International Journal of Advanced Multidisciplinary Research
ISSN: 2393-8870
www.ijarm.com
(A Peer Reviewed, Referred, Indexed and Open Access Journal)
DOI: 10.22192/ijamr Volume 9, Issue 2 -2022

Research Article

DOI: http://dx.doi.org/10.22192/ijamr.2022.09.02.014

Assessment of Rainfall Variability and Precipitation Ratio of Tiruchirappalli District, Tamilnadu – Using GIS Techniques

C. Renganathan*, V. Emayavaramban, K. Kannadasan***, D. Vinotha***
Research Scholar*, Professor**, Guest Faculty***
Department of Geography, Madurai Kamaraj University, Madurai, Tamilnadu, India
*Corresponding Author: C. Renganathan, E-mail: *rengageodsm@gmail.com*

Keywords

Rainfall,
Variability,
Precipitation Ratio,
GIS,
Interpolation,
Rain gauge Station.

Abstract

The present study is to be assessed for rainfall variability and precipitation of the study area. The study area is geographically latitudinal extension is from 10^{o} 44'. 22"N to 10^{o} 53'. 04"N and longitudinal extension is from 78^{o}.37'.48"E to78^{o} 4'21"East, and the total. Area is 146.90 sq. kms with the average height of 78 m from mean sea level. Secondary data of rainfall 35 years (1986 - 2021) is taken for this study. The mean annual variability of the study area is calculated for the forty six rainfall gauge stations located in and around the study area. Coefficient of variability is calculated from the long term mean annual rainfall and standard deviation of the each rainfall station. GIS is the effective tool for locating the rainfall stations and analyze with the interpolation techniques of kriging methods to preparing a spatial distribution of variability and precipitation ratio.

Introduction

Rainfall is the important element of the global economy. Even though the monsoons affect most part of India, the amount of rainfall varies from very heavy to scanty on different parts. There is great regional and temporal variation in the distribution of rainfall. Over 80% of the annual rainfall is received in the four rainy months of June to September over the southern region of India. The average annual rainfall is about 125 cm. but it has great spatial variations. The average distribution of precipitation provides essential input for understanding the geo-hydro process. The role of multifarious topography in mountainous basins makes the spatial distribution of rainfall different than the plain areas. The variability depends on the type of climate and the length of the considered period (Dirk RAES K.U.Leuven). The spatial distribution of clouds and precipitation has long been recognized as having vital implications for the earth–atmosphere system.

Study Area

Tiruchirappalli district is a centrally located district in Tamil Nadu state, has an area of 4404 sq. km stretching between $10^0 10'$ and $11^0 20'$ of the Northern latitudes and $78^0 10'$ and $79^0 0'$ of Eastern latitudes. Altitude is 78m above sea level bounded by Namakkal and Perambalur district on the north, Thanjavur and Pudukkottai district on the east, Sivaganga, Madurai and Dindugal districts in the South and Karur district in the West. It is not only an Inland district without any coastalline but also most centrally located district in the state. The district has no marked natural divisions.

Data and Methodology

The secondary data sources of rainfall are taken from the State ground and surface water resources Data Centre, Chennai. The 35 years of data (1986 - 2021) is to be used for this analysis. A GIS Interpolation technique is used for this present Study. Data is scrutinized and located all stations with help of Arc GIS Desktop Platform.

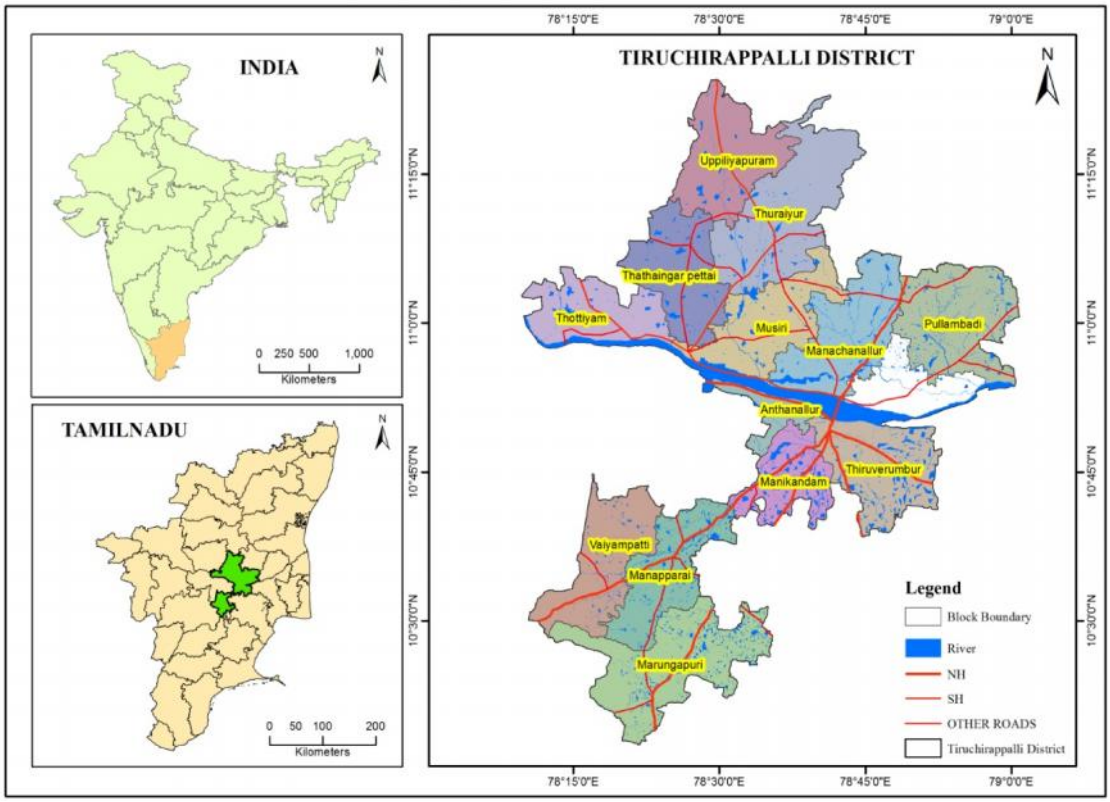

Figure No.1. Location map of the study Area.

Results and Discussion

Rainfall Variability

The coefficient of variation (CV) defined as the standard deviation divided by the mean value of rainfall. It shows the variability of rainfall in percentage. The higher the variability percentage, the lower is the dependability and vice versa. For the monthly case less than 100% of CV is dependable, while more than 100% not dependable rainfall.

$$CV = (SD/Mean) \times 100$$

where SD = Standard deviation. - 1

Mean Annual Variability

The mean annual variability of the study area is calculated for the forty six rainfall gauge stations located in and around the study area. Coefficient of variability is calculated from the long term mean annual rainfall and standard deviation of the each rainfall station. The annual variability is 56.82%. The mean annual variability of rainfall maximum found in the station Uppiliyapuram at 173.21 and manimum found in the Jayankondam at 33.36 percentage. The low variability (less than 45 %) is found in the Lalgudi, Trichy Town, Kulithalai, Kadavur, Perambalur, Thirumanur, Samayapuram, Nandiyar Head, Marungapuri, Trichy Junction, Pulivalam, Golden Rock, Trichy Airport, Sirukudi, Palaviduthi, Devimangalam, Ariyalur and Jayankondam. The Kallakudi(Pwd), Aravakurichy, Thuraiyur, Musiri, Kovilpatti, Ponneri Head, Ponnanaiyar Dam, Upper Anaicut, Karur, Senthurai, Kallakudi, Chettikulam, Pullambadi and Navalur Kuttapattu are covered with 45 – 55 percentage of variability. The annual variability range between 55 – 65 percentage is found in the following stations Thogaimalai, Panchapatti, K Paramathy, Musiri(Pwd), Kappampatti, Anai Palayam, Thathaiangarpet and Mayanur. More than 65 percentage of variability having in the stations are Uppiliyapuram, Chinnatharapuram, Siruhanur, Manaparai, Poongudi, Vembavur.

Table No. 1 Annual and Seasonal Rainfall Variability (1986 - 2021)

SI.No	Stations	Winter	Summer	NEM	SWM	Mean Annual
1	Trichy Airport	1.70	40.95	66.17	54.45	40.82
2	Trichy Town	4.27	44.60	69.02	57.84	43.94
3	Golden Rock	0.86	36.81	66.96	59.63	41.06
4	Trichy Junction	0.51	44.38	70.03	50.83	41.44
5	Upper Anaicut	10.27	42.02	63.00	74.49	47.44
6	Poongudi	1.45	60.31	176.83	104.67	85.81
7	NavalurKuttapattu	10.56	56.32	45.86	67.79	45.13
8	Musiri	2.49	40.57	70.83	92.82	51.68
9	Musiri(Pwd)	29.95	57.44	55.67	94.74	59.45
10	Pulivalam	1.53	32.31	60.60	70.70	41.29
11	Thathaiangarpet	6.58	37.52	96.32	85.94	56.59
12	Thuraiyur	4.52	44.12	68.39	91.78	52.20
13	Uppiliyapuram	0.00	0.00	0.00	692.82	173.21
14	Kappampatti	3.95	39.04	73.72	111.02	56.93
15	Lalgudi	12.28	41.51	60.43	62.25	44.12
16	Pullambadi	3.73	53.82	59.80	68.18	46.38
17	Nandiyar Head	10.26	40.24	62.90	53.54	41.73
18	Kallakudi	6.02	42.88	62.97	74.76	46.66
19	Kallakudi(Pwd)	3.28	29.51	74.06	111.87	54.68
20	Siruhanur	0.00	0.00	0.00	588.95	147.24
21	Samayapuram	0.10	37.89	61.92	67.41	41.83
22	Devimangalam	1.79	40.13	26.90	88.21	39.26
23	Sirukudi	1.89	37.63	23.68	98.91	40.53
24	Karur	3.06	38.27	76.39	70.55	47.06

25	Aravakurichy	0.47	42.92	92.58	81.57	54.38
26	K Paramathy	3.06	62.81	87.73	84.38	59.50
27	Anai Palayam	5.53	62.32	88.00	71.30	56.79
28	Chinnatharapuram	0.00	0.00	600.00	0.00	150.00
29	Kulithalai	1.06	35.64	63.53	72.54	43.19
30	Panchapatti	18.43	51.29	76.12	101.15	61.75
31	Mayanur	0.24	52.08	86.93	85.86	56.28
32	Kadavur	12.16	27.69	92.91	37.92	42.67
33	Palaviduthi	22.30	1.22	96.07	41.34	40.23
34	Thogaimalai	0.00	41.69	76.73	137.69	64.03
35	Manaparai	259.26	20.57	43.51	48.26	92.90
36	Marungapuri	1.77	23.04	67.53	73.57	41.48
37	Ponnanaiyar Dam	3.51	34.73	77.03	78.36	48.41
38	Kovilpatti	10.98	32.63	76.41	81.59	50.40
39	Ariyalur	11.55	34.67	62.30	45.14	38.42
40	Thirumanur	14.98	24.51	64.93	63.72	42.03
41	Senthurai	9.61	15.54	40.27	122.42	46.96
42	Jayankondam	13.02	25.08	46.26	49.09	33.36
43	Ponneri Head	20.93	20.05	54.90	102.41	49.57
44	Perambalur	1.10	39.03	61.74	68.25	42.53
45	Chettikulam	2.51	33.16	77.92	72.53	46.53
46	Vembavur	23.69	45.35	92.56	102.42	66.00

Source: State ground and surface water resources Data Centre, Chenna

Winter Rainfall Variability

The mean rainfall variability of winter season is 12.11% and varies from 5.00 % and 259.26% maximum variability found in Manaparai and minimum found in the Samayapuram. The low variability of less than 5 % of rainfall present in Thuraiyur, Trichy Town, Kappampatti, Pullambadi, Ponnanaiyar Dam, Kallakudi(Pwd), K Paramathy, Karur, Chettikulam, Musiri, Sirukudi, Devimangalam, Marungapuri, Trichy Airport, Pulivalam, Poongudi, Perambalur, Kulithalai, Golden Rock, Trichy Junction, Aravakurichy, Mayanur, Samayapuram, Uppiliyapuram, Siruhanur, Chinnatharapuram and Thogaimalai. The variability range 5 – 10 % of rainfall found in the places are Senthurai, Thathaiangarpet, Kallakudi, Anai Palayam. The range between 10 – 15 % of rainfall variability having in the Thirumanur, Jayankondam, Lalgudi, Kadavur, Ariyalur, Kovilpatti, Navalur Kuttapattu, Upper Anaicut and Nandiyar Head. More than 15 % of rainfall variability found in the following stations Manaparai, Musiri(Pwd), Vembavur, Palaviduthi, Ponneri Head and Panchapatti. The remaining stations are Uppiliyapuram, Siruhanur, Chinnatharapuram, Thogaimalai there is no rainfall variability in the winter season.

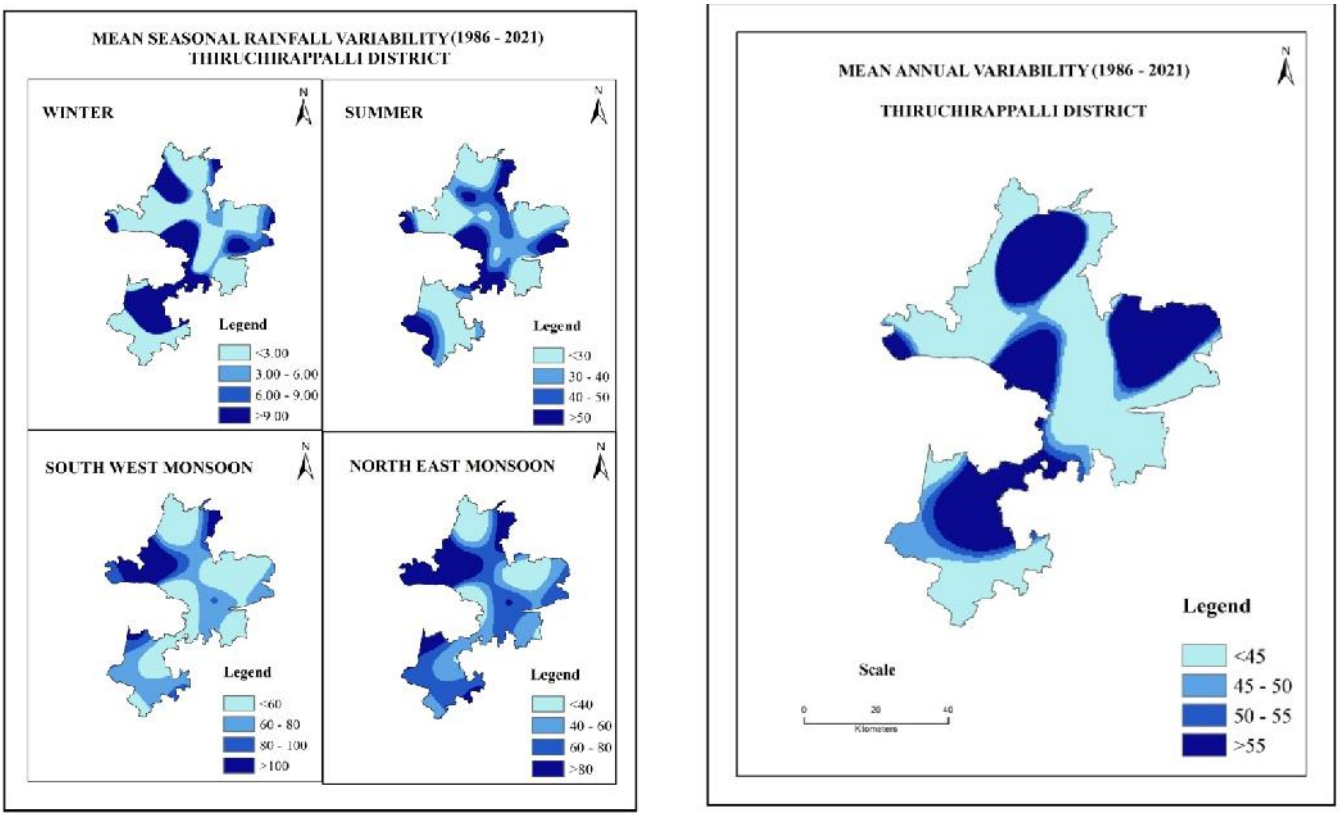

Figure No. 2 & 2.1 Mean Seasonal and Annual Variability of Rainfall

Summer Rainfall Variability

The summer variability of the study area is 36.18 percentages. It varies between 15.54 and 62.81 percentage of variability. The less than 30 percentage of variability found in the following stations Kallakudi(Pwd), Kadavur, Jayankondam, Thirumanur, Marungapuri, Manaparai, Ponneri Head, Senthurai and Palaviduthi. The Kappampatti, Perambalur, Karur, Samayapuram, Sirukudi, Thathaiangarpet, Golden Rock, Kulithalai, Ponnanaiyar Dam, Ariyalur, Chettikulam, Kovilpatti, Pulivalamthese stations are 30 – 40 percentage of variability range. The range between 40 – 50 percentage of rainfall variability has been found in the following stations Vembavur, Trichy Town, Trichy Junction, Thuraiyur, Aravakurichy, Kallakudi, Upper Anaicut, Thogaimalai, Lalgudi, Trichy Airport, Musiri, Nandiyar Head, Devimangalam. The more than 50 percentage of rainfall variability having in the stations are K Paramathy, Anai Palayam, Poongudi, Musiri(Pwd), Navalur Kuttapattu, Pullambadi, Mayanur and Panchapatti. The remaining 3 stations have there is no rainfall variability in the summer season.

Southwest Monsoon Rainfall Variability

The rainfall variability of the southwest monsoon is about 100.34%. The season contributes 40 % of total annual rainfall as equal to northeast monsoon. The rainfall variability of south west monsoon season the minimum found in Kadavur at 37.92% at and the maximum found in the Uppiliyapuram at 692.82 percentage. The less than 60 percentage of rainfall variability found in the places are Golden Rock, Trichy Town, Trichy Airport, Nandiyar Head, Trichy Junction, Jayankondam, Manaparai, Ariyalur, Palaviduthi, Kadavur. The variability range is 60 – 80 % of rainfall has been found in the following stations Ponnanaiyar Dam, Kallakudi, Upper Anaicut, Marungapuri, Kulithalai, Chettikulam, Anai Palayam, Pulivalam, Karur, Perambalur, Pullambadi, Navalur Kuttapattu, Samayapuram, Thirumanur and Lalgudi. The range between 80 – 100 percentage of rainfall variability occurs in the Sirukudi, Musiri(Pwd), Musiri, Thuraiyur,

Devimangalam, Thathaiangarpet, Mayanur, K Paramathy, Kovilpatti and Aravakurichy. The more than 100 percentage of rainfall variability found in the following stations Uppiliyapuram, Siruhanur, Thogaimalai, Senthurai, Kallakudi(Pwd), Kappampatti, Poongudi, Vembavur, Ponneri Head, Panchapatti. The Chinnatharapuram station have there is no rainfall variability in the south west monsoon season.

Northeast Monsoon Rainfall Variability

The variability of the northeast monsoon had shown the strength of the northeast monsoon. The rainfall variability of north east monsoon is about 78.66 %. The rainfall variability of north east monsoon season is the maximum found in the station Chinnatharapuram 600.00 % and the minimum found in the Sirukudi 23.68 percentage. The more than 90 percentage of rainfall variability has been found in the stations are Chinnatharapuram, Poongudi, Thathaiangarpet, Palaviduthi, Kadavur, Aravakurichy and Vembavur. The range between70 – 90 and 50 – 70 percentage of rainfall variability having in the stations are Anai Palayam, K Paramathy, Mayanur, Chettikulam, Ponnanaiyar Dam, Thogaimalai, Kovilpatti, Karur, Panchapatti, Kallakudi(Pwd), Kappampatti, Musiri, Trichy Junction, Trichy Town, Thuraiyur, Marungapuri, Golden Rock, Trichy Airport, Thirumanur, Kulithalai, Upper Anaicut, Kallakudi, Nandiyar Head, Ariyalur, Samayapuram, Perambalur, Pulivalam, Lalgudi, Pullambadi, Musiri(Pwd) and Ponneri Head. The less than 50 percentage of rainfall variability is occurs in the Jayankondam, Navalur Kuttapattu, Manaparai, Senthurai, Devimangalam and Sirukudi. The Uppiliyapuram and Siruhanur these two stations have there is no rainfall variability in the north east monsoon season.

Precipitation Ratio

The abnormalities of rainfall at a specific region can be drawn through a simple ratio of precipitation. The ratio may give the stability of rainfall with spatial pattern. Higher the ratio is the higher the abnormality in rainfall and the lower in ratio indicates the less anomaly. The formula used to calculate precipitation ratio is as follow.

Precipitation Ratio = (Px – Pn)/Pm x 100

Where: Px = Maximum of Rainfall,
Pn = Minimum of Rainfall and Pm is the mean rainfall.
Pm = Average of rainfall

Winter Precipitation Ratio

During the winter season the average precipitation ratio of this region is 96.75%, it varies at maximum of 1889.20% at Manaparai and minimum of 0.69% at Kallakudi. The more than 90% of precipitation ratio has been found in the following zones Manaparai, Thirumanur, Ariyalur, Lalgudi, Musiri(Pwd), Ponnanaiyar Dam, Trichy Airport, Golden Rock, Nandiyar Head, Perambalur. The range between 60 – 90 percentage of precipitation ratio having in the Pullambadi, Trichy Junction, Trichy Town, Marungapuri, Ponneri Head, Mayanur, Chettikulam, Thuraiyur and Musiri. The Kulithalai, Aravakurichy, Samayapuram, Karur, Vembavur, K Paramathy, Anai Palayam, Navalur Kuttapattu, Kadavur, Upper Anaicut and Thathaiangarpet these stations are found in the range of 30 – 60 percentages of precipitation ratios. Less than 30 percentage of precipitation ratio found in the following stations they are Panchapatti, Kovilpatti, Kallakudi(Pwd), Palaviduthi, Kappampatti, Senthurai, Devimangalam, Sirukudi, Uppiliyapuram, Siruhanur, Chinnatharapuram, Thogaimalai, Poongudi, Pulivalam, Kallakudi.

Table No. 2 Precipitation Ratio (1986 - 2021)

1	Trichy Airport	102.37	128.18	148.84	133.35	140.88
2	Trichy Town	76.61	139.44	154.95	133.40	143.39
3	Golden Rock	99.63	115.82	147.56	131.19	137.68
4	Trichy Junction	83.39	133.39	150.30	127.53	138.39
5	Upper Anaicut	33.86	102.90	114.20	112.00	112.93
6	Poongudi	1.08	43.61	52.59	45.22	50.22
7	Navalur Kuttapattu	41.88	70.35	34.43	69.77	61.55
8	Musiri	60.29	115.97	116.64	119.57	120.20
9	Musiri(Pwd)	130.22	167.36	123.11	133.47	138.54
10	Pulivalam	0.82	94.14	58.36	76.43	74.29
11	Thathaiangarpet	32.36	117.89	92.48	97.21	100.20
12	Thuraiyur	61.59	175.14	154.24	127.02	143.96
13	Uppiliyapuram	2.78	8.54	10.13	0.03	0.02
14	Kappampatti	17.49	137.58	128.45	137.73	134.39
15	Lalgudi	145.98	136.97	161.17	152.95	157.56
16	Pullambadi	87.55	138.24	135.22	147.73	144.36
17	Nandiyar Head	97.37	113.01	114.69	144.44	133.08
18	Kallakudi	0.69	4.67	0.01	20.94	15.69
19	Kallakudi(Pwd)	18.83	100.86	108.39	146.00	127.29
20	Siruhanur	2.78	8.54	10.13	0.99	0.50
21	Samayapuram	52.14	102.84	107.44	111.64	111.20
22	Devimangalam	4.10	137.17	69.18	152.32	121.66
23	Sirukudi	4.10	140.36	59.83	145.27	115.45
24	Karur	49.64	132.63	97.77	82.21	96.93
25	Aravakurichy	56.36	126.68	64.14	80.99	84.74
26	K Paramathy	43.76	145.28	89.11	91.72	100.27
27	Anai Palayam	42.81	129.76	67.83	78.28	84.48
28	Chinnatharapuram	2.78	8.54	9.89	1.24	0.55
29	Kulithalai	58.78	98.03	96.29	117.81	110.26
30	Panchapatti	26.81	33.04	27.05	51.24	44.46
31	Mayanur	71.42	142.09	112.93	103.26	114.54
32	Kadavur	38.71	17.58	8.81	14.68	18.52
33	Palaviduthi	18.42	7.08	11.53	28.87	24.45
34	Thogaimalai	2.78	43.58	46.79	64.71	57.97
35	Manaparai	1889.20	144.84	154.90	141.35	216.04
36	Marungapuri	75.63	98.22	121.08	104.08	112.17
37	Ponnanaiyar Dam	123.99	149.31	132.15	132.66	138.56
38	Kovilpatti	26.00	36.82	49.97	67.47	60.62
39	Ariyalur	152.74	121.84	166.34	167.84	165.06
40	Thirumanur	159.79	79.59	140.95	152.77	143.98
41	Senthurai	7.14	0.56	26.27	37.18	32.22

42	Jayankondam	186.34	83.45	184.63	197.09	182.15
43	Ponneri Head	73.73	5.73	36.99	61.67	51.23
44	Perambalur	96.99	100.40	129.70	144.09	136.22
45	Chettikulam	63.59	94.35	123.83	118.15	119.21
46	Vembavur	47.42	22.75	33.46	39.19	39.96

Summer Precipitation Ratio

During the summer season the average precipitation ratio of the study area is 91.39 %. It varies between 0.56% and 175.14 %. The lower category of less than 60 percentage of precipitation ratio is found in Poongudi, Thogaimalai, Kovilpatti, Panchapatti, Vembavur, Kadavur, Uppiliyapuram, Siruhanur, Chinnatharapuram, Palaviduthi, Ponneri Head, Kallakudi and Senthurai. The category 60 – 100 percentage having in the areas of Marungapuri, Kulithalai, Chettikulam, Pulivalam, Jayankondam, Thirumanur, Navalur Kuttapattu. The range between 100 – 140 percentage of precipitation ratio is found in the following areas Trichy Town, Pullambadi, Kappampatti, Devimangalam, Lalgudi, Trichy Junction, Karur, Anai Palayam, Trichy Airport, Aravakurichy, Ariyalur, Thathaiangarpet, Musiri, Golden Rock, Nandiyar Head, Upper Anaicut, Samayapuram, Kallakudi(Pwd) and Perambalur. The more than 140 % of summer precipitation ratio is having in the Thuraiyur, Musiri(Pwd), PonnanaiyarDam, K Paramathy, Manaparai, Mayanur and Sirukudi.

Southwest Precipitation Ratio

Southwest monsoon season is an important monsoon season for the study area. The southwest monsoon season the average precipitation ratio is 90.97%, which is lesser than other three seasons. The precipitation ratio varies between 8.81 % and 184.63%. The maximum amount of precipitation ratio is found in Jayankondam, Ariyalur, Lalgudi, Trichy Town, Manaparai, Thuraiyur and Trichy Junction. This range between 100 – 150 percntage of precipitation ratio having in the following stations Trichy Airport, Golden Rock, Thirumanur, Pullambadi, Ponnanaiyar Dam, Perambalur, Kappampatti, Chettikulam, Musiri(Pwd), Marungapuri, Musiri, Nandiyar Head, Upper Anaicut, Mayanur, Kallakudi(Pwd), Samayapuram. The Karur, Kulithalai, Thathaiangarpet, K Paramathy, Devimangalam, Anai Palayam, Aravakurichy, Sirukudi, Pulivalam, Poongudi these stations are found in the 50 – 100 percentage of precipitation ratio. The lower category of less than 50 percentage of precipitation ratio has been found in the following areas, Kovilpatti, Thogaimalai, Ponneri Head, Navalur, Kuttapattu, Vembavur, Panchapatti, Senthurai, Palaviduthi, Uppiliyapuram, Siruhanur, Chinnatharapuram, Kadavur and Kallakudi.

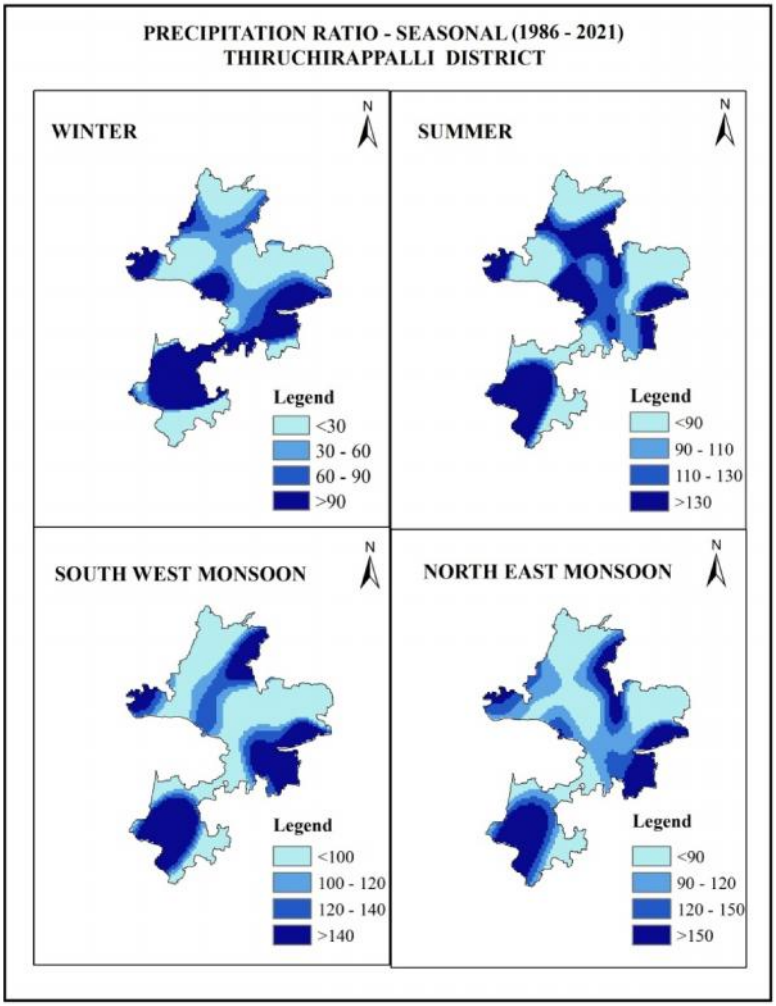

Figure No.3. Seasonal Mean Precipitation Ratio

Northeast Precipitation Ratio

Northeast monsoon equally shares 40% rainfall as southwest monsoon to the total annual rainfall. The seasonal average precipitation is 98.80% prevails in this region during this period. The northeast precipitation ratio varies between Siruhanur at minimum 0.99% and Jayankondam at maximum 197.09%. More than 150 percentage of precipitation ratio having in the Jayankondam, Ariyalur, Lalgudi, Thirumanur and Devimangalam. The categories 120 – 150 and 90 – 120 percentage occupies in the Pullambadi, Kallakudi(Pwd), Sirukudi, Nandiyar Head, Perambalur, Manaparai, Kappampatti, Musiri(Pwd), Trichy Town, Trichy Airport, Ponnanaiyar Dam, Golden Rock, Trichy Junction, Thuraiyur, Musiri, Chettikulam, Kulithalai, Upper Anaicut, Samayapuram, Marungapuri, Mayanur, Thathaiangarpet and K Paramathy. The lower category of less than 90 percentage occupies the Karur, Aravakurichy, Anai Palayam, Pulivalam, Navalur, Kuttapattu, Kovilpatti, Thogaimalai, Ponneri Head, Panchapatti, Poongudi, Vembavur, Senthurai, Palaviduthi, Kallakudi, Kadavur, Chinnatharapuram, Siruhanur and Uppiliyapuram.

Mean Annual Precipitation Ratio

The mean annual precipitation ratio of the study area is 99.09% the ratio calculated from the monthly mean of the respective season, it varies between 15.69 % minimum at Kallikudi and 216.04% maximum at Manaparai. The lower category less than 60% of precipitation ratio is found in the Thogaimalai, Ponneri Head, Poongudi, Panchapatti, Vembavur, Senthurai,

Palaviduthi, Kadavur, Kallakudi, Chinnatharapuram, Siruhanur, Uppiliyapuram. The range between 60 – 100 percentage having in the Karur, Aravakurichy, Anai Palayam, Pulivalam, Navalur, Kuttapattu, Kovilpatti. The majority of the area under range between 100 – 140 percentage occupies in the Ponnanaiyar Dam, Musiri(Pwd), Trichy Junction, Golden Rock, Perambalur, Kappampatti, Nandiyar Head, Kallakudi(Pwd), Devimangalam, Musiri, Chettikulam, Sirukudi, Mayanur, Upper Anaicut, Marungapuri, Samayapuram, Kulithalai, K Paramathy and Thathaiangarpet. More than 140 percentage of precipitation ratio has been found in the following stations are Manaparai, Jayankondam, Ariyalur, Lalgudi, Pullambadi, Thirumanur, Thuraiyur, Trichy Town and Trichy Airport.

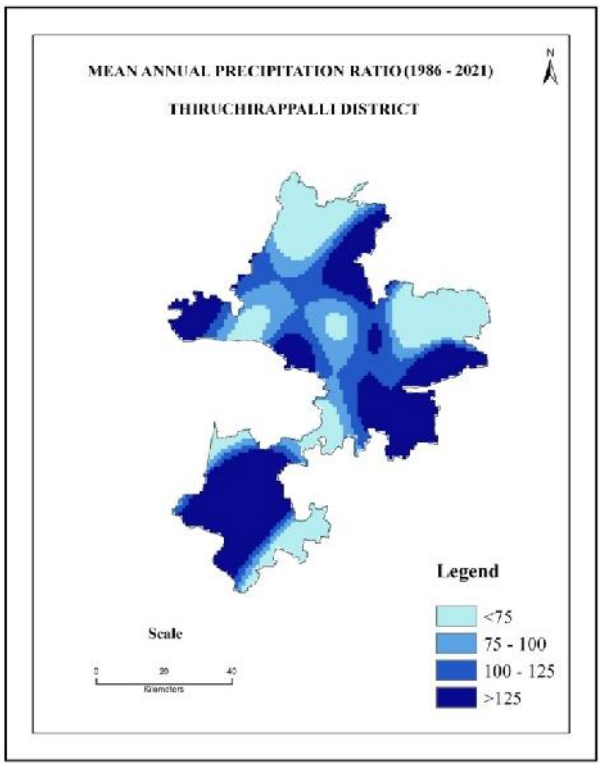

Figure No. 4 Mean Annual Winter Precipitation Ratio

Conclusion

The study area Tiruchirappalli district has received good annual and seasonal rainfall. The study area receives total average rainfall is 73.37 mm and annual average rainfall is 1.60 mm. The annual variability is 56.82%. The mean annual variability of rainfall maximum found in Uppiliyapuram station at 173.21 mm. The mean rainfall variability of winter season is 12.11% and varies from 5.00 % and 259.26% maximum variability found in Manaparai. The summer variability of the study area is 36.18 percentages. It varies between 15.54 and 62.81 percentage of variability. Rainfall variability of the southwest monsoon is about 100.34%. The season contributes 40 % of total annual rainfall as equal to northeast monsoon. The rainfall variability of south west monsoon season the minimum found in Kadavur at 37.92%. The variability of the northeast monsoon had shown the strength of the northeast monsoon. The rainfall variability of north east monsoon is about 78.66 %. The rainfall variability of north east

monsoon season is the maximum found in the station Chinnatharapuram 600.00 %. Based on the rainfall and other climatic parameter is much suitable for agricultural practices. All over the district the ground water sources for both drinking and domestic purposes is well in condition.

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DOI:10.22192/ijamr.2022.09.02.014	

How to cite this article:
C. Renganathan, V. Emayavaramban, K. Kannadasan, D. Vinotha. (2022). Assessment of Rainfall Variability and Precipitation Ratio of Tiruchirappalli District, Tamilnadu – Using GIS Techniques. Int. J. Adv. Multidiscip. Res. 9(2): 172-183.
DOI: http://dx.doi.org/10.22192/ijamr.2022.09.02.014