

ANALYSIS ON RAINFALL VARIABILITY OF PAKOKKU TOWNSHIP

Nu Nu Lwin¹, Mya Mya Than², U Khin Maung Htwe³

ABSTRACT

This research paper is “Analysis of climate variability of rainfall in Pakokku Township”. The study area is located within Pakokku District, Magway Region in the Dry Zone. It was composed of 27 wards, 54 village tracts and the total 252 villages. There are two main important towns, Pakokku and Kamma town in Pakokku Township. In this study, it is aimed to explore the climatic condition of Pakokku Township from 1987 to 2016. The objectives of this study are to study variability of rainfall, variability of annual rainfall and variation of monthly rainfall and to describe mean annual rainfall using the interpolation of geographic information system. The study has made use of various primary and secondary data. These time series were used to obtain estimates of average annual precipitation over a 30 year period. In the study area was used geographic information system (GIS), remote sensing (RS) technology and office data. The long turn annual rainfall of Pakokku Township is 614.172mm (24.16) inches. The study area is characterized with unit of topography in quantum of rainfall due to the influence of the western part of the study areas. The maximum rainfall is 707.644mm (27.86) inches and minimum rainfall 681.99 mm (26.85) inches in this study area.

¹Assistant Lecture, Department of Geography, Sagaing University of Education

Head of professor, Dr, Geography Department, Sagaing University of Education

Assistant Lecture, Department of Geography, Sagaing University of Education

INTRODUCTION

Climate is a physical element of environment. It is a force which can influence not only the physical landscape of a region, but it can also influence the socio-economic condition of a region. Climate can control the type of natural vegetation, the development of soil, land use and agriculture of a region. The main factors that control and influence the climate of Pakokku Township are location and physiography. Pakokku Township lies completely in the north of the equator and in the Torrid Zone. Moreover, this township is far away from the sea. Thus, inland climatic type is dominant in Pakokku Township.

Study Area

- to describe mean annual rainfall using the interpolation of geographic information system

Methodology

The study has made use of various primary and secondary data. These time series were used to obtain estimates of average annual precipitation over a 30 year period. In the study area was used geographic information system (GIS), remote sensing (RS) technology and office data.

Temperature condition of the Study Area

Temperature condition of Pakokku Township is described on data obtained from Meteorology and Hydrology Department of Pakokku. Pakokku Township lies in the tropical zone, so it has high temperature. The temperature conditions are studied by using the data from Pakokku Weather Station.

According to the 1987 to 2016 climatic data, average maximum temperature is (95.16°F), whereas average minimum temperature is (66.57°F) and average mean temperature is (80.87°F). So the range of average temperature is (28.59°F). According to the monthly temperature condition, the hottest month is May, its average mean temperature is (87.67°F) and average maximum temperature is (106.55°F) while average minimum temperature is (68.78°F). The coldest month is January, its average mean temperature is (69.58°F) and average maximum temperature is (86.92°F) while average minimum temperature is (52.24°F). The range of average mean temperature between the hottest month and the coldest month is (19.5°F). Pakokku Township is the hottest area in Magway Region. The temperature condition of Pakokku Township is considerably suitable for agricultural. See Figure (2)

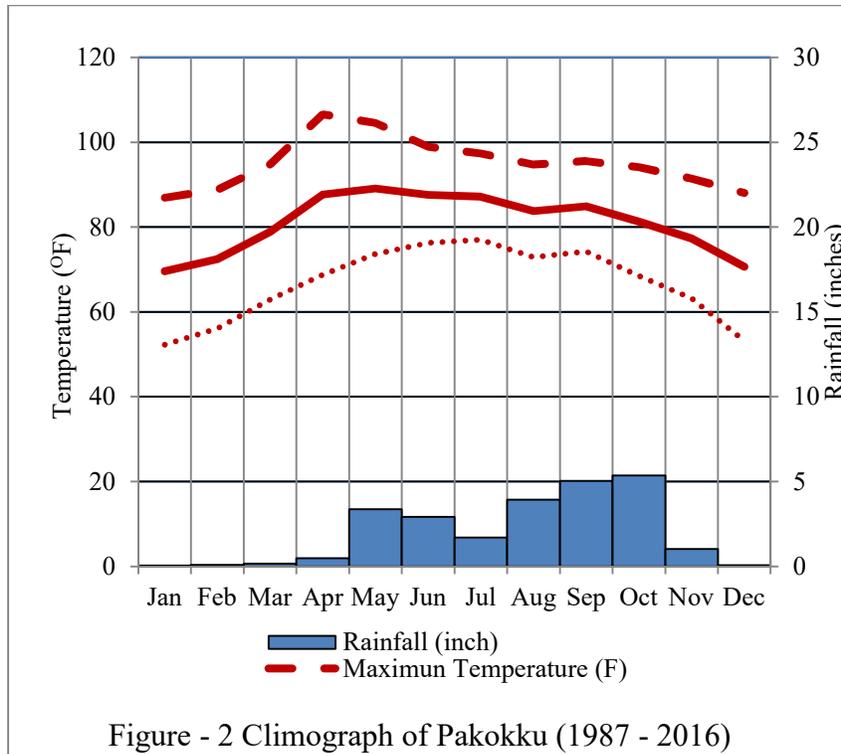


Table - 1.3 Monthly Mean Temperatures and Rainfall of Pakokku (1987-2016)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average Temperature & Total Rainfall
Maximum Temperature (F)	86.92	88.78	94.83	106.55	104.54	98.97	97.35	94.71	95.56	94.16	91.45	88.09	95.16
Mean Temperature (F)	69.58	72.43	78.89	87.67	89.08	87.62	87.18	83.79	84.9	81.32	77.34	70.63	80.87
Minimum Temperature (F)	52.24	56.08	62.94	68.78	73.62	76.26	77.00	72.87	74.24	68.47	63.22	53.17	66.57
Rainfall (inch)	0.05	0.08	0.16	0.48	3.36	2.91	1.7	3.93	5.03	5.36	1.03	0.07	24.16

Source: Meterology and Hydrology Department, Pakokku

Rainfall

Pakookku Township is a dry region of Myanmar. As for The rainfall condition from 1987 to 2016, the total amount of average normal rainfall is (614.172) mm (24.16) inches. The highest rainfall (1043.94) mm (5.36) inches was received in 2011 and the lowest rainfall (335.03) mm (0.05) inches was received in 1998. In studying the period of rainfall, the month with the lowest rainfall are January, February, March, April, July, November and December the heaviest rainfall occurs in the months of May, June, August, September and October. As the total

rainfall of the middle six months (441.96) mm (17.4) inches are Township is the area receiving" Summer Rain".

FINDINGS AND DISCUSSION

Variability of Rainfall

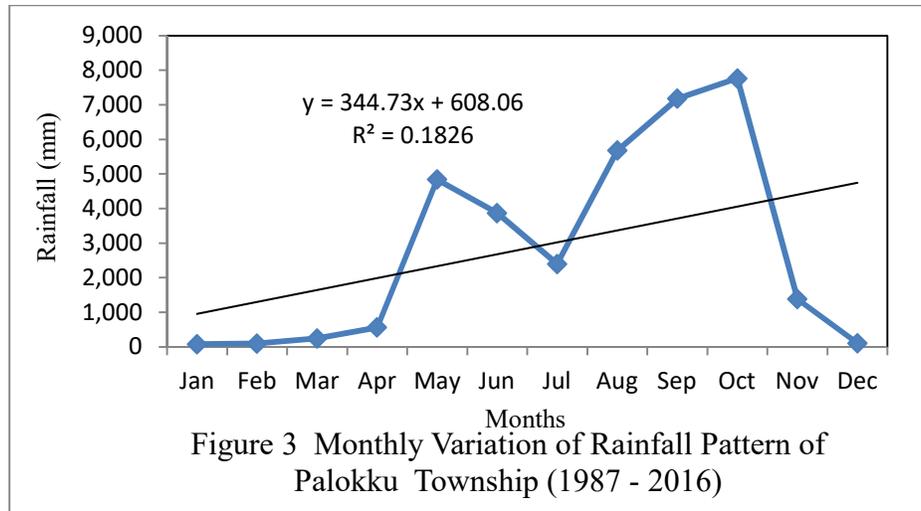
“Variability defined as the deviation from mean” or “ratio of the standard deviation to the mean rainfall” and in other words variability of coefficient of variation.

Variability of Annual Rainfall

Annual rainfall variability of the study areas stretch between 1.38% and 8.61% during the 30 -years (1987-2016).The variation of rainfall was found in the low fluctuation between 1987 and 2009. This fluctuation indicates that the region suddenly had heavy high rainfall from 2010 to 2013. In 2014, it gradually decreased to 5.7% of annual variability of rainfall and it had been increased with high variability of rainfall in 2015 and 2016.

Variation of Monthly Rainfall

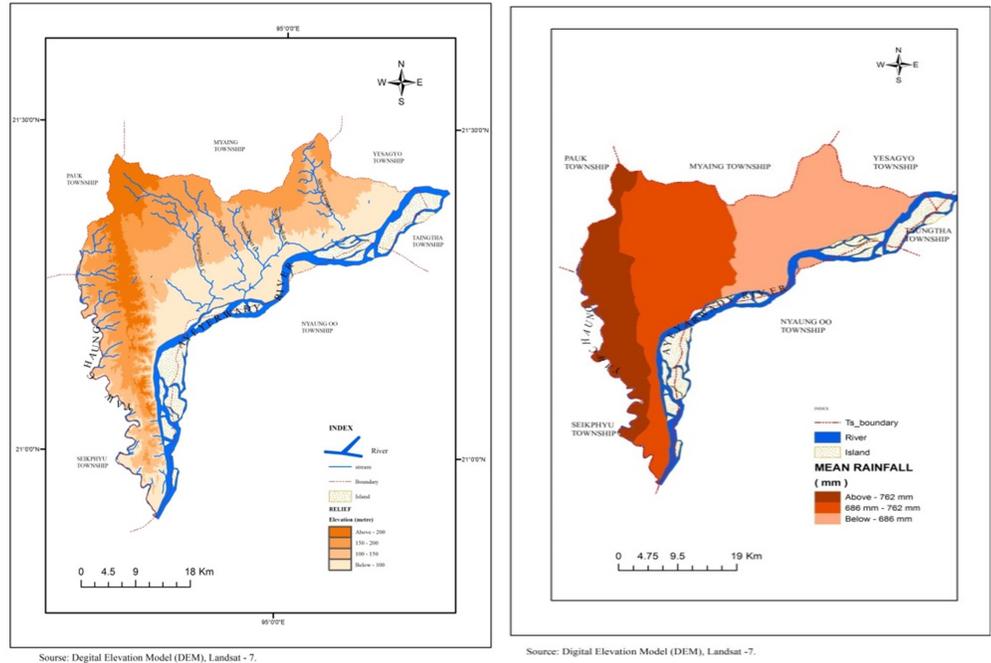
The average monthly rainfall of 30 years (1987-2016) of Pakokku Township inferred that the variation of rainfall is found in every month and intensity of rainfall is low from January to mid-April and suddenly increased to May. It is suddenly decreasing from mid-June to July. The highly intensity trends were noticed in the months of August to October which get the highest rainfall and it reached a maximum peak and it also started to decrease from the month of December and the lowest of rainfall was in the month of January See Fig (3).



Mean Annual Rainfall Using the Interpolation of Geographic Information System

According to figure (4), the long turn annual rainfall of Pakokku Township is 614.172mm (24.16) inches. The study area is characterized with unit of topography in quantum of rainfall due to the influence of the western part of the study areas. The maximum rainfall is 707.644mm (27.86) inches and minimum rainfall 681.99 mm (26.85) inches in this study area. Generally, the rainfall of study areas can be divided into three types as follow;

- (1) High rainfall zone with (Above – 762 mm) it is found in the Chaik, Shadu, Ahshaekanbu, Depya, Sanyaung, Myithphyar, Gawinledaing and Magyithonebin village tracts.
- (2) Moderate rainfall zone with (686 mm-762 mm) it is found in the Paungkwe, Sabe, Chaing, Yemyet, Nyaungbinhla, Yelagyi, Palan-O, Shinmakan, Myitche, Thayettaw, Nyaungbin, Nyaungghla , Pauktaw, Myoso, Kyatto, Seikkhawa and Lanywa village tracts.
- (3) Low rainfall zone with (below – 686 mm) it is found in the Kanyatgyi, Kandaw, Myokintha, Myinwin, Anaukmagyikan, Beywa, Shabinkine, Shabin, Kuywa, Kyagyun, Mezalebinkone, Tingat, Myinkyun, Kyunnyogyi, Leya, Kanhla, Chaukkan, Yelezidaw, Pakokkukyun, Letpanyun, Kokkohla, Kywede, Kyyiwa, Kuniya, Padinechone, Kaing, Magyipinpu, Shweda and Natkyun village tracts.



Source: Digital Elevation Model (DEM), Landsat - 7.

Source: Digital Elevation Model (DEM), Landsat - 7.

Figure-4 Relief and Mean Annual Rainfall
Using the Interpolation of Geographic Information System

CONCULTION

In the study area has temperature conditions, rainfall, variability of rainfall, variability of annual rainfall, Variation of Monthly Rainfall and Mean Annual Rainfall Using the Interpolation of Geographic Information System. According to the monthly temperature condition, the hottest month is May, its average mean temperature is (87.67°F) and average maximum temperature is (106.55°F) while average minimum temperature is (68.78°F). The coldest month is January, its average mean temperature is (69.58°F) and average maximum temperature is (86.92°F) while average minimum temperature is (52.24°F). The range of average mean temperature between the hottest month and the coldest month is (19.5°F). Pakokku Township is the hottest area in Magway Region. The temperature condition of Pakokku Township is considerably suitable for agricultural. Pakokku Township is a dry region of Myanmar. As for The rainfall condition from 1987 to 2016, the total amount of average normal rainfall is (614.172) mm (24.16) inches. The rainfall of study areas can be divided into three types as follow; High rainfall zone with (Above – 762 mm), Moderate rainfall zone with (686 mm-762 mm), Low rainfall zone with (below – 686 mm).

REFERENCES

1. Zhang, Q.; Xu, C.Y; and Zhang, Z. (2009). Observed changes of drought/wetness episodes in the Pearl River basin, China, using the standardized precipitation index and aridity index. *Theoretical and Applied Climatology*, 98(1-2), 89-99.
2. Antonic, O., J. Krizan, A. Marki, and D. Bukovec, 2001: Spatio- temporal interpolation of climatic variables over large region of complex terrain using neural networks, *Ecological Modelling* 138, 255- 263.
3. Hofstra, N., M. Haylock, M. New, P. Jones, and C. Frei, 2008: Comparison of six methods for the interpolation of daily European climate data, *Journal of Geophysical Research* 113, D21110, doi: 10.1029/2008JD010100.

Acknowledgements

I would like to extend the respectful gratitude to Dr Saw Phyone Naing (Rector, Sagaing University of Education)who gave me an opportunity to do this study. The authors would like to express their special gratitude to Dr. Mya Mya Than, Professor, Head of Geography Department, Sagaing University of Education and Dr. Win Win Nyunt, Associate Professor, Geography Department, Mandalay University for supervision, and guidance of this research paper. I am also deeply grateful to all our teachers and friends, for their love and patience and the Office staff from the department of land record and Sagaing township development committee for their necessary help in doing this paper.

ANALYSIS ON RAINFALL VARIABILITY OF PAKOKKU TOWNSHIP

A Research Paper
Sagaing University of Education

By

Daw Nu Nu Lwin (Assistant Lecturer)
Dr. Mya Mya Than (Head of Professor)
U Khin Maung Htaw (Assistant Lecturer)
Department of Geography
Sagaing University of Education

September, 2018