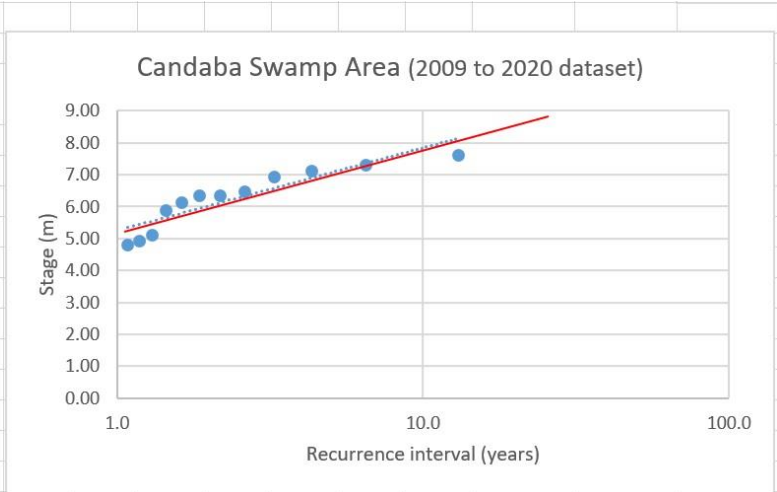


Figure 5.5

Sasmuan

Stage Recurrence Interval Table

Year	Stage	Rank	Prob	R.I. (yrs)
2019	3.50	1	7.7	13.0
2018	3.47	2	15.4	6.5
2017	3.34	3	23.1	4.3
2011	3.22	4	30.8	3.3
2012	3.17	5	38.5	2.6
2013	3.06	6	46.2	2.2
2020	3.06	7	53.8	1.9
2009	3.03	8	61.5	1.6
2016	2.94	9	69.2	1.4
2015	2.81	10	76.9	1.3
2010	2.73	11	84.6	1.2
2014	2.71	12	92.3	1.1

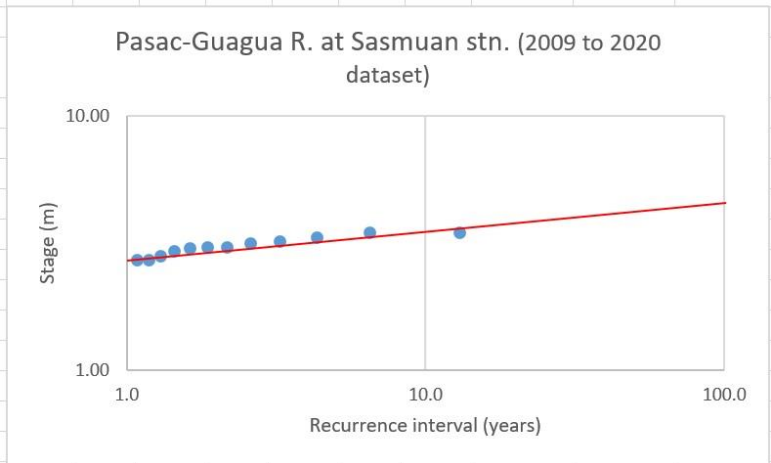


Figure 5.6

Sulipan

Stage Recurrence Interval Table

Year	Stage	Rank	Prob	R.I. (yrs)
2011	4.85	1	7.7	13.0
2009	4.73	2	15.4	6.5
2015	4.29	3	23.1	4.3
2020	3.99	4	30.8	3.3
2012	3.95	5	38.5	2.6
2018	3.52	6	46.2	2.2
2013	3.26	7	53.8	1.9
2016	3.24	8	61.5	1.6
2014	3.13	9	69.2	1.4
2019	2.76	10	76.9	1.3
2017	2.74	11	84.6	1.2
2010	2.22	12	92.3	1.1

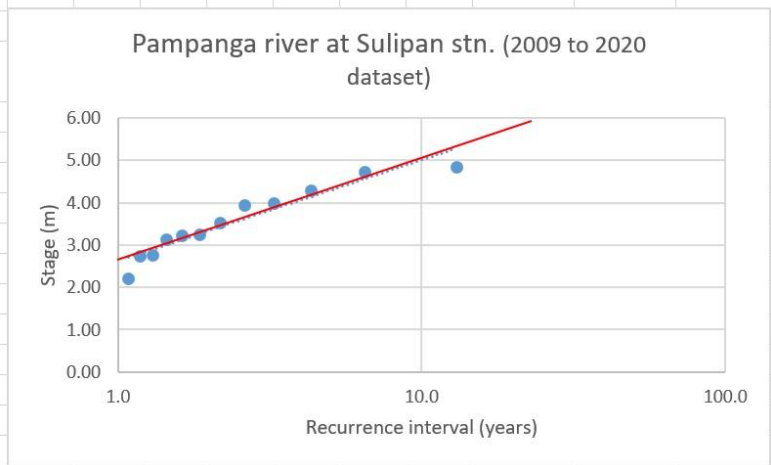


Figure 5.7

Mexico

Stage Recurrence Interval Table

Year	Stage	Rank	Prob	R.I. (yrs)
2009	3.54	1	7.7	13.0
2012	3.53	2	15.4	6.5
2011	3.30	3	23.1	4.3
2013	3.11	4	30.8	3.3
2015	3.03	5	38.5	2.6
2010	2.61	6	46.2	2.2
2018	2.45	7	53.8	1.9
2020	2.27	8	61.5	1.6
2016	2.02	9	69.2	1.4
2019	1.75	10	76.9	1.3
2017	1.74	11	84.6	1.2
2014	1.17	12	92.3	1.1

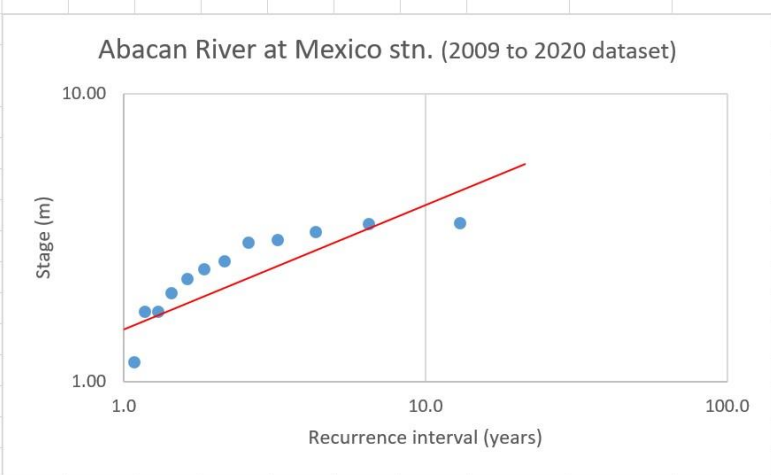


Figure 5.8

C. ANNEX 1

Table A1. PRFFWC Present Flood Warning Assessment Levels (SG in meters)

Color code	YELLOW	ORANGE	RED
STATION	ALERT	ALARM	CRITICAL
Sapang Buho	3.70	4.50	6.50
Mayapyap			
Zaragoza ++	2.50	3.50	4.50
Penaranda	2.50 **	3.50 **	4.00 *
San Isidro +	3.20	4.50	6.00
Arayat	5.00	6.00	8.50
Candaba	3.50	4.50	5.00
Mexico	2.00 **	2.50 **	3.00 *
Sasmuan +			3.00
Sulipan +	2.60	3.20	3.80

* Based on past observations from various flood events (for validation)

** Initial value (for validation)

Table A2. Water Level Station notes

Water Level Station	Elevation of "0" of Staff Gauge (m) (as of Aug. 2009)	Rating Curve (RC) Equation as of April 2009	RC range of applicability
Sapang Buho	50.212	$Q = 4.015 (H - (-2.94))^2$	$0 < H \leq 3.4$
Zaragoza	10.213	$Q = 12.111 (H - 0.0)^2$	(for validation)
Peñaranda	22.498**	$Q = 2.30 (H - (-1.20))^2$	$0 < H \leq 4.0$
San Isidro	9.585	$Q = 15.2 (H - (-1.70))^2$	$0 < H \leq 8.0$
Arayat	0.077	$Q = 9.106 (H - (-0.39))^2$	$0 < H \leq 9.0$
Candaba	-0.157	$Q = 1.80 (H - (-1.30))^2$	$0 < H \leq 2.0$
Sasmuan	-1.147	$Q = 1.50 (H - (-2.0))^2$	$0 < H \leq 2.0$
Sulipan	-0.062	$Q = 9.50 (H - (-0.4))^2$	$0 < H \leq 3.0$
Mexico	5.933**	$Q = 11.0 (H - (-0.50))^2$	$0 < H \leq 3.0$

Notes: RC equations by JICA Consultants

* - based on x-section of March 2000 (by PRFFWC)

** - based on temporary markers (TBM)

Above table are still the latest information for PRFFWC streamgaging sites. The RCs should be updated regularly.

D. ANNEX 2

School Hydrological Information Network (SHINe) Rainfall Observations:

A presentation of the rainfall observations of 3 SHINe school beneficiaries of Bulacan province have been included in this compendium report. The observation data gathered from these schools have been browsed and checked only for possible “obvious” erroneous entries. As a caveat, users may refer to and use them at their own risk. (for more info on SHINe program: <http://bulacanshine.yolasite.com/>)

The following SHINe schools that were considered in this report:

SHINe School	Location	Coordinates (Google Earth estimates)
John J. Russell Memorial High School	Sibul Springs, San Miguel, Bulacan	15°09'51.8"N, 121°03'41.8"E
Obando School of Fisheries	Obando, Bulacan	14°44'42.6"N, 120°54'44.6"E
Angat National High School	Taboc, Angat, Bulacan	14°56'18.3"N, 120°59'27.6"E

Below are various views of SHINe school beneficiaries and location of rain gauge in their respective area.

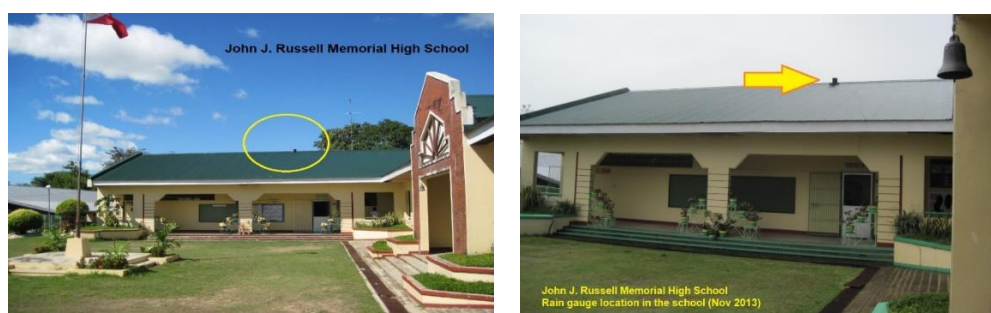


Figure B1. John J. Russell Memorial High School located in Sibul Springs, San Miguel, Bulacan



Figure B2. Obando School of Fisheries located in Obando, Bulacan



Figure B3. Angat National High School located in Bgy. Taboc, Angat, Bulacan

Table B1. Daily Point Rainfall in millimeters (meteorological day)

2020	Station: John J. Russell Memorial HS (SHINE Program)											
Day	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	12.7	0.0	15.2	31.2	0.0
2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.8	0.0	0.0	0.0	0.0
3	0.0	0.0	0.0	0.0	1.3	0.0	0.0	0.0	0.0	13.5	0.0	0.0
4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.5
5	0.0	0.0	0.0	0.0	0.0	0.0	4.3	0.0	0.0	0.0	46.0	0.0
6	0.0	0.0	0.0	0.0	2.3	0.0	0.0	0.0	0.0	0.0	0.0	7.4
7	0.0	20.1	0.0	0.0	3.6	0.0	0.0	0.0	17.0	0.0	2.3	0.0
8	0.0	0.0	0.0	0.0	1.0	0.0	0.0	4.8	0.0	1.8	12.2	0.0
9	0.0	0.0	0.0	0.0	5.3	0.0	2.3	8.1	0.0	0.0	0.0	47.8
10	1.0	0.0	0.0	0.0	0.0	0.0	9.1	5.3	0.3	25.1	0.5	0.0
11	0.0	0.0	0.0	4.8	0.0	0.0	0.0	0.0	0.0	78.7	150.4	21.3
12	0.0	0.0	0.0	0.0	0.0	0.0	4.8	10.7	0.0	23.4	0.0	0.0
13	0.0	0.0	0.0	3.0	0.0	46.2	15.5	0.0	22.9	0.0	0.0	0.0
14	0.0	0.0	0.0	0.0	7.1	0.0	0.0	0.0	27.9	40.4	0.0	0.0
15	0.0	0.0	1.8	0.0	9.9	0.0	0.0	0.0	2.3	2.3	0.0	0.0
16	0.0	0.0	0.0	5.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
17	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.6	0.0	11.4	0.0	0.0
18	0.0	0.0	0.0	2.3	0.0	0.0	0.0	5.6	0.0	0.0	0.0	0.0
19	0.0	0.0	0.0	0.0	0.0	20.3	0.0	1.8	0.0	0.0	0.0	6.9
20	0.5	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.8	126.0	0.0	29.7
21	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.9	0.0	0.0
22	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	28.2	0.0	0.0	0.0
23	0.0	0.0	0.0	0.0	2.8	0.0	0.0	0.0	109.0	0.0	0.0	0.0
24	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.8	3.6	0.0	0.0
25	0.0	0.0	0.0	0.0	0.0	17.0	0.0	0.0	0.0	77.7	0.0	0.0
26	0.5	0.0	0.0	0.0	0.0	0.0	4.3	0.0	33.3	28.4	0.0	0.0
27	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	15.7	0.0	0.0	0.0
28	0.0	0.0	0.0	0.0	0.0	0.0	11.2	0.0	7.9	15.5	0.0	0.0
29	0.0	0.0	0.0	0.0	6.1	0.0	15.0	0.0	2.5	2.5	0.0	0.0
30	0.0		0.0	0.0	0.0	0.0	19.6	29.5	8.4	0.0	0.0	0.0
31	0.0		0.0		0.0		0.0	12.4		11.2		0.0

Monthly Total	2.0	20.1	1.8	15.5	39.4	83.6	86.1	101.3	281.9	483.6	242.6	114.6
Monthly Mean	0.07	0.69	0.06	0.52	1.27	2.79	2.78	3.27	9.40	15.60	8.09	3.70
Max daily rain	1.0	20.1	1.8	5.3	9.9	46.2	19.6	29.5	109.0	126.0	150.4	47.8
Day of Max Daily	10	7		16	15	13	30	30	23	20	11	9
No. of Rain days	3	1	1	4	9	3	9	12	14	17	6	6
Max 1-hr rain												
Day of max 1-hr												

Total rain for the year	1472.4
Total rain days for the year	85

Table B2. Daily Point Rainfall in millimeters (meteorological day)

2020	Station: Obando School of Fisheries (SHINE Program)											
Day	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	0.0	0.0	0.0	0.0	0.0	6.1	0.0	27.2	2.3	131.3	24.6	0.0
2	0.0	0.0	0.0	0.0	0.0	0.8	0.0	0.0	0.0	12.2	0.0	0.0
3	0.0	1.0	0.0	0.0	0.3	0.0	0.0	0.0	0.8	17.3	0.0	7.9
4	0.0	0.0	0.0	0.0	0.0	31.2	32.8	17.3	24.6	0.0	20.3	0.3
5	0.0	0.0	0.0	0.0	0.0	0.0	24.9	3.0	0.0	0.0	0.0	2.5
6	0.0	0.0	0.0	0.0	2.5	29.7	4.1	69.9	1.0	0.3	0.0	0.0
7	0.0	184.9	0.0	0.0	2.8	1.3	0.3	6.6	45.0	24.9	23.9	14.0
8	0.0	0.5	0.0	0.0	0.0	0.0	10.9	2.0	11.7	3.0	0.0	0.0
9	0.0	0.0	0.0	0.0	32.0	8.9	53.1	99.1	0.8	5.3	0.0	8.9
10	0.0	0.0	21.3	0.0	0.3	67.8	0.0	23.9	19.6	33.0	0.0	25.9
11	0.0	0.0	0.0	0.0	0.0	73.9	0.5	1.0	1.8	430.0	97.5	0.0
12	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	48.0	0.0	0.0
13	0.0	0.0	0.0	0.0	0.0	0.0	37.3	1.5	0.0	11.2	0.0	0.0
14	0.0	0.0	0.0	0.0	9.1	41.4	0.0	12.7	48.8	90.9	0.0	0.0
15	0.0	0.0	0.3	0.0	56.4	3.0	0.0	2.0	18.5	0.0	0.0	0.0
16	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	6.6	1.0	0.0
17	0.0	0.0	0.0	0.3	0.0	0.0	6.6	0.0	0.0	11.4	0.0	0.8
18	0.0	0.0	0.0	3.8	0.0	1.0	0.0	0.0	6.6	6.6	0.0	118.9
19	0.0	0.0	0.0	0.0	0.0	1.3	0.8	35.3	0.5	0.3	0.0	28.4
20	0.0	0.0	0.0	0.0	0.0	0.0	1.0	8.4	0.0	224.8	0.8	0.0
21	0.0	0.0	0.0	0.0	0.0	1.0	5.6	0.0	0.0	48.0	0.0	0.8
22	0.0	0.0	0.0	0.0	15.5	1.3	0.0	0.0	6.6	0.0	0.0	0.0
23	0.0	0.0	0.0	0.0	37.6	61.0	12.7	0.0	155.4	0.0	0.0	0.3
24	12.4	0.0	0.0	0.0	0.0	0.3	1.3	0.0	6.9	47.0	0.0	0.0
25	0.3	0.0	0.0	0.0	0.0	5.6	2.3	0.0	0.0	207.8	0.0	0.0
26	0.0	0.5	0.0	0.0	0.0	3.3	0.5	0.0	0.0	0.0	33.3	193.0
27	0.0	0.0	0.0	0.0	24.6	1.0	3.0	0.0	0.0	0.0	3.0	260.1
28	0.0	0.0	0.0	0.0	0.0	14.2	4.1	0.0	41.4	0.0	72.9	0.0
29	0.0	0.0	0.0	0.0	0.0	0.0	313.7	1.8	0.0	1.5	11.4	54.1
30	0.0		0.0	0.0	4.1	0.0	8.9	0.3	15.5	0.0	0.8	0.0
31	0.0		0.0		0.0		0.8	0.0		0.0		0.3

Monthly Total	12.7	186.9	21.6	4.1	185.2	355.1	525.0	312.2	407.7	1361.4	289.6	716.0
Monthly Mean	0.41	6.45	0.70	0.14	5.97	11.84	16.94	10.07	13.59	43.92	9.65	23.10
Max daily rain	12.4	184.9	21.3	3.8	56.4	73.9	313.7	99.1	155.4	430.0	97.5	260.1
Day of Max Daily	24	7		18	15	11	29	9	23	11	11	27
No. of Rain days	2	4	2	2	11	21	21	17	18	21	11	15
Max 1-hr rain	3.8	35.8	12.4	3.8	29	31.5	114.8	23.9	63.5	33.5	19.8	31.5
Day of max 1-hr	24	8	11	18	15	23	30	10	23	12	29	27

Total rain for the year	4377.4
Total rain days for the year	145

Table B3. Daily Point Rainfall in millimeters (meteorological day)

2020	Station: Angat National High School (SHINE Program)											
Day	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	0.0	0.0	0.0	0.0	0.0	7.6	0.0	3.6	0.0	27.9	23.6	0.0
2	0.0	0.0	0.0	0.0	0.0	0.0	38.1	0.0	5.3	1.3	0.0	0.0
3	0.0	0.0	0.0	0.0	0.3	59.9	9.9	1.0	0.0	5.8	3.0	11.4
4	0.0	0.0	0.0	0.0	0.0	7.4	19.1	5.8	0.0	0.0	0.3	0.3
5	0.3	0.0	0.0	0.0	0.0	0.0	1.3	0.3	0.0	0.0	0.0	2.0
6	0.0	0.0	0.0	0.0	0.0	0.0	10.7	14.7	14.0	1.3	8.6	0.0
7	0.3	25.7	0.0	0.0	0.0	1.8	0.0	6.4	18.0	5.1	45.7	12.7
8	0.5	2.5	0.0	0.0	0.0	0.0	0.0	5.8	45.2	4.6	2.5	4.1
9	0.0	0.0	3.0	0.0	15.5	0.0	0.0	26.4	0.0	2.3	7.9	6.6
10	0.8	0.0	0.0	0.0	5.8	0.8	19.6	5.1	3.3	66.8	0.5	14.0
11	0.0	0.0	0.0	0.3	0.3	27.2	0.0	16.8	0.0	110.2	251.5	0.0
12	0.0	0.0	0.0	0.0	0.0	2.8	0.5	0.0	0.3	9.1	2.0	1.5
13	0.0	0.0	0.0	0.8	0.0	3.0	6.4	0.0	0.0	4.8	0.3	0.0
14	0.0	0.0	0.0	0.0	5.3	0.5	0.0	18.5	15.7	22.6	0.3	0.0
15	0.0	0.0	3.0	0.0	88.1	0.0	11.4	0.0	6.4	0.0	0.0	0.0
16	0.0	0.0	0.0	5.1	0.3	0.0	0.3	24.4	0.3	6.1	0.0	0.0
17	0.0	0.3	0.0	0.0	0.3	0.0	0.5	0.5	0.0	3.0	0.0	9.4
18	0.0	0.0	0.0	0.0	0.0	1.8	0.3	31.0	2.0	6.9	0.0	19.8
19	0.0	0.0	0.0	0.0	0.5	23.4	0.0	10.7	0.0	0.5	0.0	26.9
20	0.0	0.0	0.0	6.6	0.0	0.3	3.0	6.1	0.0	72.6	0.5	4.3
21	0.0	0.0	0.0	0.0	0.0	0.5	10.2	0.0	0.0	15.7	0.0	0.0
22	0.0	0.0	0.0	0.0	0.0	6.1	0.0	0.0	48.5	15.5	0.3	0.0
23	0.0	0.3	0.0	0.0	35.1	6.1	4.8	0.0	41.7	2.8	0.0	0.0
24	0.5	0.0	0.0	0.0	0.3	8.4	2.3	0.0	0.0	57.9	0.0	0.0
25	0.0	0.0	0.0	0.0	0.0	11.7	3.3	0.0	1.0	6.1	0.3	0.0
26	0.0	3.3	0.0	0.0	0.0	6.1	0.0	0.0	31.5	0.0	9.4	26.7
27	0.0	0.3	0.0	0.0	0.0	4.6	10.2	0.0	0.0	0.0	3.6	19.8
28	0.0	0.3	0.0	0.0	0.3	8.1	7.1	0.0	8.9	2.0	38.4	0.0
29	6.9	0.0	0.0	0.0	6.1	0.0	105.4	1.3	1.8	5.6	9.7	0.0
30	0.0		0.0	0.0	0.0	0.0	21.6	1.3	0.0	0.0	0.3	0.0
31	0.0		0.0		0.0		7.4	3.0		0.0		0.0

Monthly Total	9.1	32.5	6.1	12.7	158.0	188.0	293.1	182.6	243.8	456.7	408.4	159.5
Monthly Mean	0.29	1.12	0.20	0.42	5.10	6.27	9.46	5.89	8.13	14.73	13.61	5.15
Max daily rain	6.9	25.7	3.0	6.6	88.1	59.9	105.4	31.0	48.5	110.2	251.5	26.9
Day of Max Daily	29	7		20	15	3	29	18	22	11	11	19
No. of Rain days	6	7	2	4	13	20	22	19	16	24	20	14
Max 1-hr rain												
Day of max 1-hr												

Total rain for the year	2150.6
Total rain days for the year	167

J.J.Russell monthly rainfall in 2020

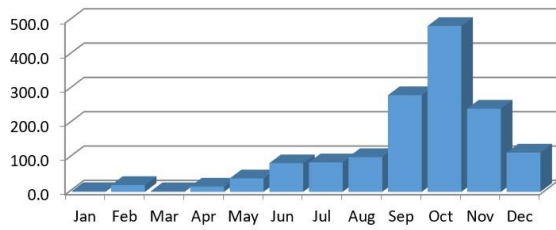


Figure B4. J.J. Russell Memorial High School monthly rainfall hyetograph (2020)

Obando School of Fisheries monthly rainfall in 2020



Figure B5. Obando School of Fisheries monthly rainfall hyetograph (2020)

Angat National HS monthly rainfall in 2020

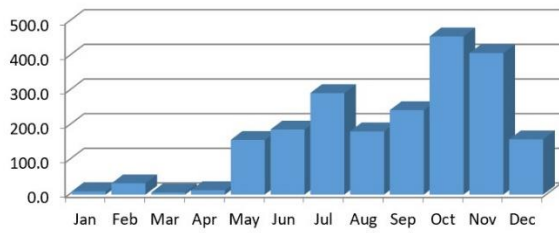


Figure B6. Angat National High School monthly rainfall hyetograph (2020)

