



# CLIMATE IMPACT ASSESSMENT

for  
Philippine Agriculture  
(Rice and Corn)



Impact Assessment and Applications Section (IAAS)  
Climatology and Agrometeorology Division (CAD)  
Philippine Atmospheric, Geophysical and Astronomical Services  
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# P R E F A C E

The Impact Assessment and Applications Section (IAAS) of Climatology and Agrometeorology Division (CAD) regularly issue this monthly/bulletin which will provide users such as food security managers, economic policy makers, agricultural statisticians and agricultural extension officials with qualitative information on the current and potential effects of climate and weather variability on rainfed crops, particularly rice and corn. This bulletin, entitled "Climate Impact Assessment for Agriculture in the Philippines", represents a method for converting meteorological data into economic information that can be used as supplement to information from other available sources.

For example, an agricultural statistician or economist involved in crop production and yield forecast problems can combine the assessment with analysis from area survey results, reports on the occurrence of pests and diseases, farmers' reports and other data sources.

The impact assessments are based on agroclimatic indices derived from historical rainfall data recorded for the period 1951 to the present. The indices, expressed in raw values percent of normals and percentile ranks, together with real time meteorological data (monthly rainfall, in percent of normal), percent of normal cumulative rainfall, as well as the occurrence of significant event such as typhoons, floods and droughts are the tools used in the assessment of crop performance. Crop reports from PAGASA field stations are also helpful.

The narrative impact assessment included in the bulletin depicts the regional performance of upland, 1st lowland and 2nd lowland palay; and dry and wet season corn crops, depending on the period or the season. Tabulated values of normal rainfall and generalized monsoon and yield moisture indices are provided for ready reference. Spatial analysis of rainfall, percent of normal rainfall and the generalized monsoon indices in percentile ranks are also presented on maps to help users visualize any unusual weather occurring during the period. The generalized monsoon indices in particular, are drought indicators; hence, the tables (see Appendices) together with the threshold values can be used in assessing drought impact, if there are any. It also helps assess any probable crop failure.

It is hoped therefore that this bulletin would help provide the decision-makers, planners and economist with timely and reliable early warning/information on climatic impact including the potential for subsistence food shortfalls, thereby enabling them to plan alternate cropping, if possible, food assistance strategies/mitigation measures to reduce the adverse impact of climate and eventually improve disaster preparedness.

Impact assessment for other principal crops such as sugarcane and coconut, for energy and for water resources management, are from time to time will be included in the forthcoming issues of this bulletin.

The IAAS of CAD will appreciate suggestions/comments from end-users and interested parties for the improvement of this bulletin.

## Definition of Terms

The Generalized Monsoon Index (GMI) helps determine the performance of the rains during the season and serves as a good indicator of potential irrigation supplies. It is a tool used to assess rainfed crops.

The GMI for the southwest monsoon (GMI<sub>sw</sub>) in an area during June to September is defined as follows:

$$GMI_{sw} = W_6P_6 + W_7P_7 + W_8P_8 + W_9P_9$$

The GMI for the northeast monsoon (GMI<sub>ne</sub>) in an area during October to January is defined as:

$$GMI_{ne} = W_{10}P_{10} + W_{11}P_{11} + W_{12}P_{12} + W_1P_1$$

where:

W = weight coefficient of monthly rainfall for the season;

P = rainfall amount in the *i*<sup>th</sup> month

(i = 1 for January, 2 = for February, etc.)

The Yield Moisture Index (YMI) is a simple index that helps the users assess agroclimatic crop conditions during the crop season. The YMI for a particular crop is defined as follows:

$$YMI = \sum_i^n [P_i K_i]$$

where:

i = crop stage (1 = planting/transplanting, 2 = vegetative, 3 = flowering, 4 = maturity, etc.)

n = total no. of crop stages;

P = rainfall during the *i*<sup>th</sup> crop stage; and

K = appropriate crop coefficient for the *i*<sup>th</sup> crop stage.

Tentatively, the threshold values of categories of indices for interpretation being adopted for both **YMI** and **GMI** are as follows:

Percentile Rank	Interpretation
> 80	Potential for flood damage
41 - 80	Near normal to above- normal crop condition
21 - 40	Moderate drought impact with reduced yield
11 - 20	Drought impact with major yield losses
< 10	Severe drought impact with crop failure and potential food shortages

## AGROCLIMATIC / CROP ASSESSMENT FOR SEPTEMBER 2021

### OVERVIEW

Harvesting of late-planted upland palay and delayed-planted lowland 1<sup>st</sup> palay has begun in some parts of the country; good to normal yield is expected in Ilocos Norte, Ilocos Sur, CAR, Batanes, Nueva Ecija, Zambales, CALABARZON, most of MIMAROPA, Romblon, Bicol Region, Western Samar, Leyte, Panay Island, Bohol, Zamboanga del Norte, Bukidnon, most of Davao Region, CARAGA and BARMM. In contrast, below normal yield is anticipated in other areas of Ilocos Region, Cagayan, Aurora, Pangasinan, Palawan, Cebu, Negros Occidental, Northern Samar, Zamboanga Sibugay, Misamis Oriental, and South Cotabato because the crops suffered from moisture stress during their critical stage of growth and development.

The lowland 1<sup>st</sup> palay, currently in reproductive to maturity stage is faring well in Masbate, Bohol, Negros Oriental, Zamboanga del Norte, Davao Region, Bukidnon, and Maguindanao. However, the same crops might have suffered from moisture stress in Cebu, Negros Occidental, Zamboanga Sibugay, most of Northern Mindanao and General Santos, because of the minimal rainfall received over those areas. Such crops in the same stage may have been damaged by inundation due to heavy rainfall induced by the Tropical Cyclone passage in most of Ilocos Region, Zambales, Nueva Ecija, CAR, Batanes, Cagayan, most of CALABARZON, Bicol Region, MIMAROPA, Eastern Visayas, Panay Island, and most of CARAGA.

The weather systems that affected the country during the month were the Southwest (SW) monsoon, localized thunderstorms, low pressure areas (LPAs), easterlies, intertropical convergence zone (ITCZ) and the passage of two (2) tropical cyclones (TCs), namely: Typhoon (TY) “Jolina” (Sept. 6-9) and Typhoon (TY) “Kiko” (Sept. 7-12). TY Jolina made landfall and brought heavy rainfall, which caused flooding in parts of Eastern Visayas and Southern Luzon, while TY Kiko did not make landfall but enhanced the Southwest monsoon and brought moderate to heavy rainfall, which caused flooding and landslide in some parts of Luzon and Western Visayas.

Rainfall assessment for the month showed that near to above normal rainfall conditions were experienced in most parts of the country except for Northern Luzon where below normal rainfall conditions were observed.

**REGION I (Ilocos Region)**

Harvesting of delayed-planted upland palay has just started. Good to normal yield is expected in Ilocos Norte and Ilocos Sur, but other areas in the region may have below normal yield due to insufficient moisture experienced by the crops during their critical stage of growth and development.

The heavy rainfall brought by the TC passage might have caused potential damaged to lowland first palay, which is currently in reproductive to maturity stage.

**CAR (Cordillera Administrative Region)**

Harvesting of delayed-planted upland palay has just started. Good to normal yield is generally expected in the Region. Meanwhile, for the lowland first palay in the reproductive to ripening stage, below normal yield might be expected due to heavy rainfall influenced by TC passage.

**REGION II (Cagayan Valley)**

Harvesting of delayed-planted upland palay has just started. Below normal yield is anticipated because the crops suffered from moisture stress during their critical stage of growth and development. In Batanes, good to normal yield is expected. However, for the lowland first palay in the ripening stage, below normal yield might be expected throughout the Region due to heavy rainfall brought indirectly by the TC passage.

**REGION III (Central Luzon)**

Harvesting of delayed-planted upland palay has just started. Good to normal yield is expected in most parts of the Region, except in Aurora. Meanwhile, the lowland first palay that are in the reproductive to ripening stages, below normal yield might be expected due to heavy rainfall influenced by TC passage.

**REGION IV-A (CALABARZON)**

Harvesting of delayed-planted upland palay and delayed-planted, lowland 1<sup>st</sup> palay have just started. Good to normal yield is generally expected in the Region. Meanwhile, the lowland first palay in reproductive to ripening stage in most parts of the Region may have been damaged due to heavy rainfall caused by the TC passage.

**REGION IV-B (MIMAROPA)**

Harvesting of delayed-planted upland palay has just started. Good to normal yield is expected, except in Palawan, where crops most likely suffered from moisture stress during the critical stage of growth. In addition, heavy rainfall due to TC most likely damaged the lowland first palay in reproductive to ripening stage.

**REGION V (Bicol Region)**

Harvesting of delayed-planted upland palay and late-planted lowland 1<sup>st</sup> palay have just started. Good to normal yield is expected in the Region. The lowland first palay in reproductive to ripening stages in most parts of the region may have been damaged due to heavy rainfall influenced by the TC passage.

**REGION VI (Western Visayas)**

Harvesting of delayed-planted upland palay has just started. Good to normal yield is expected. Meanwhile, the lowland first palay in Panay Island, currently in reproductive to ripening stages might have been damaged due to heavy rainfall caused by the TC passage.

**REGION VII (Central Visayas)**

Harvesting of delayed-planted upland palay has started. Good to normal yield is expected in Bohol and Negros Oriental, while the rest of the region could have below normal yield due to moisture stress experienced by the crops during their critical stage of growth and development. The lowland first palay, currently in the reproductive to ripening stage are in good condition courtesy of the sufficient rainfall during the month.

**REGION VIII (Eastern Visayas)**

Harvesting of delayed-planted upland and lowland 1<sup>st</sup> palay has just started. Good to normal yield is expected in most parts of the Region, except in Northern Samar, which could have below normal yield due to moisture stress during the maturity stage. The lowland first palay in reproductive to ripening stage in most parts of the region might also have been damaged due to heavy rainfall caused by the TC passage.

**REGION IX (Zamboanga Peninsula)**

Harvesting of delayed-planted upland palay has just started. Below normal yield is expected due to moisture stress. Meanwhile, lowland first palay in the ripening stage in Zamboanga del Norte are in good condition because of sufficient rainfall received in the area. In contrast, crops in Zamboanga Sibugay might have been suffering from moisture stress.

**REGION X (Northern Mindanao)**

Harvesting of delayed-planted upland palay has just started. Good to normal yield is expected in most parts of the Region, except in Misamis Oriental. The lowland first palay in reproductive to ripening stage may be suffering from moisture stress in most parts of the Region.

**REGION XI (Davao Region)**

Harvesting of delayed-planted upland palay has just started. Good to normal yield is expected in most parts of the Region. Meanwhile, lowland first palay in the ripening stage are in good condition courtesy of the sufficient rainfall.

**REGION XII (SOCCSKSARGEN)**

Harvesting of delayed-planted upland palay has just begun. Below normal yield is expected due to moisture stress experienced by the crops during their maturity stage. The same condition may be observed in the lowland first palay which are in reproductive to ripening stages.

**REGION XIII (CARAGA Administrative Region)**

Harvesting of delayed-planted, lowland 1<sup>st</sup> palay has just started. Good to normal yield is anticipated. The lowland first palay in reproductive to ripening stage in most parts of the Region may have been damaged due to heavy rainfall influenced by the TC passage.

**BARMM (Bangsamoro Autonomous Region of Muslim Mindanao)**

Harvesting of delayed-planted, lowland 1<sup>st</sup> palay has just started. Good to normal yield is expected. Similarly, the remaining lowland first palay currently in the ripening stage is in good condition courtesy of the sufficient rainfall.

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**TABLE 1. GENERALIZED SOUTHWEST MONSOON INDICES  
FOR JUNE TO SEPTEMBER 2021 in Millimeters and Percentile Rank.**

STATIONS	JUNE		JULY		AUGUST		SEPTEMBER	
	GMI	%RANK	GMI	%RANK	GMI	%RANK	GMI	%RANK
<b>CAR (Cordillera Administrative Reg.)</b>								
Baguio	53	40	484	88	792	83	887	79
<b>Region I (Ilocos Reg.)</b>								
Dagupan	32	14	172	38	299	19	339	17
Sinait	41	36	271	79	367	31	422	26
Laoag	41	40	223	71	332	48	386	31
<b>Region II (Cagayan Valley)</b>								
Aparri	34	69	52	38	96	33	126	17
Basco	27	43	90	60	221	67	432	93
Tuguegarao	20	38	49	19	78	7	101	2
<b>Region III (Central Luzon)</b>								
Iba	110	64	535	90	663	57	777	50
Munoz	25	17	96	24	236	38	309	43
Baler	61	50	168	74	237	81	303	74
Casiguran	54	55	101	31	150	33	208	21
<b>NCR (Metro Manila)</b>								
Science Garden	43	36	265	83	346	50	446	45
<b>Region IV-A (CALABARZON)</b>								
Ambulong	37	43	207	90	261	74	332	71
Infanta	33	29	105	29	169	52	303	81
Tayabas	47	45	142	60	206	74	390	95
<b>Region IV-B (MIMAROPA)</b>								
Calapan	56	40	195	86	252	88	342	95
Coron	66	52	183	50	229	26	341	29
Cuyo	81	55	161	31	225	19	275	19
Puerto Princesa	22	17	49	10	92	14	116	5
Romblon	31	21	211	95	281	95	363	90
San Jose	75	55	240	76	319	48	432	60
<b>Region V (Bicol Reg.)</b>								
Daet	21	19	71	17	130	40	219	57
Legaspi	42	33	114	48	172	57	251	57
Masbate	22	31	66	21	121	33	211	69
Virac Synop	52	55	142	74	240	93	308	88
<b>Region VI (Western Visayas)</b>								
Roxas	47	31	98	21	181	50	264	67
<b>Region VII (Central Visayas)</b>								
Mactan	59	81	94	36	140	60	172	43
Dumaguete	23	26	55	29	107	67	155	74
Dauis	59	93	76	67	106	74	170	86
<b>Region VIII (Eastern Visayas)</b>								
Catarman	38	43	98	38	135	50	185	45
Catbalogan	37	31	65	5	127	26	190	19
Tacloban	63	69	102	52	153	74	218	79
<b>Region IX (Zamboanga Peninsula)</b>								
Dipolog	43	14	99	24	157	36	211	52
Zamboanga	14	17	29	2	50	5	95	10
<b>Region X (Northern Mindanao)</b>								
El Salvador	47	45	118	55	160	50	201	40
Malaybalay	59	14	113	5	191	12	347	67
<b>Region XI (Davao Reg.)</b>								
Davao	64	74	110	81	165	86	208	81
<b>Region XII (SOCCSKSARGEN)</b>								
General Santos	19	26	48	38	74	45	94	48
<b>Region XIII (Caraga)</b>								
Surigao	27	38	65	31	116	62	173	67
Hinatuan	77	45	164	83	227	88	290	90
<b>ARMM (Autonomous reg. of Muslim Mindanao)</b>								
Cotabato	38	10	84	10	120	10	188	21



**TABLE 2. CUMULATIVE YIELD MOISTURE INDICES FOR DELAYED PLANTED UPLAND PALAY**  
in Millimeters and Percentile Rank. (June -September 2021)

STATIONS	JUNE		JULY		AUGUST		SEPTEMBER	
	YMI	%RANK	YMI	%RANK	YMI	%RANK	YMI	%RANK
<i>CAR (Cordillera Administrative Reg.)</i>								
Baguio	248	40	1711	86	2202	52	2634	45
<i>Region I (Ilocos Reg.)</i>								
Dagupan	136	14	630	36	1018	19	1206	12
Sinait	185	38	994	79	1425	40	1688	36
Laoag	174	38	867	71	1182	48	1414	29
<i>Region II (Cagayan Valley)</i>								
Aparri	152	69	228	40	588	64	681	50
Basco	113	40	400	60	544	21	1298	79
Tuguegarao	80	38	195	19	290	7	378	2
<i>Region III (Central Luzon)</i>								
Iba	491	64	1988	88	2406	60	2949	62
Munoz	105	19	366	24	787	36	1090	29
Baler	191	50	570	74	1584	98	1828	98
Casiguran	190	55	369	31	829	83	1030	67
<i>Region IV-A (CALABARZON)</i>								
Ambulong	148	43	749	88	1071	79	1366	83
Tayabas	154	45	489	60	632	45	1267	90
<i>Region IV-B (MIMAROPA)</i>								
Coron	282	52	691	50	917	29	1363	33
Cuyo	286	55	567	31	728	14	947	10
Puerto Princesa	74	17	187	10	302	5	395	2
Romblon	109	21	768	95	1124	98	1436	93
San Jose	289	55	891	76	1101	36	1572	45
<i>Region V (Bicol Reg.)</i>								
Masbate	88	31	242	21	506	40	826	76
<i>Region VI (Western Visayas)</i>								
Roxas	148	31	334	24	520	24	862	50
<i>Region VII (Central Visayas)</i>								
Mactan, Cebu	192	81	316	36	493	52	617	38
Dumaguete	73	26	190	29	369	52	552	74
Dauis	184	93	250	57	462	86	717	93
<i>Region VIII (Eastern Visayas)</i>								
Catbalogan	137	31	235	5	385	2	608	12
Tacloban	199	69	342	52	534	62	794	76
<i>Region IX (Zamboanga Peninsula)</i>								
Dipolog	126	14	340	26	529	33	757	52
Zamboanga	47	17	104	2	426	62	598	67
<i>Region X (Northern Mindanao)</i>								
El Salvador	160	45	411	55	565	40	730	31
Malaybalay	201	14	392	5	653	5	1275	64
<i>Region XI (Davao Reg.)</i>								
Davao	201	74	385	81	616	83	787	81
<i>Region XII (SOCCSKSARGEN)</i>								
General Santos	54	26	162	36	437	93	527	93

**TABLE 3. CUMULATIVE YIELD MOISTURE INDICES FOR DELAYED PLANTED LOWLAND FIRST PALAY in Millimeters and Percentile Rank. (June -September 2021)**

STATIONS	JUNE		JULY		AUGUST		SEPTEMBER	
	YMI	% RANK	YMI	% RANK	YMI	% RANK	YMI	% RANK
<b>Region IV-A (CALABARZON)</b>								
Infanta	113	29	366	29	577	36	1017	74
<b>Region V (Bicol Reg.)</b>								
Daet	86	17	269	17	461	24	744	45
Legaspi	147	33	424	48	613	43	892	45
Virac	137	33	291	14	461	24	614	19
<b>Region VIII (Eastern Visayas)</b>								
Catarman	129	43	349	38	469	38	654	43
Catbalogan	137	31	235	5	440	17	653	17
Tacloban	199	69	342	52	510	50	757	69
<b>Region XIII (Caraga)</b>								
Hinatuan	219	45	563	86	769	76	1030	88
Surigao	102	38	235	31	402	45	602	55

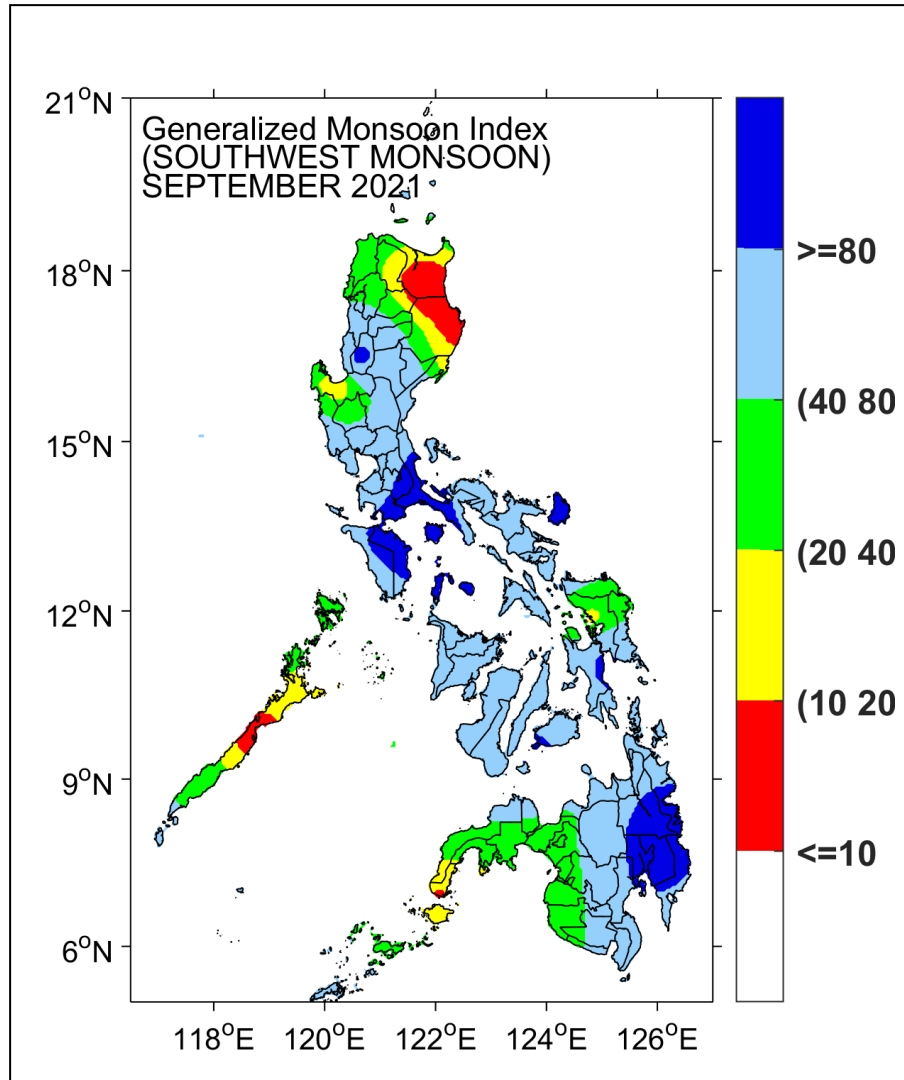


**TABLE 4. CUMULATIVE YIELD MOISTURE INDICES FOR LOWLAND FIRST PALAY in Millimeters and Percentile Rank. (July-October 2021)**

STATIONS	JULY		AUGUST		SEPTEMBER		OCTOBER	
	YMI	%RANK	YMI	%RANK	YMI	%RANK	YMI	%RANK
<b>CAR (Cordillera Administrative Reg.)</b>								
Baguio	1309	88	2227	88	2680	81		
<b>Region I (Ilocos Reg.)</b>								
Dagupan	441	62	820	31	1018	14		
Laoag	620	74	945	55	1189	38		
Sinait	724	83	1009	40	1285	33		
<b>Region II (Cagayan Valley)</b>								
Basco	256	69	646	74	1438	98		
Tuguegarao	103	26	189	10	281	2		
<b>Region III (Central Luzon)</b>								
Iba	1340	90	1721	60	2291	50		
Munoz	234	40	649	45	968	43		
<b>Region IV-A (CALABARZON)</b>								
Ambulong	537	93	697	76	1008	81		
Tayabas	299	79	489	76	1156	98		
<b>Region IV-B (MIMAROPA)</b>								
Calapan	457	95	624	83	1020	93		
Coron	366	52	505	17	974	24		
Cuyo	251	26	379	79	673	12		
P. Princesa	251	93	443	90	477	45		
Romblon	589	98	798	95	1127	90		
San Jose	538	79	774	40	1269	50		
<b>Region V (Bicol Reg.)</b>								
Masbate	139	31	304	36	640	69		
<b>Region VI (Western Visayas)</b>								
Roxas	166	38	415	50	774	74		
<b>Region VII (Central Visayas)</b>								
Cebu	111	19	247	24	377	21		
Dumaguete	105	45	259	64	452	79		
Dauis	59	14	150	21	418	64		
<b>Region VIII (Eastern Visayas)</b>								
Catbalogan	87	10	273	21	508	24		
Tacloban	128	40	280	38	554	74		
<b>Region IX (Zamboanga Peninsula)</b>								
Zamboanga	51	5	115	5	296	26		
<b>Region X (Northern Mindanao)</b>								
El Salvador	172	36	296	21	469	21		
Malaybalay	172	7	403	14	1056	81		
<b>Region XII (SOCCSKSARGEN )</b>								
General Santos	96	62	173	50	268	55		
<b>ARMM (Autonomous reg. of Muslim Mindanao)</b>								
Cotabato	145	19	250	7	561	29		

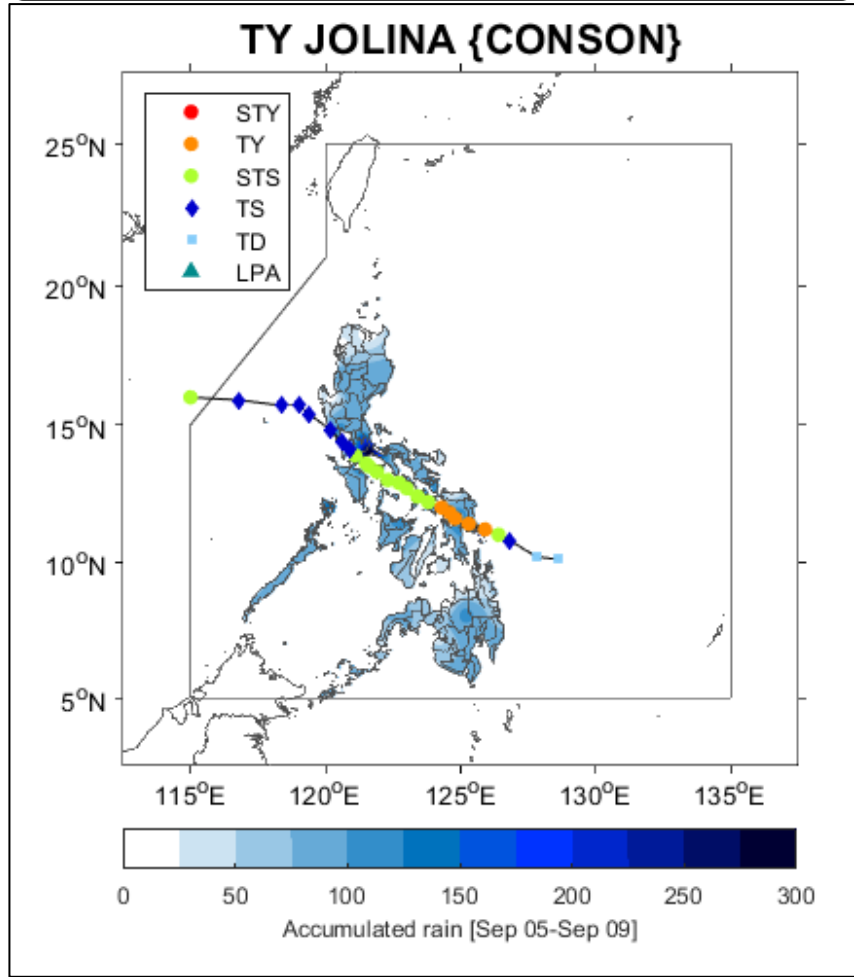
**TABLE 5. DEKADAL AND CUMULATIVE DEKADAL RAINFALL**  
**For the month of SEPTEMBER 2021**  
**[actual values (in mm) and percent of normal ]**

	<i>REGION</i>	<i>DEKAD</i>	<i>ACTUAL SEP</i>	<i>% Normal of Actual</i>	<i>CUMULATIVE JAN.-SEP</i>	<i>% Normal Cumulative</i>
<b>R01</b>	Ilocos Region	25	151	91	2006.0	98
		26	101	63	2107.1	96
		27	29	34	2136.0	93
<b>CAR</b>	CAR	25	140	96	1732.6	99
		26	70	51	1802.3	96
		27	12	15	1813.9	93
<b>R02</b>	Cagayan Valley	25	110	105	1350.3	92
		26	55	52	1405.7	89
		27	15	21	1421.2	86
<b>R03</b>	Central Luzon	25	187	150	1798.1	98
		26	105	68	1902.8	96
		27	49	56	1951.8	94
<b>R04-A</b>	CALABARZON	25	224	255	1781.5	121
		26	97	101	1878.4	120
		27	101	107	1979.5	119
<b>R04-B</b>	MIMAROPA	25	142	149	1358.2	110
		26	71	66	1429.7	106
		27	74	90	1503.8	105
<b>NCR</b>	NCR	25	214	172	1683.7	105
		26	98	70	1781.5	102
		27	70	80	1851.4	101
<b>R05</b>	Bicol Region	25	136	177	2032.2	134
		26	82	107	2114.0	133
		27	82	93	2195.6	131
<b>R06</b>	Western Visayas	25	105	125	1298.6	105
		26	100	119	1398.3	106
		27	53	63	1451.1	104
<b>R07</b>	Central Visayas	25	81	142	1162.7	126
		26	78	147	1240.5	127
		27	37	60	1277.9	123
<b>R08</b>	Eastern Visayas	25	142	236	2491.4	160
		26	81	132	2572.3	159
		27	36	44	2608.7	153
<b>R09</b>	Zamboanga Peninsula	25	55	81	1230.7	112
		26	90	166	1321.2	115
		27	63	100	1384.3	114
<b>R10</b>	Northern Mindanao	25	121	157	1651.0	119
		26	94	123	1745.0	119
		27	121	159	1866.3	121
<b>R11</b>	Davao Region	25	57	100	1995.6	137
		26	109	189	2105.0	139
		27	44	74	2149.4	136
<b>R12</b>	SOCCSKSARGEN	25	58	109	1368.9	136
		26	103	211	1472.4	139
		27	43	92	1515.7	137
<b>R13</b>	CARAGA	25	92	148	2556.1	126
		26	102	175	2658.3	128
		27	66	104	2724.1	127
	ARMM	25	67	109	1182.5	111
		26	106	189	1288.4	115
		27	54	94	1342.6	114

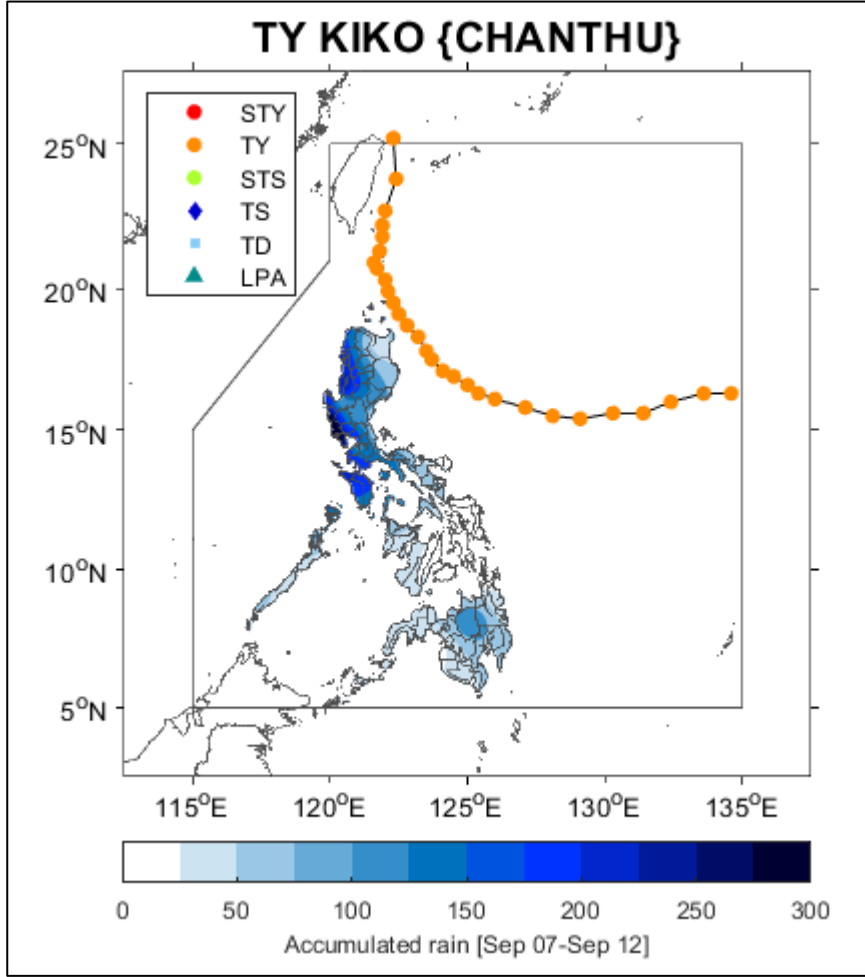


**FIG. 1. Spatial Analysis of the GENERALIZED SOUTHWEST MONSOON INDEX Ending SEPTEMBER 2021 in Percentile Rank**

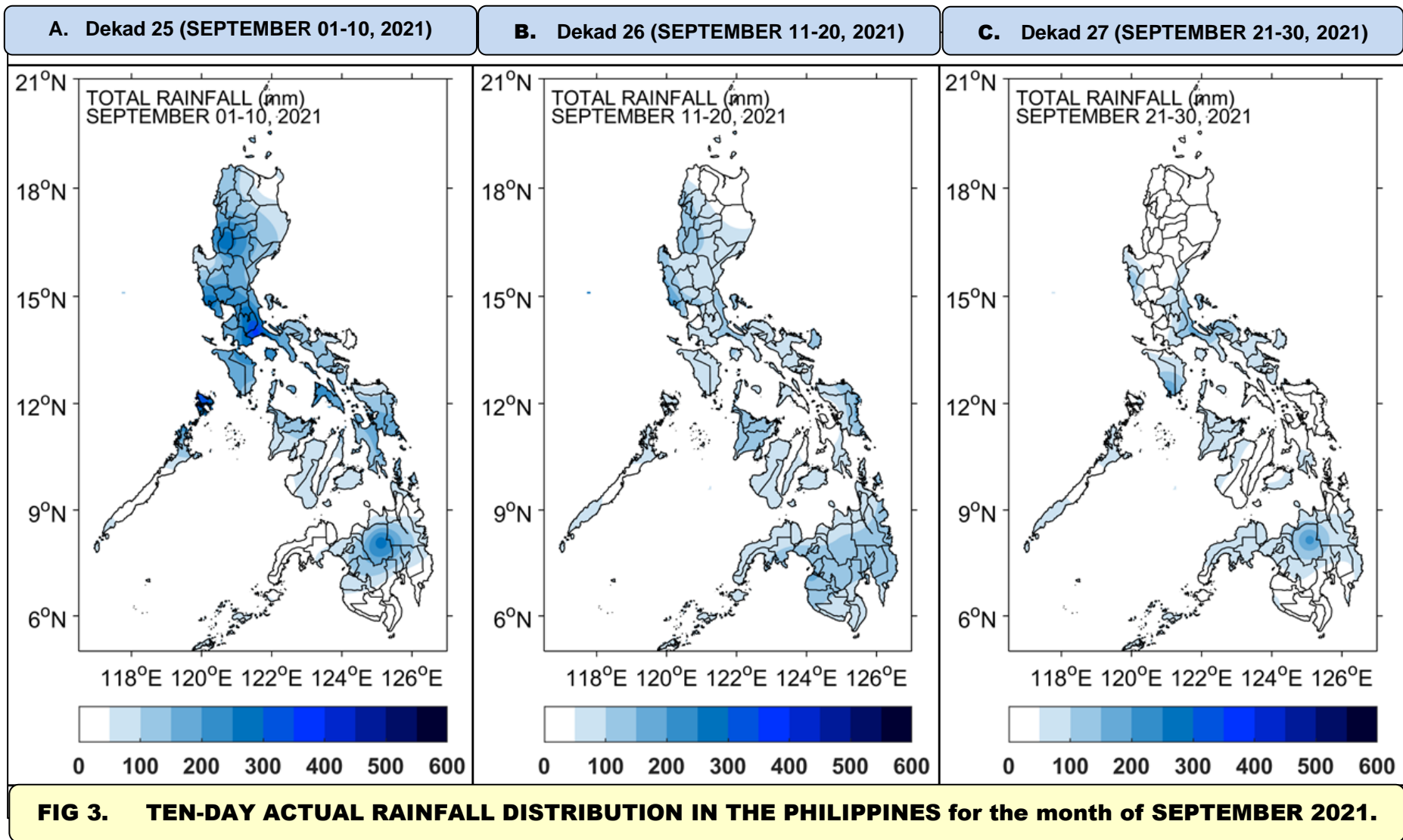
A. Cumulative Rainfall during the Passage of Typhoon (TY) "JOLINA" (Sept 5-9, 2021)

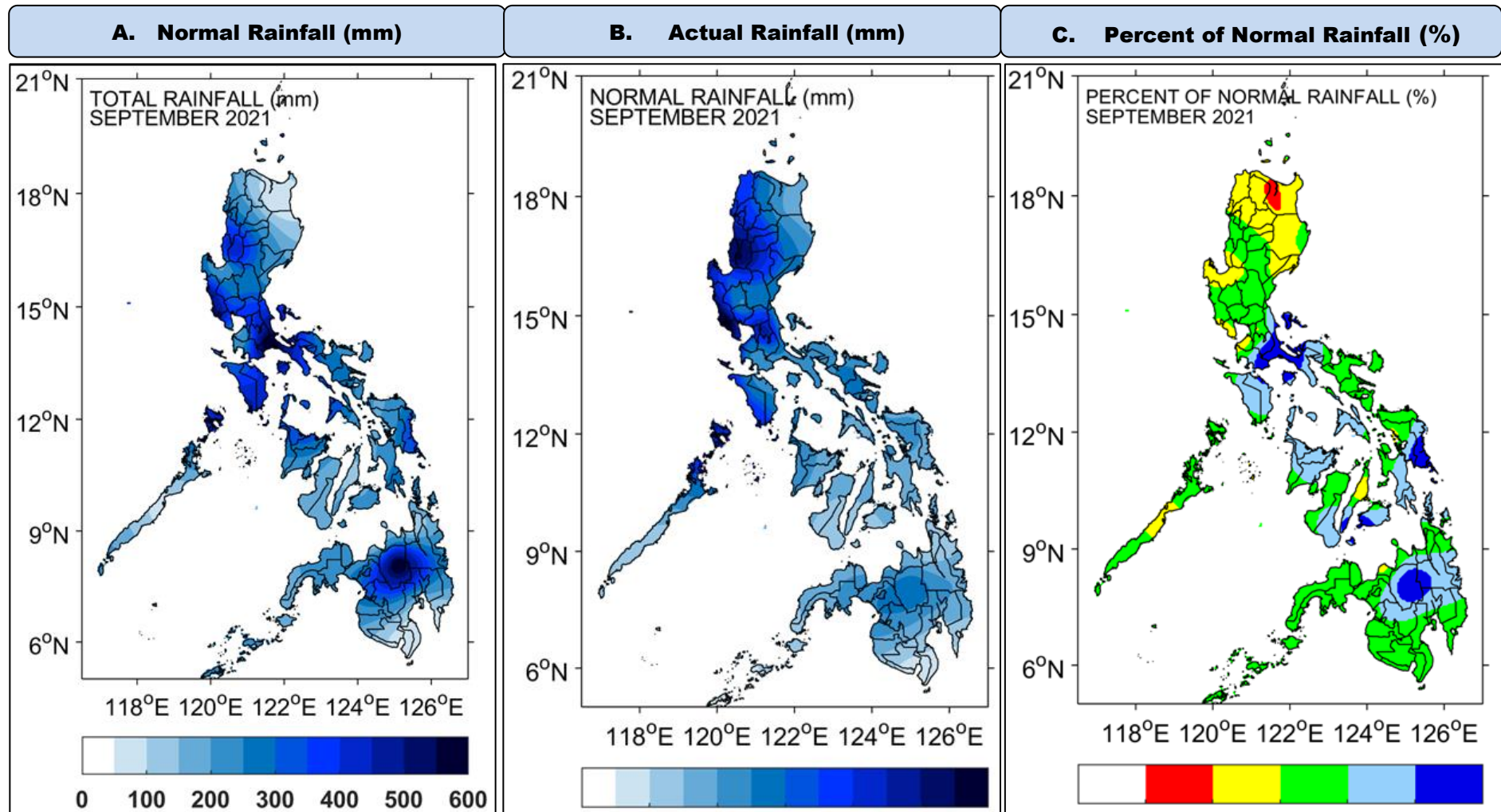


B. Cumulative Rainfall during the Passage of Typhoon (TY) "KIKO" (Sept 7-12, 2021)



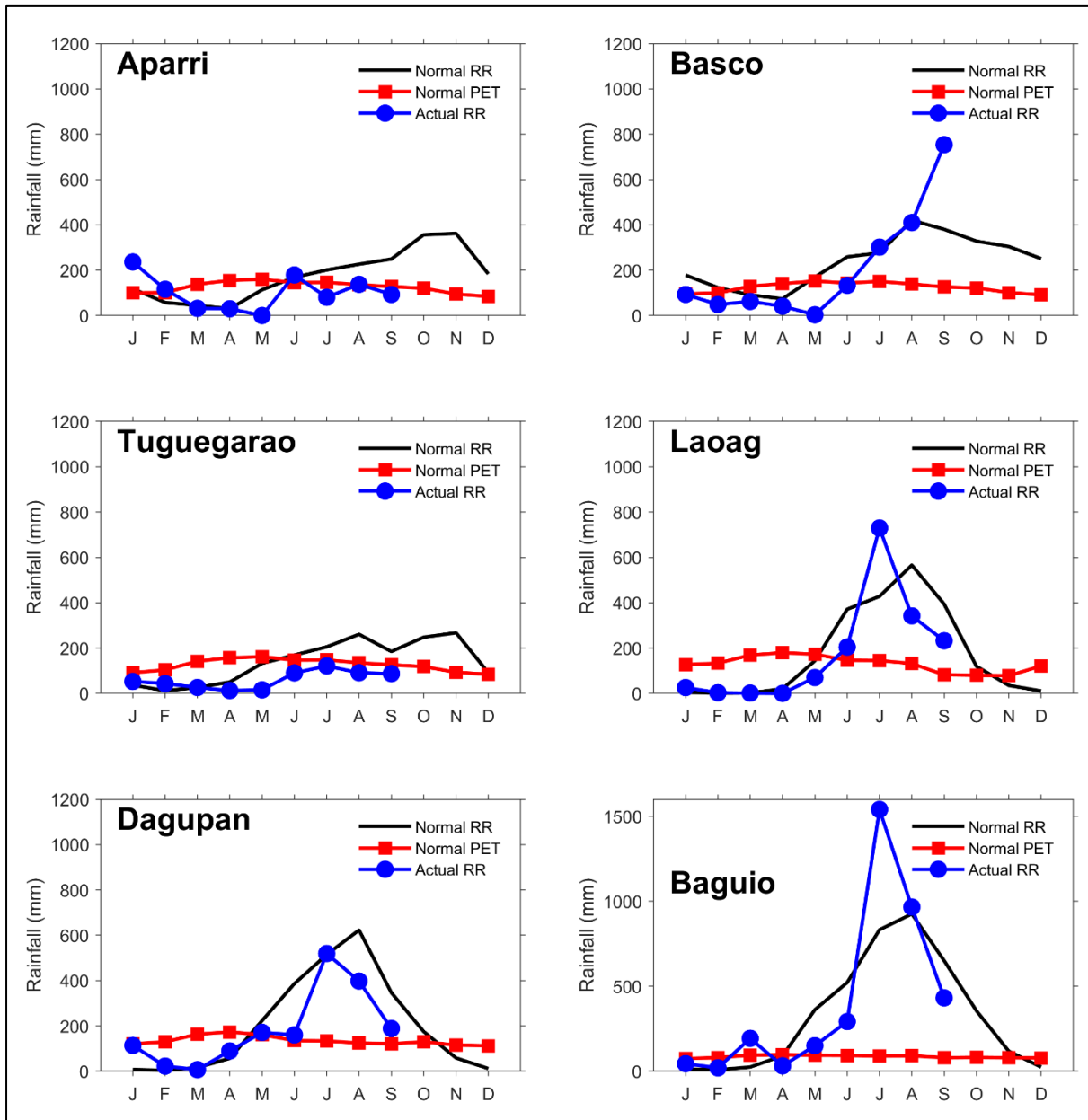
**FIG. 2. ACTUAL CUMULATIVE RAINFALL [mm] DURING THE PASSAGE OF TROPICAL CYCLONE IN THE PHILIPPINE AREA OF RESPONSIBILITY FOR THE MONTH OF SEPTEMBER 2021.**



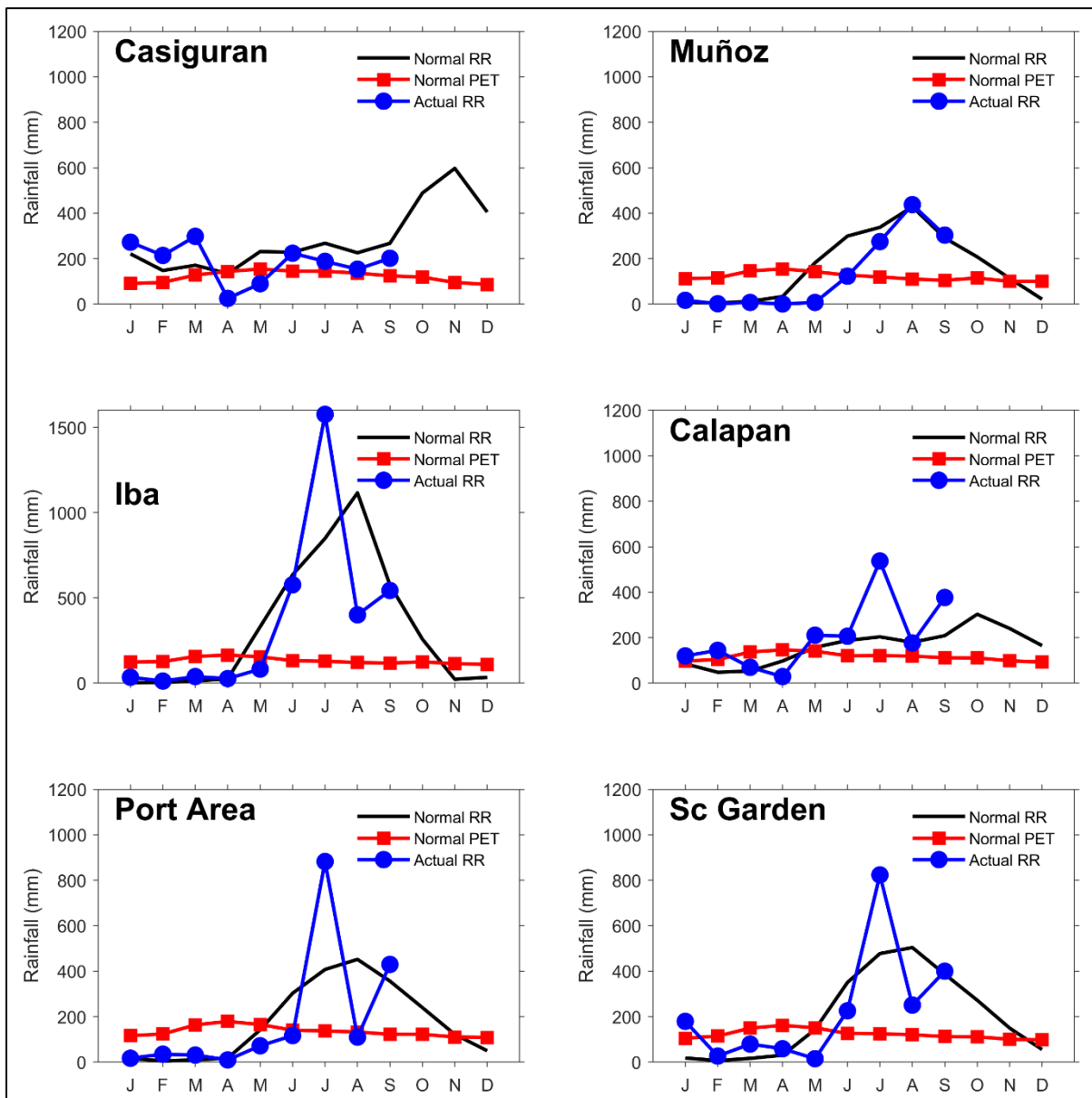


**FIG. 4. RAINFALL IN THE PHILIPPINES for the month of SEPTEMBER 2021**

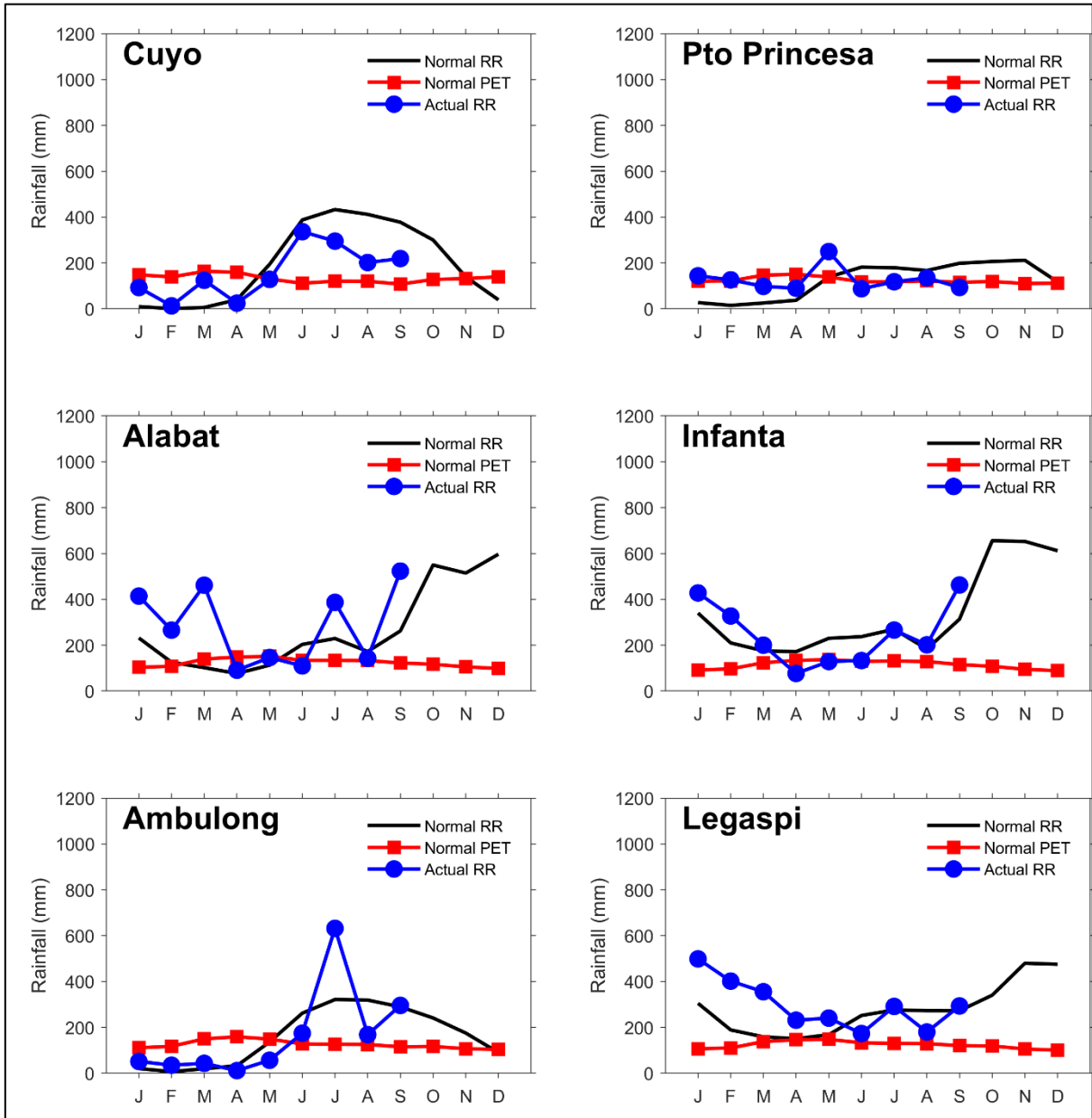




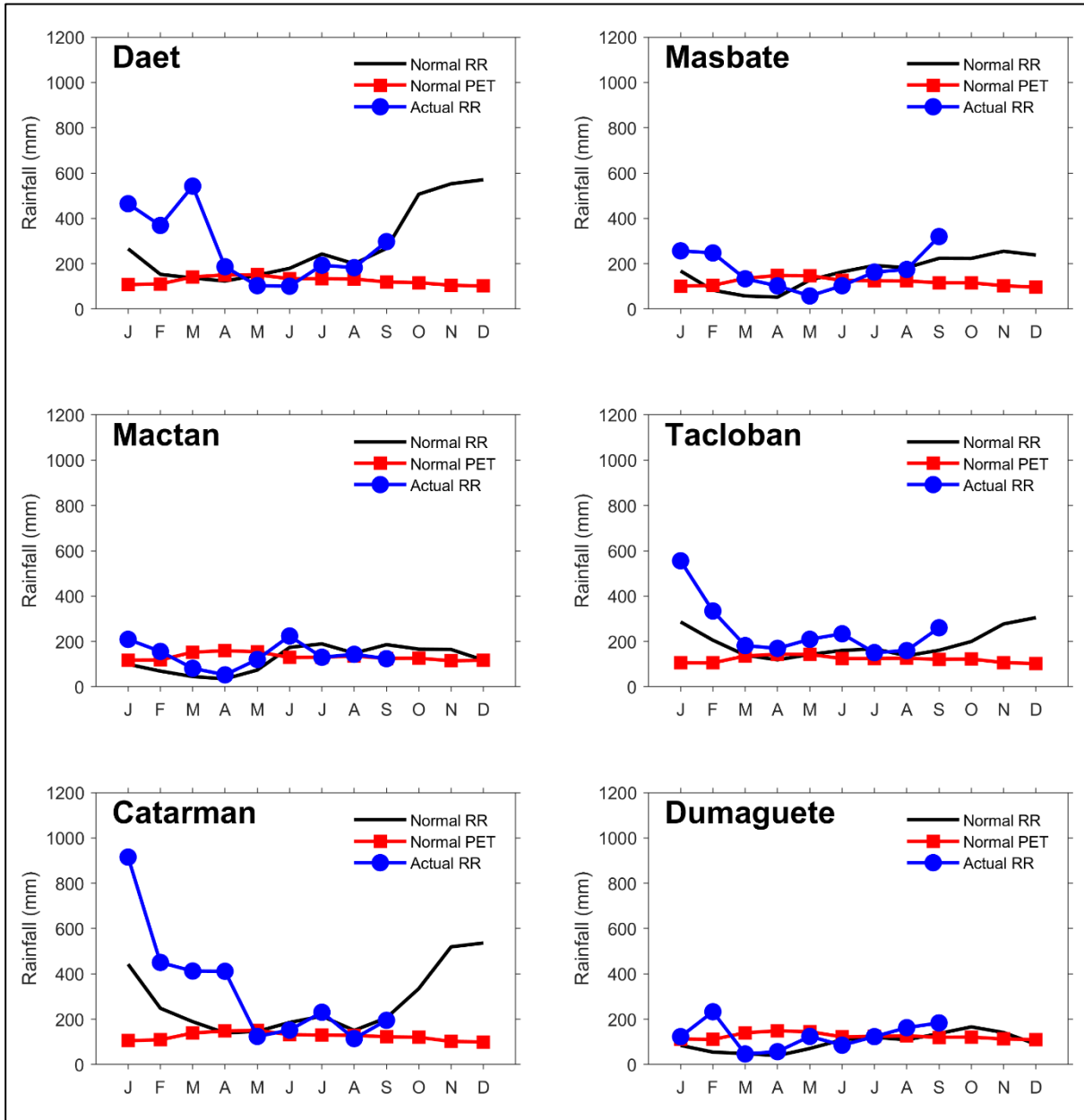
**Fig. 5a. Comparison of normal rainfall and potential evapotranspiration with the actual monthly rainfall at Aparri, Basco, Tuguegarao, Laoag, Dagupan, and Baguio.**



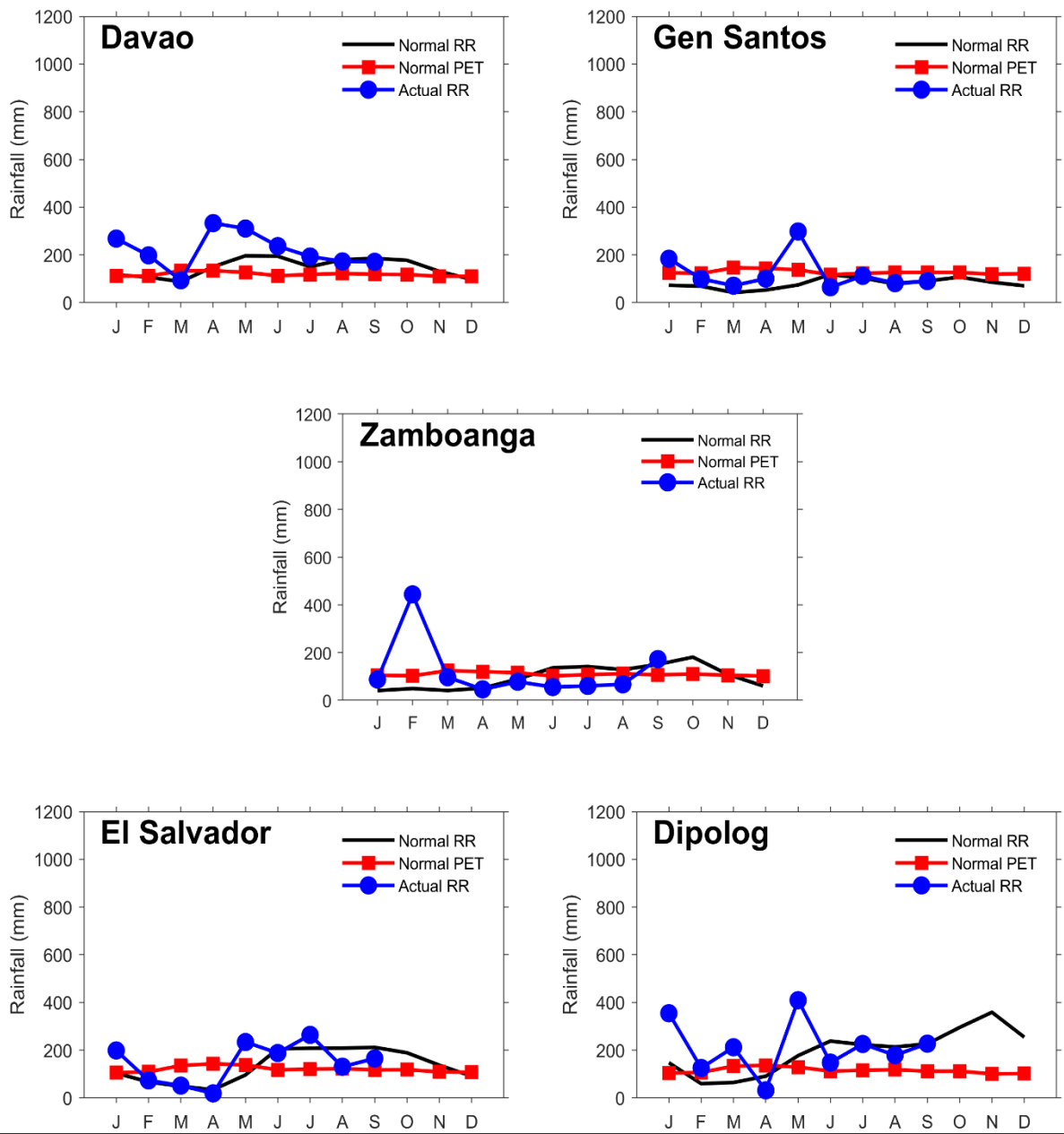
**Fig. 5b. Comparison of normal rainfall and potential evapotranspiration with the actual monthly rainfall at Casiguran, Iba, Muñoz, Calapan, Port Area, and Science Garden.**



**Fig. 5c. Comparison of normal rainfall and potential evapotranspiration with the actual monthly rainfall at Cuyo, Puerto Princesa, Alabat, Infanta, Ambulong, and Legaspi.**



**Fig. 5d. Comparison of normal rainfall and potential evapotranspiration with the actual monthly rainfall at Daet, Masbate, Mactan, Tacloban, Catarman and Dumaguete.**



**Fig. 5e. Comparison of normal rainfall and potential evapotranspiration with the actual monthly rainfall at Davao, General Santos, Zamboanga, El Salvador, and Dipolog.**