**Short communication**

**AVERAGE RAINFALL TREND IN NORTHERN SAMAR**

**ABSTRACT**

This study focused on the average rainfall trend in Northern Samar for the last ten years, 2010 to 2019. The researcher collected the data through the PAG ASA Catarman Northern Samar after which it was analyzed using the annual average rainfall and monthly rainfall and the scatter plot. Results showed that the rainy months with higher average rainfall recorded were during the months September, October, November, December, January, February, and March with 206.754 mm, 302.154 mm, 416.618 mm, 823.539 mm, 691.73 mm, 284.11 mm, and 409.71 mm, respectively. June and July were also found to have an average rainfall of 216.2 mm and 259.75 mm. A scatter plot was also used to graph the trend of the rainfall in the province.

**Keywords**

 Average rainfall, scatter plot, rainfall trend

**INTRODUCTION**

Rainfall is the most important climatic element in the Philippines. Rainfall distribution throughout the country varies from one region to another (Villafuerte II et al., 2014). The growing concern about climate change has been a major problem around the globe (Matsumoto et al., 2020). The Philippines, like many of the world’s countries, is among the most vulnerable to the impact of climate change (De Asis & Varela, 2020; Pullen et al., 2015). Climate data for the past 50 years already show trends of rising temperatures by about 0.0110C annually, changes in the rainfall pattern and increasing number of extreme climate events, like cyclones, flooding and drought (Paje, 2014). Independent studies and climate modeling of the Philippine Atmospheric, Geophysical and Astronomical Services (PAG-ASA) projects the rise of the mean annual temperatures of the country by about 0.90C to 1.40C by 2020 and 1.70C to 2.40C by 2050.

 The continued rise in air temperature causes changing rainfall patterns in the country (Veloria et al., 2021; Gren & Helander, 2017). Northern Samar in particular has a significant rainfall throughout the year. Even the driest month still has a rainfall. Recently, severe flooding continues to be the major problem of the province.

 In this study, the researcher tried to analyze the average annual and monthly rainfall trend in the province and its corresponding graph using scatter plot.

**METHODOLOGY**

The researcher utilized only the rainfall data recorded by the PAG ASA Catarman Northern Samar. Annual and monthly rainfall data from 2010 to 2019 were analyzed by computing the average annual rainfall and monthly rainfall. Data were also graphed using scatter plot to identify the average trend of the rainfall.

**RESULTS AND DISCUSSION**

 Table 1 shows the average monthly rainfall in Northern Samar with corresponding average annual rainfall. Results showed that 2011 has the highest amount of annual average rainfall of 590.28 mm. This result is in accordance to the report of NASA Earth Observatory that heavy rains, flash floods, and landslides in the Philippines that had affected more than 450,000 people and killed at least 18 by January 5, 2011. The heaviest precipitation is concentrated along the eastern coasts, southeast of Manila. It was also revealed that during the years 2014, 2017, and 2018 have also a great amount of annual average rainfall of 426.84 mm, 348.98 mm, and 382.06 mm, respectively. It could be inferred that the annual average rainfall varies intermittently from 2010 to 2019.

Results also showed that the amount of rainfall per year slightly decrease from 2010 to 2019. In relation to this, as seen on Fig. 1, the scatter plot graph of the annual rainfall tends to decrease year after year from 2010 to 2019.

 On the other hand, the average monthly rainfall varies also year after year. It can be noted on Table 1 that the average monthly rainfall with highest amount of precipitation had been found out to start from the months, October, November, December and January with an average monthly rainfall of 302.154, 416.648, 823.539, and 691.73, respectively.From these, the most rainy months with highest amount of rainfall were December and January with average rainfall of 823.539 mm and 691.73 mm, respectively. The scatter plot of the average monthly rainfall is shown in Fig. 2.

**Table 1. Rainfall Data for Ten Years in Northern Samar (2010-2019)**

**(in millimeters)**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **YEAR** | **JANUARY** | **FEBRUARY** | **MARCH** | **APRIL** | **MAY** | **JUNE** | **JULY** | **AUGUST** | **SEPTEMBER** | **OCTOBER** | **NOVEMBER** | **DECEMBER** | **ANNUAL** | **AVERAGE** |
| 2010 | 468 | 32.4 | 93.2 | 87.5 | 20.2 | 91.8 | 251.2 | 139.6 | 229.1 | 324.8 | 374.9 | 1129.7 | 3242.4 | **270.20** |
| 2011 | 1524.2 | 511.1 | 1516.7 | 273.3 | 855.9 | 273.7 | 442.4 | 158.3 | 86.3 | 224.2 | 495.8 | 721.4 | 7083.3 | **590.28** |
| 2012 | 618.6 | 423.2 | 526.9 | 147.8 | 188.9 | 132.4 | 359.1 | 42.7 | 342.4 | 355.3 | 285.6 | 409.9 | 3832.8 | **319.40** |
| 2013 | 372.8 | 438.5 | 459.9 | 47.9 | 70.8 | 355.9 | 214 | 234.8 | 147.3 | 151.9 | 511.9 | 576.5 | 3582.2 | **298.52** |
| 2014 | 734.5 | 200.3 | 414.7 | 387.8 | 31.7 | 371.8 | 428.1 | 286.9 | 286.3 | 479.5 | 448.3 | 1052.2 | 5122.1 | **426.84** |
| 2015 | 603.5 | 96.3 | 160.3 | 162.4 | 22.5 | 151.2 | 106.1 | 161.3 | 161.1 | 216.5 | 285.9 | 548.4 | 2675.5 | **222.96** |
| 2016 | 328.4 | 342.9 | 61.4 | 38.7 | 66.8 | 236.5 | 474.2 | 62.9 | 182.7 | 535.6 | 520.3 | 764.9 | 3615.3 | **301.28** |
| 2017 | 754 | 146.5 | 263.1 | 84.4 | 213.8 | 233.7 | 206.8 | 99.7 | 273.9 | 286 | 414.2 | 1211.6 | 4187.7 | **348.98** |
| 2018 | 1134 | 624.8 | 569.7 | 171.9 | 53.9 | 121.6 | 11.8 | 151.6 | 154.3 | 152.7 | 424.3 | 1014.1 | 4584.7 | **382.06** |
| 2019 | 379.3 | 25.1 | 31.2 | 81.4 | 62.3 | 193.4 | 103.8 | 157.77 | 204.14 | 295.04 | 405.28 | 806.69 | 2745.42 | **228.78** |
| **AVERAGE**  | **691.73** | **284.11** | **409.71** | **148.31** | **158.68** | **216.2** | **259.75** | **149.557** | **206.754** | **302.154** | **416.648** | **823.539** |  |  |

**Fig. 1. Annual Average Rainfall from 2010 to 2019**

**Fig. 2. Mean Monthly Rainfall from 2010 to 2019**

**CONCLUSION:**

* The researcher concludes that the annual average rainfall in the province was 590.28 mm.
* The average annual rainfalls with higher amounts were 426.84 mm, 348.98 mm, and 382.06 mm in 2014, 2017, and 2018, respectively.
* The average monthly rainfall with highest amount of precipitation had been found out to start from the months, October, November, December and January with an average monthly rainfall of 302.154, 416.648, 823.539, and 691.73, respectively.
* The most rainy months with highest amount of rainfall were December and January with average rainfall of 823.539 mm and 691.73 mm, respectively.
* The scatter plot graph of the annual rainfall tends to decrease year after year from 2010 to 2019.

**RECOMMENDATION:**

* Further study is highly recommended to determine the significant impact to the production of agricultural products in the province.
* The abrupt change of rainfall year after year is also recommended for further study using Mann Kendal’s Test.

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