IJCRT.ORG ISSN : 2320-2882

INTERNATIONAL JOURNAL OF CREATIVE RESEARCH THOUGHTS (IJCRT)

An International Open Access, Peer-reviewed, Refereed Journal

Deforestation And Impact On Environmental Deterioration-Emerging Degradation For Sustainable Development In Manipur

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Abstract

In recent decades, our mother Earth has been experiencing climate change beyond human activities due to disturbances within the natural balance of greenhouse gases, which maintains the earth's temperature at a traditional habitable level. Regional Climate Changes, particularly the temperature rise are affecting many natural and human systems. The climate of Manipur is influenced by the topographical features and enjoys tropical and sub-tropical kind of climates; where wet in summer and dry in winter. Besides, location, altitude, topography, the direction of the prevailing winds and seasonal rhythm etc., are the factors controlling the temperature of the state. The paper aims to seek out the causes of emerging environmental degradation and becoming serious blows to global climate change and water shade management within the state.

Keywords: Climate Changes, Greenhouse effects, Topographical Features, Prevailing Winds, Deforestation, Water shade Management

Introduction

Topographically, hills and mountains surround Manipur, which occupies about 20,089 sq km constituting about 90 percent of the total land area of the state, and remaining only a small area of 1,843 sq km (8.25 percent), is a plain or intermontane basin. The climate of Manipur is controlled by the Himalayan ranges with their extension up to Myanmar, the nice air currents of winter and summer, western disturbances from the southwestern summer monsoon, predominance of the air mass, mountain and valley winds of the region, and extensive water bodies from the Bay of Bengal and Loktak lake. Manipur experiences sub-tropical monsoon climate. The greater part of Manipur falls under Koppen's CWG climate with hot and wet summers and cold and dry winters. The seasonal variability of weather including its characteristics is felt within the state because of the impact of terrain diversity, altitudinal variation, forest cover, etc. Manipur comes under the Himalayan Biodiversity Hotspot and Indo-Burma Biodiversity Hotspot, which are rich in bio-diversity Manipur enjoyed moderate and pleasant temperatures throughout the years ranging from 21-29 degrees Celsius from 1953 to 1998 and continued to record soaring temperatures within the following decades. There are overwhelming problems of emerging environmental degradation within the state because of deforestation due to jhuming cultivation and extensive firewood within the surrounding jungles. There is uncertain consensus and evidence that slash/shifting or jhuming cultivation causes ecological threshold within the state. The impacts of temperature change are occurring faster than many scientists have predicted.

Objectives

The objective of the study is to examine the paradigm of climate change in the state and situation and geo-hydrological environment conditions of the river basin areas. One of the main objectives of this research paper is to examine the emerging critical issues on the relationship between climate change and deforestation as well as the crisis shortage of water in the state. The study would provide an overview of people's perceptions regarding deforestation and its impact on climate change and environmental degradation under the direct influence of anthropogenic activities.

STUDY AREA

Manipur is an isolated hill-girt and a picturesque state in the extreme north-eastern border of India. It is located at the extreme side of the Himalayan Purbanchal (Chatterjee, 1965) region along the Indo-Myanmar border with Imphal, a flower on lofty heights, as the state capital. The state is bounded by Nagaland in the north, Mizoram in the south, Myanmar in the east, and the Cachar district of Assam in the west. The state lies between 92°58'E to 94°45'E longitudes and 23°50'N to 25°42'N latitudes with a total geographical area of 22,327 sq. km. of which a very important plain of 1,843 sq. km. being only about 8.3 percent of the whole area of the state constitutes the central plain. The hills and mountains cover 20,484 sq. km. (91.7 percent). Manipur valley stands at a height of 790 meters to 2020 meters from the MSL and therefore, the valley of gorgeous oval shaped with fertile alluvial plain is of lacustrine formation. The mountain ranges act as a barrier to the cold winds from the north and prevent the Cyclonic storms that originate from the Bay of Bengal.

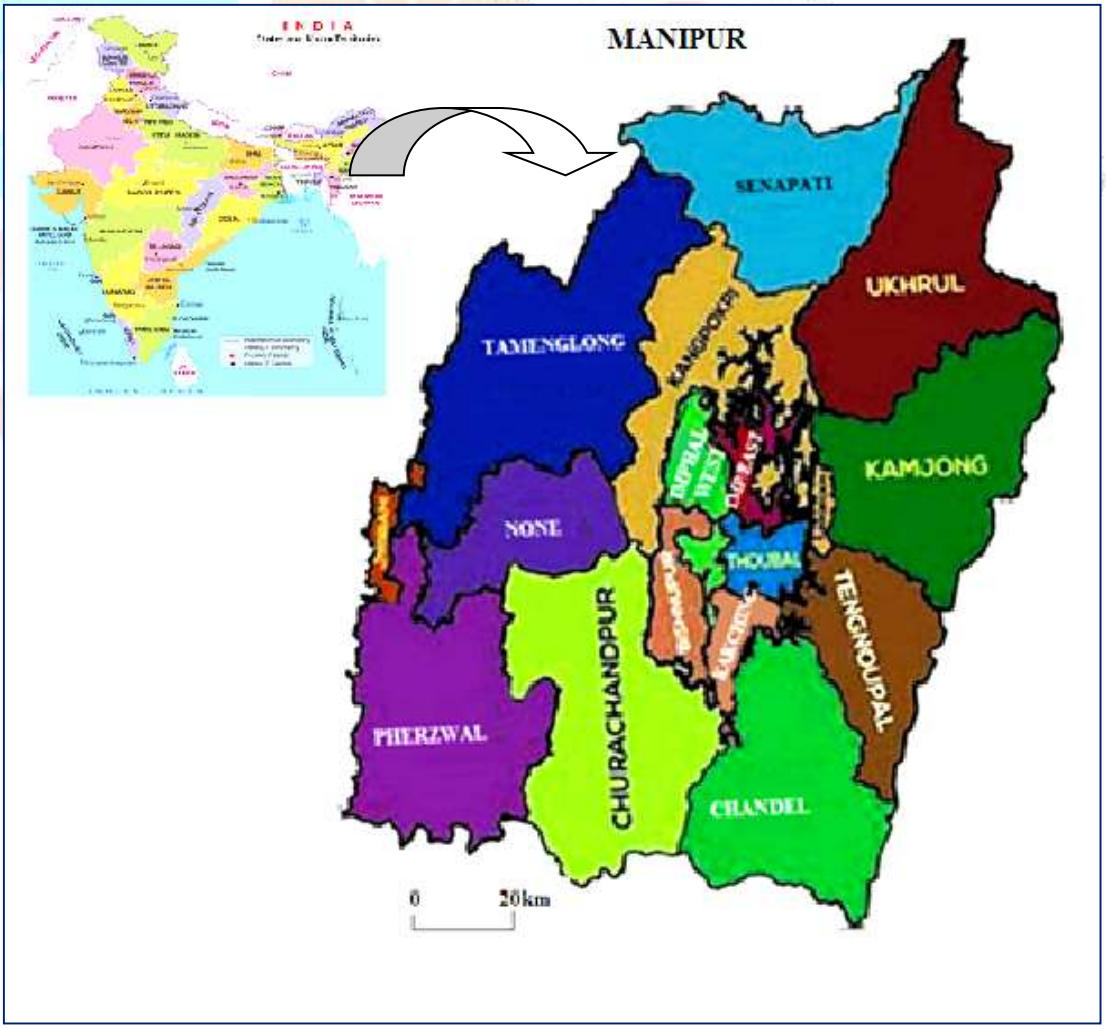

Fig.1

REVIEW OF LITERATURE:

Adverse Effects of Deforestation on Environment

Deforestation is one in every outcome of urbanization having the character of extensional development and deforestation may indeed be a havoc wreaked by thoughtless destruction in development. As the population increased, more forests have been cleared to fulfill the wants for various uses of habitats, agriculture, transportation, tourism, industries, etc. Additionally, the commercial exploitation of forests is the main reason for deforestation. Deforestation resulted in several problems; encompassing environmental degradation through accelerated rate of soil erosion, increase within the sediment load of the rivers, siltation of reservoirs anti riverbeds, increase in the frequency, decrease in agricultural production because of loss of fertile top soils, dimension of floods and droughts. These influences are within the pattern of distribution of precipitation, intensification of greenhouse effects, and increase in the destructive force of the atmospheric storms, etc. Carbon emission from fire is a consequence of deforestation released to the atmosphere those divisors to the environment. Most of the carbon is released to the atmosphere as carbon dioxide, but small amounts of methane and carbon monoxide gas may additionally be released with the decomposition or burning of forest fires.

Deforestation also results in the rise of the concentration of greenhouse gas within the atmosphere because forests consume carbonic acid gas during the processes of photosynthesis for the manufacturing of their food. However, the absence of forests allows more concentration of carbon dioxide in the atmosphere due to its consumption. It is, thus, obvious that deforestation increases atmospheric phenomena, which raises the temperature of the earth's surface and atmosphere, especially the biosphere. In line with the Forest Report, 2013 by the Forest Survey of India (FSI), Deharadun, and the forest cover of Manipur is 16,900 sq. km as against 17,280 sq km in 2009, reducing 380 sq km. Churachandpur and Ukhrul, hill districts of Manipur are covered with open forests. Whereas, Tamenglong district in Manipur is covered with dense and moderate forest (table. 1). The total forest cover in Manipur, as assessed by FSI, an area in sq km has dramatically decreased during two decades from 17685 sq km in 1991 to 16296 in 2001 and fortunately increased to 353 sq km in 2003 (Table-1).

Table-1
District-wise Forest Area in Manipur

District	*Geogra-phical Area*	*Forest Cover(Area in '000 hectare)*				*%*
		Very Dense	*Moderately Dense*	*Open Forest*	*Total*	
Senapati	3,271	233	940	1,130	2,303	70.41
Tamenglong	4,391	264	1,584	2,063	3,911	89.07
Churachandp	4,570	37	1,169	3,068	4,274	93.52
Chandel	3,313	0	734	2,065	2,799	84.49
Ukhrul	4,544	167	976	2,504	3,647	80.26
Imphal East	669	0	43	173	216	32.29
Imphal West	559	0	24	30	54	9.66
Bishnupur	496	0	0	20	20	4.03
Thoubal	514	0	4	52	56	10.89
Total	22,327	701	5,474	11,105	17,28	72.40

Source: Economic Survey of Manipur, (2014-15): Directorate of Economics & Statistics, Government of Manipur

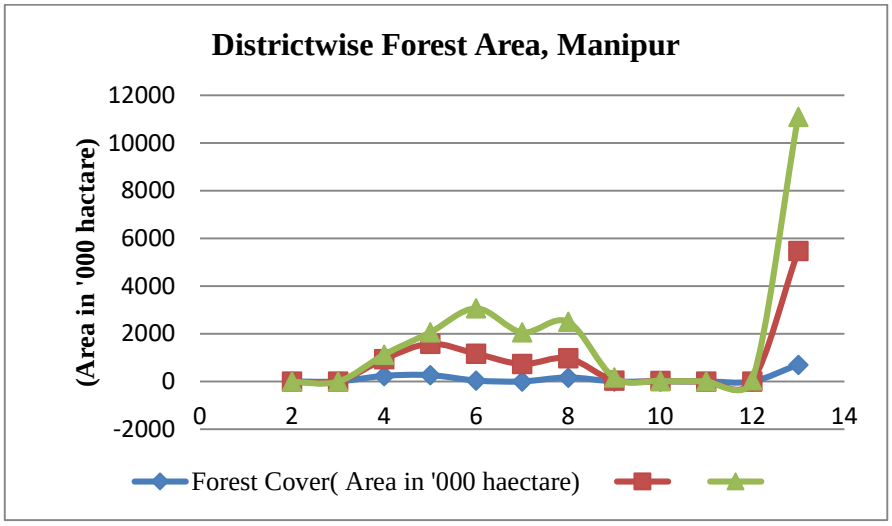

Fig-1

Table 2: Changes in Forest Cover: 1991-2001

	Years	Area (sq. km.)*
Forest cover as assessed by FSI	1991	17685
	1993	17621
	1995	17558
	1997	17418
	1999	17384
	2001	16926
	2003	17219
Changes between years	1991-93	- 64
	1993-95	- 63
	1995-97	-
	1997-99	- 34
	1999-2001	+ 34
	2001-03	+29
	1991-2003	-466

* The negative figures indicate decrease during the periods under consideration. Sources: FSI various issues.

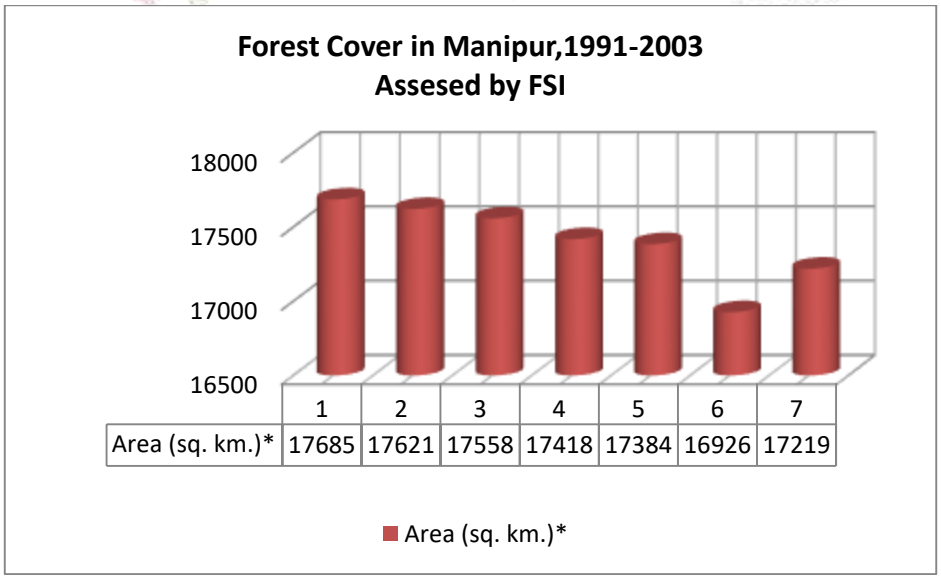

Fig-2

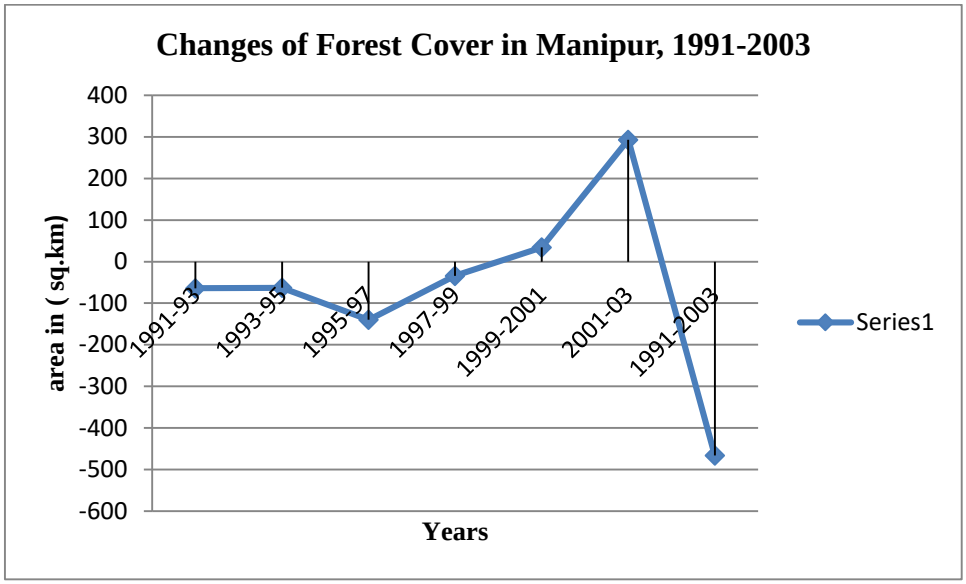

Fig-3

DISCUSSION:

Climate Change in Manipur

The impact of deforestation on environmental degradation can be seen slowly within the type of micro-climatic change, increase in temperature and reduction in rainfall, soil erosion, and increase in the frequency of floods and landslides, loss of soil fertility, mudflow, etc. In the past, Manipur enjoyed moderate and pleasant temperatures with six months of winter and summer every year, receiving regular rainfall and normal temperatures. During 1953-1998, the Meteorological Observatory Unit in Imphal recorded a maximum temperature of 21oC-29oC. On April 14, 1999, Imphal recorded a temperature of 36 degrees centigrade, which was the highest in the history of Manipur. On April 21, 2014, the unit recorded 35.6 degrees Celsius, the highest since 1999 (April 22, 2014, Times of India) (Table 3). On May 21, 2015, Manipur had another record of soaring temperature at Moreh Town in Chandel District 39.4 degrees Celsius, the utmost since 1952 (May 2015). All these lead to unaccountable destruction and pose serious ecological problems. Serious efforts have to be made to shield and conserve forests at both government and public levels. Due attention should be given to forest management. Forest or natural vegetations protect the ground surface from erosion caused by falling raindrops and controls the radiation balance of the Earth's surface and also the atmosphere by consuming increased amounts of CO2 released from the environment degrading anthropogenic activities and thus preventing the world from becoming too hot. However, Manipur is industrially backward; the state is liable to anthropogenic greenhouse gas (GHG) emissions from forest fires, shifting cultivation, and settlements. Manipur state is susceptible to anthropogenic greenhouse gas (GHG) emissions. The dataset of surface temperature variation observed during 1954-2011 shows an increasing trend in both the minimum and maximum temperatures. When the maximum temperature has increased from 26.5 to 27.3 degrees Celsius, the minimum temperature has risen from 13.0 to 15.3 degrees Celsius. The climate varies per the elevations of the landforms in the state. The weather in the plains is, however, similar to that of the other states in the country. However, the hilly regions are different and reveal a pleasing climate with dry and low temperatures. The weather in the state is very influenced by the winds blowing from the Bay of Bengal and is conducive to heavy rainfall in the rainy season.

Anthropogenic activities against the natural environment result in severe deterioration of our ecology, making the blanket of greenhouse gas thicker, leading to enhanced atmospheric phenomenon, and wishes to avoid wasting our mother earth with safety enhancements. Carbon emissions from fossil fuels like coal, gas, and oil burning in factories, power stations, and industries increased from about 1600 million tonnes of CO2 in 1950 to 6000 million tonnes in 2000. Deforestation in extensive areas within the surrounding hills mainly for shifting cultivation, construction of roads, extension of settlement areas, and firewood are the prime factors that influenced the direct results of temperature rising and environmental degradation in the state.

Table-3
Year wise minimum and maximum temperature in Manipur, 2011-18

year		Temperature	Humidity	Pressure
2018	High	33 °C (18 Sep, 14:30)	98% (2 Sep, 05:30)	1014 mbar (2 Sep, 05:30)
	Low	21 °C (30 Sep, 05:30)	57% (16 Sep, 14:30)	997 mbar (18 Sep, 14:30)
	Average	26 °C	80%	1006 mbar
2017	High	34 °C (19 Sep, 11:30)	100% (13 Sep, 05:30)	1012 mbar (13 Sep, 05:30)
	Low	21 °C (17 Sep, 05:30)	60% (25 Sep, 11:30)	999 mbar (25 Sep, 14:30)
	Average	25 °C	87%	1006 mbar
2016	High	35 °C (6 Aug, 23:30)	98% (1 Aug, 05:30)	1014 mbar (1 Aug, 05:30)
	Low	21 °C (26 Aug, 05:30)	27% (6 Aug, 23:30)	994 mbar (15 Aug, 14:30)
	Average	26 °C	83%	1002 mbar
2015	High	34 °C (26 Jul, 17:30)	100% (9 Jul, 05:30)	1007 mbar (9 Jul, 05:30)
	Low	20 °C (31 Jul, 05:30)	58% (13 Jul, 14:30)	995 mbar (5 Jul, 14:30)
	Average	25 °C	85%	1002 mbar
2014	High	35 °C (20 Apr, 14:30)	98% (5 Apr, 05:30)	1016 mbar (5 Apr, 05:30)
	Low	13 °C (13 Apr, 05:30)	21% (20 Apr, 14:30)	1001 mbar (24 Apr, 14:30)
	Average	25 °C	59%	1008 mbar
2013	High	34 °C (4 Aug, 14:30)	100% (3 Aug, 11:30)	1007 mbar (3 Aug, 11:30)
	Low	22 °C (1 Aug, 05:30)	61% (24 Aug, 14:30)	995 mbar (25 Aug, 14:30)
	Average	26 °C	85%	1003 mbar
2012	High	35 °C (29 May, 4:30)	98% (1 May, 05:30)	1011 mbar (1 May, 05:30)
	Low	15 °C (1 May, 05:30)	37% (8 May, 14:30)	995 mbar (27 May, 17:30)
	Average	26 °C	72%	1004 mbar
2011	High	33 °C (31 Aug, 14:30)	99% (9 Aug, 05:30)	1009 mbar (9 Aug, 05:30)
	Low	22 °C (25 Aug, 05:30)	58% (30 Aug, 14:30)	995 mbar (1 Aug, 14:30)
	Average	26 °C	85%	1003 mbar

Source: Imphal, Weather by Custom Weather, © 2018

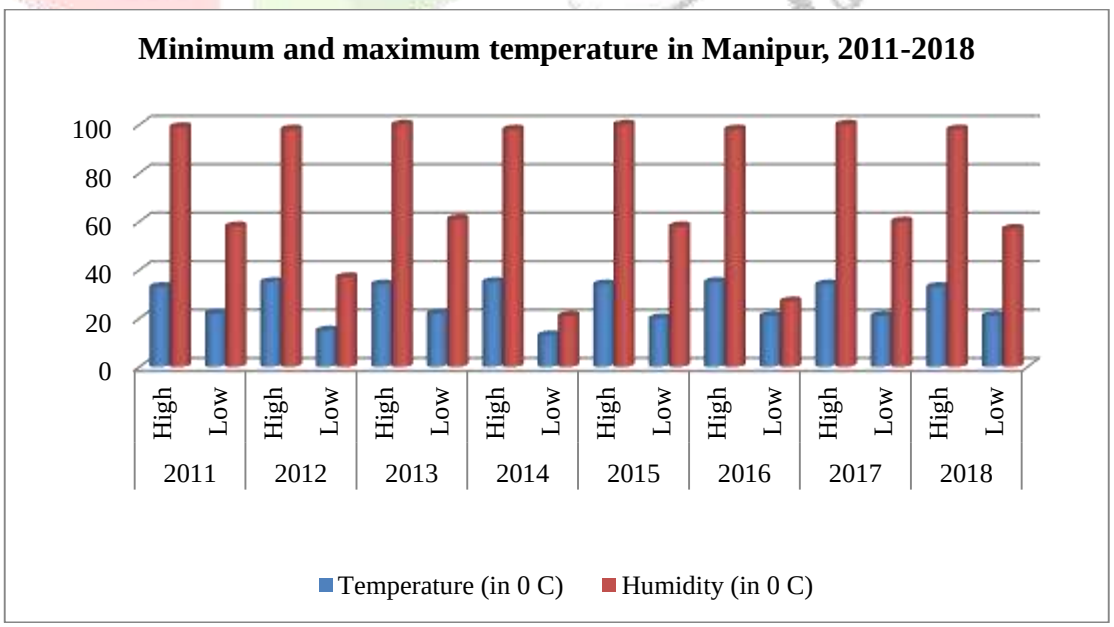

Fig-4

Changing Pattern of Rainfall:

The NE region falls under a high rainfall zone with a subtropical type of climate. However, under the influence of global climate change, the high rainfall areas are currently facing drought-like situations. Droughts and floods are the adverse atmospheric conditions arising out of deficit and excess rainfall and the impact of global climate change is visible in Manipur. Manipur recorded 2268 milliliters of rainfalls in 1999, which declined the subsequent year to 1854. The downward trend continued in 2009 with only 1027 milliliters (ml) of rainfall, 1500 ml in 2011, and only 6 ml recorded till February 2012. In keeping with the Forest Survey of India, forest areas of Manipur in 1987 were 79.21 percent whereas the said size shrunk to 76.54 in 2011. As a result of deficit rainfall and loss of forest cover, and with increased dry spells, the catchment areas of important rivers have been shrunken as a result, there's the occurrence of scarcity of water for agriculture, drinking, and other domestic purposes within the geographic region. Consequently, many rare species of the flora and fauna found abundantly within the forests are now in an exceeding state of extinction and therefore the natural beauty and charm of this little state have virtually been reduced to a near barren land infested by human moth. According to the Indian Council of Agricultural Research (ICAR) Manipur, the state by the end of September had received 1,181 mm of rainfall against the annual average, which is 1,600 mm and a 34 percent rainfall deficit in 2018. Water scarcity emerged as a daily phenomenon in Manipur, considered in concert as one of the rainiest places on Earth. Increased privatization of water services is already an obvious reality in Manipur. However, under the influences of global climate change, the high rainfall areas are now facing drought-like situations. Droughts and floods are the adverse climate arising out of deficit and excess rainfall and such impact of global climate change has appeared in Manipur. Manipur recorded 2268 milliliters of rainfalls in 1999, which declined the following year to 1854. The downward trend continued in 2009 with only 1027 milliliters (ml) of rainfall, 1500 ml in 2011, and only 6 ml recorded till February 2012. According to the Forest Survey of India, forest areas of Manipur in 1987 were 79.21 percent however, the said size shrunk to 76.54 in 2011.

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Rainfall:

The annual rainfall follows an up and downtrend and shows a decreasing trend, gradually within the beginning of the 21st century. The fluctuation has been from 1167.2mm to 2077.9mm between 1959 and 2003. In 1983 and 1993, the annual rainfall was about 2000mm and in 1997, the quantity of rainfall lowered all the down to 1167.2mm. Manipur, typically, observes a moderate climate throughout the year. Depending upon the altitude, the climate ranges from tropical to temperate. Though the state enjoys all three seasons of summers, winters, and monsoons; precipitation dominates the valley for many of the year. Summers prevail from March until May when temperatures reach the max of 34°C. It is never too hot in Manipur. Monsoons formally arrive in June and drench the state with heavy rain showers up to September. Manipur receives an annual rainfall of 1500mm. The months of October and November, more or less, remain dry. The winter season extends from December to February when the temperatures usually drop to 0°C. Here heavy woollens are required to beat the cold winds in winters. To sum up, Manipur enjoys a salubrious climate around the year. The rain last from May till mid-October. The common rainfall experienced is 1467.5 mm. Manipur could be a state where you can see hills all around.

Recommendation:

Deforestation in the upstream hill areas for shifting cultivation is the basic need to keep the basin safe, sound, and sustainable. In addition, the ever-growing vulnerability that is induced by global and local changes such as population changes, climate changes and variability, socio-economic issues, and environmental degradation, can result in increasing both the frequency and severity of extreme events,

including droughts and floods. However, hills and mountains of forests surround Manipur; the state is susceptible to anthropogenic greenhouse gas (GHG) emissions emitted from deforestation, mainly for the use of the land for cultivation or habitation, and causes environmental degradation. The climate history of Manipur recorded ranges from maximum temperature 210C-290C and minimum temperature from 40C - 100C during 1953-1998 and annual rainfall ranging from 1236.4mm to 1682.5mm. The trend of maximum temperature increases from 300C -340C during 2011-2018, except 360C in 1999, the highest temperature record in the history of the state whereas, the annual rainfall of the state decreased from 1236.4-2149.5 mm during three decades (1959-1988) to 1167.2-1657. 2 mm during 1989-2015. To keep Mother Earth and its ecology a balanced and sustainable, it is the right time to check deforestation. Grow more trees to keep Mother Earth sustained not only our generation but also generations of humankind.

Acknowledgement: Author expresses deep gratitude to the principal of the College for financial support, Research Committee of

the College for reviewing the manuscript and sharing their full cooperation ongoing the preparation of the present paper.

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