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# A note on: "Climate Change/Global Warming versus Climate Crisis"

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## Abstract

To provide inputs to the coming IPCC's "AR6 Report" on global warming, institutions around the world have been burning midnight oil by two different types of groups, namely (a) statistical approach using observed data [ground & satellites]; and (b) hypothetical model simulations. All ills of the society have been talked as "climate crisis" that was linked to global warming. According to IPCC's AR5, more than half of the linear trend in global average annual temperature anomaly is greenhouse effect component that includes global warming & aerosols component. MoES presented for India wherein observed trend is 0.7°C per 120 years; & modelled trend by 2100 are 2.7 (best case scenario) to 4.4°C (worst case scenario). Thus if global warming alone is 50% of the trend, then by 2100 they respectively are 0.45°C & 1.35 to 2.2°C. Model predictions already crossed Paris Agreement limit. However, in nature trend can't be linear as the other main input Sun's energy is constant, wherein it is modulated by natural rhythmic variation in relation to sunspot cycles. Also, it is modified by local "soil-climate system" and also there are several other factors affecting the trend. The USA raw temperature data has no trend but the global adjusted data has a trend by lowering the starting period. The adjusted data series also showed 60-year cycle varying between -0.3 and +0.3°C, which will play an important role on year or month reports. The hottest daily maximum temperature data of Sydney in Australia has also no trend, but has a natural variability. Such inaccurate data are being used in legal battles and as well by financial institutions; by attributing "climate crisis" to such global warming. However agrometeorological studies could help in overcoming climate crisis if any. All these are discussed in this article.

***Key words:*** *Global Warming; Climate Crisis; Climate Change; Greenhouse Gases [GHG]; Climate Sensitivity Factor [CSF]; Greenhouse Effect; Carbon Dioxide ($CO_2$)*

## Introduction

**Background:** "The scientists said that the heat added to problems with widespread wildfires, pest outbreaks and the thawing of permafrost which led to a massive pipeline oil spill. Thawing permafrost also has the potential to release huge amounts of greenhouse gases trapped under the frozen ground, which could then worsen the warming. Most of the planet's trapped heat goes into the oceans and rising sea temperatures mean more energy for hurricanes and typhoons. Record-breaking cyclones hit Mozambique last year. The deluge delivered in the US by Hurricane Harvey in 2017 was made three times more likely by climate change. Rising sea level also means storms cause more coastal damage.

Natural variability would cause some extreme weather, even without global heating, but our impacts on the climate make such extremes more likely. Carbon Brief analysed more than 230 studies and found 95% of heatwaves were made more likely or worse by climate change. For droughts, 65% were definitely affected by our hotter world, while the figure for floods was 57%. With the 'rapidly accelerating' likelihood of 40°C temperatures in UK, it is now undeniable that global heating is causing more extreme weather."

*However, all these processes were there in the past and will be there in future. These predictions are not based on science but they are heuristic. The current wet period in Beira/Mozambique & dry period in Durban/South Africa were predicted as back as1986 [Reddy, 1986].*

**Vicious Circle:** The real pollution has a short life in the atmosphere that has been creating innumerable new health hazards. To cure these health hazards established drug manufacturing industries and corporate hospitals; they in turn have been creating new pollution. This formed a vicious circle with no end. Stan Cox in 2006 brought out a book titled "Sick Planet: Corporate Food & Medicine" that provides clear picture on the vicious circle under the corporate food and medicine. Unfortunately nobody has bothered on this vital issue that has been affecting rich and poor; developed and developing countries; with no barriers on religion or caste. This is basically because there is no green-fund to share similar to "Global Warming and Carbon Credits" like flies flock around the Sweeteners. The basic problem in India is not "climate driven system" but it is "profit driven system".

**Beliefs outplay Science:** Beliefs have been outplaying the Science. Vastu is one such area, which is the science of architecture that vary with weather and climate and that of natural terrain of the location (Reddy, 1997a & b). But people putting more importance to beliefs rather than to the science. Same is the case with global warming.

In China, ancient seers introduced a simple system of "vastu" to counter summer heat and winter cold. It is termed as "Feng-Shu", which means "Wind and Water". It is associated with temperature conditions in summer and winter. To counter the summer heat nalas have been built to carry water in front of the buildings. In winter severe cold air from the North brings with it allergic yellow spores. To counter this, houses have been built with north closing without any openings or using mountains as backdrop to stop cold winds entering the house. However, in tropical areas it is associated with the rainfall. For example, the Southwest Monsoon brings the principal rains to the city of Hyderabad and thus north-east plots are preferred with the entrance from the northeast direction. The Northeast Monsoon brings the principal rains to the city of Chennai and thus south-west plots are preferred with the entrance from the southwest direction. Here to avoid rains fury, the entrance is chosen. WMO presented in a report on housing in different climate zones. Similar systems were developed and have been in practice for hundreds of years in agriculture over different parts. Global warming and carbon credit is following in the footsteps of modern Vastu.

**Greenhouse Effect**

**Greenhouse gases [GHG]**

**Introduction**

The Sun is the basic input in the process of greenhouse effect which was discovered scientifically in 1824. The Sun emits radiation/energy which is constant but modulated by sunspot cycle (Reddy et al., 1977). Some of the atmospheric gases absorb this that warm the Planet's lower atmosphere which includes land & oceans. Such gases are termed as greenhouse gases [GHG] and the warming associated with these gases is known as greenhouse effect.

The Earth's Atmosphere is a layer of gases and retained by gravity. It contains around 78.0842% of nitrogen, 20.9463% of oxygen, 0.9342% of organ, 0.0381% of carbon dioxide, 0.002% of other gases and around 1 to 4% of water vapour. This mixture of gases is commonly known as Air. However, minor gases like water vapour, carbon dioxide, methane, etc. regulates the Sun's energy reaching the Earth's surface wherein the composition of these minor gases varies depending upon the location, the weather, and many other local factors associated with human actions. Human/natural actions have been adding more GHG to natural GHG of which some have short life [water vapour], some have medium life [methane] and some others have long life [carbon dioxide] in the atmosphere.

**Water vapour**

Earth's temperature is primarily driven by energy cycle; and then by the hydrological cycle. Global solar radiation reaching the Earth's surface and net radiation/radiation balance at the Earth's surface is generally estimated as a function of hours of bright Sunshine. Total cloud cover [average of low, medium & high clouds] has a direct relation to hours of bright Sunshine (Reddy, 1974). Cube root of precipitation showed a direct relation to total solar radiation and net radiation (Reddy, 1987). In all these latitude plays major role

(Reddy & Rao, 1973; Reddy, 1987). Evaporation presents a relation with net and global solar radiation (Reddy & Rao, 1973) wherein relative humidity plays an important role that reduces with increasing relative humidity. If 'X' is global solar radiation received under100% relative humidity then with the dryness [with relative humidity coming down] it may reach a maximum of 2X; and under net radiation also with increasing relative humidity net radiation is reduced. That means water vapour in the atmosphere is the principal component that controls the incoming and outgoing radiation and thus temperature at the Earth's surface. Thar Desert presents high temperature with negligible water vapour in the atmosphere as maximum energy reaches the earth suface. However, these impacts differ under inland (dryness), hill (declining temperature with height – lapse rate) & coastal (wetness) locations and sun's movement (latitude and declination of the Sun -- seasons) (Reddy & Rao, 1973). IPCC integrated these under "climate system" (Figure 1a) and the advective condition by general circulation pattern [GCP] (Figure 1b).

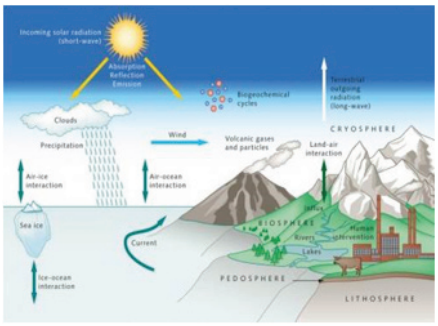


***Figure 1a:*** *Climate System as per IPCC.*

Cold-island effect [I coined this, see Reddy (2008)] is part of human induced climate change associated with changes in land use and land cover. Since 1960's to meet the food needs of ever increasing population, started intensive agriculture – conversion of dryland to wetland; & creation of water resources; etc. In this process increased levels of evaporation and evapotranspiration contributed to raise in water vapour up to around 850 mb levels in the lower atmosphere. Unusual changes in water vapour beyond 850 mb level [for example at 700 mb level] become a cause for thunderstorm activity (Reddy & Rao, 1978). Wet bulb temperature (°C) at the surface of the Earth provides the square root of total water vapour (g/cm$^2$) in the vertical column of the atmosphere; and also wet bulb temperature (°C) is a function of dry bulb temperature (°C), relative humidity (%) and square root of station level pressure (height) relative to standard value in mb [p/1060] (Reddy, 1976). Thus, unlike $CO_2$, water vapour presents a short life with steadily increasing with land use and land cover changes. However, met network in this zones have been sparse and thus the cold island effect is not properly accounted under global average temperature computations. Though satellite data takes this in to account, this data series were withdrawn from the internet and introduced new adjusted data series that matches with adjusted ground data series. Annual state-wise temperature data series in India wherein intensive agriculture practices are existing, namely Punjab, Haryana & UP belt, showed decreasing trend in annual average temperature – cooling. Some of these are explained below:

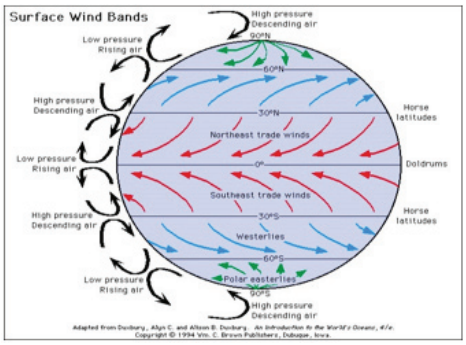


***Figure 1b:*** *General Circulation Patterns [GCP].*

Reddy (1983) presented a daily soil water balance model that computes daily evapotranspiration, known as ICSWAB Model. The daily soil water balance equation is generally written as:

$$\blacktriangle M_n = R_n - AE_n - RO_n - D_n$$

In the above equation left to right represent the soil moisture change, rainfall or irrigation, actual evapotranspiration, surface runoff and deep drainage on a given day (n). The term Actual Evapotranspiration [$AE_n$] is to be estimated as a function of f(E), f(S) & f(C), wherein they represent functions of evaporative demand on day n, soil & crop factors, respectively. As these three factors are mutually interactive, the multiplicative type of function is used.

$$AE_n = f(E_n) \times f(S) \times f(C)$$

However, the crop factor does not act independently of the soil factor. Thus it is given as:

$$AE_n = f(E_n) \times f(S,C) \text{ and } f(S,C) = K \times b_n$$

Where f(S,C) is the effective soil factor, K = soil water holding capacity [that varies with soil type] in mm and $b_n$ is the crop growth stage [that vary with crop & cropping pattern] factor that varies between 0.02 to 0.24 -- fallow to full crop cover conditions (with leaf area index crossing 2.75). Evaporative demand is expressed by the terms evaporation and/or evapotranspiration. Evaporation (E) and evapotranspiration (PE) are related as:

PE = 0.85 x E [with mesh cover] or = 0.75 x E [without mesh cover].

However, the relationship holds good only under non-advective conditions [i.e., under wind speeds less than 2.5 m/sec]. Under advective conditions E is influenced more by advection compared to PE. In the case of PE, by definition, no soil evaporation takes place and thus PE relates to transpiration only – where the crop grows on conserved soil moisture with negligible soil evaporation. With the presence of soil evaporation, the potential evapotranspiration reaches as high as 1.2 x PE or E with mesh cover. McKenney & Rosenberg (1993) studied sensitivity of some potential evapotranspiration estimation methods to climate change. The widely used methods are Thornthwaite and Penman presented 750 mm and 1500 mm wherein Thornthwaite method is basically uses temperature and Penman uses several meteorological parameters (Reddy, 1995).

In this process the temperature is controlled by solar energy but moisture under different soil types [water holding capacity] it is modified. This modified temperature cause actual evapotranspiration and thus water vapour. This is a vicious circle. For example average annual temperature in red soils Anantapur it is 27.6°C; in deep black soils Kadapa it is 29.25°C & in medium soils Kurnool it is 28.05°C. That means, local temperature is controlled by soils.

Reddy (1976 a&b) presented a method of estimating precipitable water in the entire column of the atmosphere at a given location using Wet Bulb Temperature. The equations are given as follows:

$$T_w = T \times [0.45 + 0.006 \times h \times (p/1060)^{1/2}]$$

$$W = c' \times T_w^2$$

Where T & $T_w$ are dry and wet bulb temperatures in °C; h is the relative humidity in %; p is the annual normal station level pressure in mb [1060 normal pressure in mb, a constant]; W is the precipitable water vapour in gm/cm$^2$ and c' is the regression coefficient.

Figure 2 presents the spatial distribution of annual global solar radiation, net radiation & evaporation over India [Reddy, 2002]. This clearly shows the impact of Western Ghats [north to south], Thar Desert [North western part] and high wet-bulb temperature – water vapour impact [north central-eastern parts].

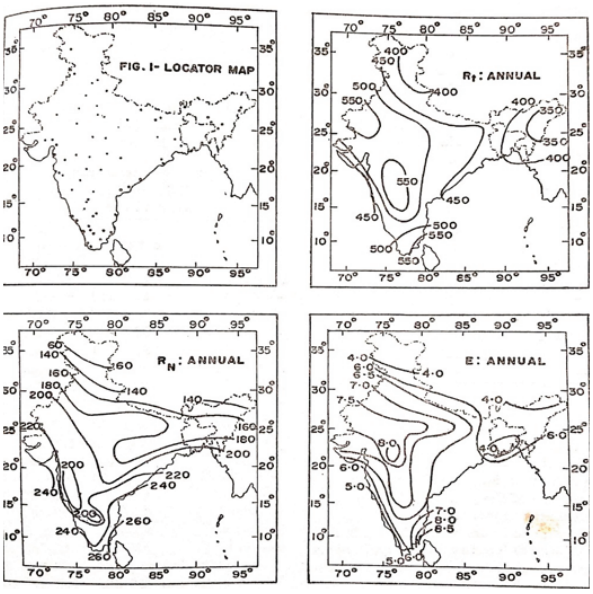


***Figure 2:*** *Stations network and annual $R_t$, $R_N$ & E distribution over India.*

AR5 - IPCC state that humans have contributed to observed increases in atmospheric moisture content since 1960. The fingerprint of climate change has been found in the increase of wet bulb temperature since 1973, driving heat stress globally and in most land regions analysed. In nature most effective greenhouse gas is the water vapour; with the growth of population, since 1960s both the water vapour and the carbon dioxide have been increasing in the atmosphere due to different actions of humans. To stop such growth needs control of population. Figure 3a show the specific humidity [*the ratio of the mass of water vapour in air to the total mass of the mixture of air and water vapour*] trends from 1948 to 2008 for the 300 mb (left), 600 mb (centre) and 1000 mb (right) for the entire Earth. The general trend is decreasing specific humidity at 300 mb and increasing specific humidity near the Earth's surface (1000 mb).

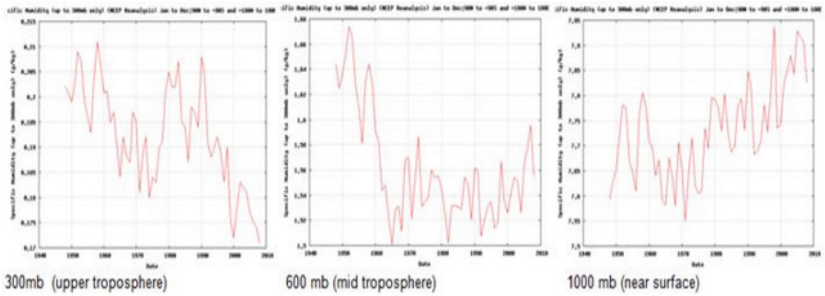


***Figure 3a:*** *Specific humidity trends during 1948 to 2008 at 1000, 600 & 300 mb levels.*

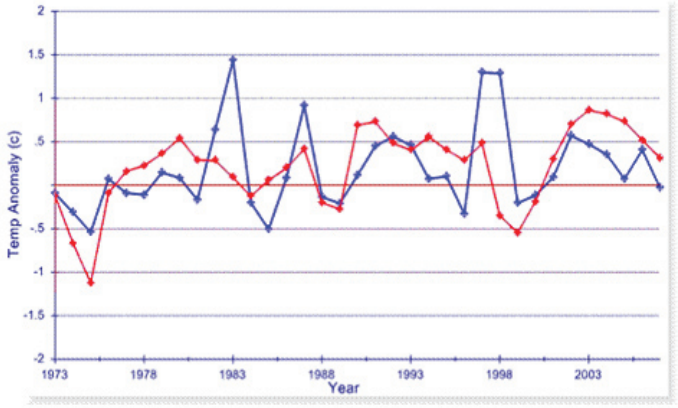


***Figure 3b:*** *The average annual sea surface temperature (SST) anomalies for 1973-2007 for two regions.*

However, it is not correct as (a) at 300 mb level though it showed a decreasing trend up to around 1975, from there onwards showed an increasing trend up to around 1990, and from there onwards it showed again a decreasing trend; (b) at surface (1000 mb) up to around 1975 showed a decreasing trend and from there onwards it showed a steep increasing trend; and (c) at 600 mb level, it showed a via media of surface (1000 mb) and 300 mb levels. This pattern is not seen over the oceans. See Figure 3b, which shows the average annual sea surface temperature (SST) anomalies for 1973-2007 for the two regions with strongest trends in specific humidity. The area with strongest negative trend is shown in the red line below (5N-5Sx160-180E) and the area with the strongest positive trend is shown in the blue line (0-10Nx80-100W). There has been no net warming in the area with positive specific humidity trend, while there has been slight warming in the area with the negative specific humidity trend.

**Methane**

The measurements around 1960 started at only 5 stations. Before 1960s the main contributor for this gas was wild animals, which were later adapted and domesticated. Researchers of present day say meat eating habits are contributing to this gas. Leaky oil and gas infrastructure has been playing an outsized role in climate change by spewing out far more quantities of an even more potent GHG into the atmosphere than earlier thought. It is reported that satellites by the European Space Agency have detected huge plumes of methane leaking from the 2,607-mile-long Yamal pipeline that transports natural gas from Siberia to Europe. Human activities, however, are by far the biggest source of methane on our planet, contributing 60% of new emissions every year. It was previously estimated that the energy sector contributes ~25% of the world's methane emissions. However, the latest revelation implies that these estimates are highly conservative. Indeed, the latest findings are backed by a 2015 study that found that U.S. oil and gas supply chains produce ~60% more methane than estimates by the Environmental Protection Agency (EPA).

Scientists have found evidence that frozen methane deposits [known as hydrates] in the Arctic Ocean – known as the "sleeping giants of the carbon cycle" – have started to be released over a large

area of the continental slope off the East Siberian coast. Methane has a warming effect 80 times stronger than carbon dioxide over 20 years. The United States Geological Survey has previously listed Arctic hydrate destabilisation as one of four most serious scenarios for abrupt climate change.

*However, as it is well known that Methane has short life unlike $CO_2$. Thus, it does not contribute to long-term trend, if any!*

According to the models, as the Earth warms more water evaporates from the ocean, and the amount of water vapour in the atmosphere increases. Since water vapour is the main greenhouse gas, this leads to a further increase in the atmospheric temperature.

IPCC claim that $CO_2$ can cause catastrophic global warming. Because $CO_2$ is not capable of causing significant global warming by itself, their contention is that increased $CO_2$ raises temperature slightly and that produces an increase in water vapour, which does have the capability of raising atmospheric temperature. If that is indeed the case, then as $CO_2$ rises, we should observe a concomitant increase in water vapour. However, water vapour (relative humidity) between 10,000 and 30,000 feet declined from 1948 to 2014.

Water vapour accounts for by far the largest greenhouse effect. The reason for this is because water vapour emits and absorbs infrared radiation at many more wavelengths than any of the other greenhouse gases, and there is much more water vapour in the atmosphere than any of the other greenhouse gases. The atmospheric water vapour content is highly variable and not easy to measure as a single global number.

**Carbon Dioxide [$CO_2$]**

$CO_2$ is one of the gases in the air. Humans breathe the air, use oxygen and release $CO_2$ back into the atmosphere. It is a negative feedback. Forests/greenery is considered as lungs of the Planet Earth. Forests breathe the air, use $CO_2$ and release oxygen back into the atmosphere. It is a positive feedback.

With the steadily rising population $CO_2$ in the atmosphere presented a linear increase since 1960. Thus negative feedback is steadily rising with growing population & associated destruction of forest/greenery.

**Building castles with poor quality data series:** The main input to understand the greenhouse effect is availability of quality data series. Recording of $CO_2$ started at 45 stations around 1960s covering sparse network in the Southern Hemisphere (SH) [3 stations] and no station in tropics. So, prior to that $CO_2$ is estimated through indirect ways similar to adjustments made to temperature to get global average. Also the $CO_2$ is very low in the SH compared to Northern Hemisphere (NH). Also met stations network have been steadily increasing; and with satellite data again they have been steadily decreasing. Oceans occupy two-thirds of the globe but up to around 1993 the met data collection was sparse. After 1993 started collecting data using a specialized system [moored buoys] but even with this the network has not been improved much. With such a poor quality data series with wide variations in space and time through adjustments built data series for the global average by different institutions but they differ. Similarly after 1979 satellite data recordings are available but the global averages differ among themselves and as well they differ from the ground based data. Modellers started dumping their own simulation results with wide variations through trial and error approaches after producing [using electricity to run the computers] huge quantity of $CO_2$. With such poor quality data series world is burning with hypothetical climate crisis.

**Other issues:** Recent reports suggest that the world's soils contain two to three times more carbon than the atmosphere, but as average global temperatures creep up, the rate of decomposition of organic matter also goes up; meaning the amount of carbon released from soils also rises. The study says that average global temperature increase by 2°C would lead to around 230 billion tonnes of carbon being released from the world's soil – it is like egg or hen story. The melting of the permafrost is a similar cycle, in which higher temperatures cause greater levels of thawing, which releases more methane and carbon, which go on to worsen the greenhouse effect and heat the planet further.

Recent reports presented that planting new forests 'can do more harm than good'. Past studies have indicated that trees have enormous potential to soak up and store carbon, and many countries have established tree planting campaigns as a key element of their plans to tackle climate change. The study looked at the example of Chile, where a decree subsidising tree planting ran from 1974 to 2012, and was widely seen as a globally influential afforestation policy. Their study found the subsidy scheme expanded the area covered by trees, but decreased the area of native forest, which are rich in biodiversity and store large amounts of carbon, the subsidy scheme failed to increase the carbon stores and accelerated biodiversity loss. The researchers looked at northern China, which has

seen intensive tree planting by the government because of climate change but also in an effort to reduce dust from the Gobi desert. Both papers have been published in the journal Nature Sustainability."

Recent reports present that global warming is making the oceans more stable, increasing surface temperatures and reducing the carbon they can absorb and warned that the findings have "profound and troubling" implications. They said this process is also exacerbated by the melting of sea ice, meaning that more freshwater "which is lighter than saltwater" also accumulates on the surface of the ocean. With warmer upper waters receiving less oxygen, there are also implications for marine life. By absorbing a quarter of man-made $CO_2$ and soaking up more than 90 percent of the heat generated by GHG, oceans keep the population alive "but at a terrible cost, according to IPCC. Seas have grown acidic, potentially undermining their capacity to draw down $CO_2$. Warmer surface water has expanded the force and range of deadly tropical storms. Marine heatwaves are wiping out coral reefs and accelerating the melt-off of glaciers and ice sheets driving sea-level rise. In 2019, research published in the US Proceedings of the National Academy of Sciences calculated that climate change would empty the ocean of nearly a fifth of all living creatures, measured by mass, by the end of the century. *They are mostly hypothetical presumptions only. Oceans present natural variation in temperature*.

Researchers found "Spreading rock dust on farmland could suck billions of tonnes of $CO_2$ from the air every year". The chemical reactions that degrade the rock particles lock the GHG into carbonates within months. They say that rock dust approach, called enhanced rock weathering (ERW), has several advantages. First, many farmers already add limestone dust to soils to reduce acidification, and adding other rock dust improves fertility and crop yields, meaning application could be routine and desirable.

If at all there is greenhouse effect with the $CO_2$ levels increase since 1951 in the atmosphere, it should be different in the NH and SH; and equator to Polar regions. Also several localized factors including Climate System [Figure 1a] as defined by IPCC play important role along with General Circulation Patterns [Figure 1b] and changes in land use and land cover changes (Reddy, 2008, 2016 & 2019c). In India they are playing critical role on heat waves and cold waves (Reddy & Rao, 1978). This is also clear from a recent study by IMD-IITM former scientists (De, U.S., et al., 2005). Trend showed positive, negative and zero. This plays the important role in agrometeorology that help long term planning in agriculture and water resources management. However, human greed factor entered into this at local and regional levels. Governments and UN Agencies must encourage individual countries to study temperature in their respective countries and use in applied sciences. Modellers see severe uncertainties in climate sensitivity factor.

From all these, however, *the basic question that arise, for reducing 1.0°C in temperature, how much $CO_2$ or its equivalent is to be reduced?*

**Localized factors**

Several local and regional factors contribute to irregular variations [extreme/abnormal conditions in a given year and time], namely heat & cold waves, wildfires, dust storms, volcanic eruptions, etc.

**Heat & cold waves:** Western disturbances in north-western India (Reddy & Rao, 1978) influences heat and cold waves in summer and winter respectively, based on the high pressure belt located around Nagpur latitude – east and west and north and south shift with the passing of time in any given year. The winds associated with the high pressure belt define the penetration of cold winds in winter and warm winds in summer in to southern parts and eastern parts of India. However these are modified by cyclonic system in Arabian Sea and Bay of Bengal and destruction of Western Ghats.

**Wildfires:** WMO described last year's fires as "unprecedented" and warned of the enormous impact they would have on $CO_2$ levels contributing to the climate crisis. The WMO said: "Although wildfires are common in the northern hemisphere between May and October, the latitude and intensity of these fires, as well as the length of time that they have been burning for, has been particularly unusual. "The ongoing Arctic fires have been most severe in Alaska and Siberia, where some have been large enough to cover almost 100,000 football pitches, or the whole of Lanzarote. "In Alberta, Canada, one fire is estimated to have been bigger than 300,000 pitches. In Alaska alone, Cams has registered almost 400 wildfires this year, with new ones igniting every day." Parrington added: "The fact that so many intense wildfires can burn in the Arctic Circle, a region which many people will think of as being frozen, indicates that the rapidly changing climate in that part of the world is providing the right conditions for fires to burn for many weeks following an ignition. "Firstly, such large fires produce a lot of air pollutant which can

affect air quality locally and thousands of kilometres downwind. Also from a climate point-of-view, deposition of soot or black carbon on the sea ice in the Arctic Ocean will affect the albedo and could accelerate warming and, as some of these fires are known to be burning in peatlands, they are irreversibly releasing carbon into the atmosphere which has been stored for tens of thousands of years."

In December 2019, President Vladimir Putin commented on the unusual heat: "Some of our cities were built north of the Arctic Circle, on the permafrost. If it begins to thaw, you can imagine what consequences it would have. It's very serious." Thawing permafrost was at least partly to blame for a spill of diesel fuel in Siberia this month that led Putin to declare a state of emergency. The supports of the storage tank suddenly sank, according to its operators; green groups said ageing and poorly maintained infrastructure was also to blame. Wildfires have raged across hundreds of thousands of hectares of Siberia's forests. Farmers often light fires in the spring to clear vegetation, and a combination of high temperatures and strong winds has caused some fires to burn out of control. Swarms of the Siberian silk moth, whose larvae eat at conifer trees, have grown rapidly in the rising temperatures. Vladmir Soldatov, a moth expert said that "In all-my long career, I've never seen moths so huge and growing so quickly", He warned of "tragic consequences" for forests, with the larvae stripping trees of their needles and making them more susceptible to fires."

**Polar region wildfires:** A prolonged heatwave in Siberia is undoubtedly alarming, climate scientists have said. The freak temperatures have been linked to wildfires, a huge oil spill and a plague of tree-eating moths. On a global scale, the Siberian heat is helping push the world towards its hottest year on record in 2020, despite a temporary dip in carbon emissions owing to the coronavirus pandemic. Temperatures in the polar-regions are rising fastest because ocean currents carry heat towards the poles and reflective ice and snow is melting away. When average is computed, they rarely correct for such localized/regionalized factors. BBC also presented a report "Arctic circle sees 'highest-ever' recorded temperatures". "Temperatures in the Arctic Circle are likely to have hit an all-time record on Saturday [20th June 2020], reaching a scorching 38°C (100°F) in Verkhoyansk, a Siberian town. Heatwaves in the Arctic aren't unusual. Weather patterns around the world can align in such a way that hot air is transported quite far northward and colder air from the poles southward (Figure 1b).

Russian towns in the Arctic Circle have recorded extraordinary temperatures, with Nizhnyaya Pesha hitting 30.0°C on 9th June and Khatanga, which usually has daytime temperatures of around 0.0°C at this time of the year, hitting 25.0°C on May 22nd. The previous record was 12.0°C. In May, surface temperatures in parts of Siberia were up to 10.0°C above average, according to the EU's Copernicus Climate Change Services (C3S). Martin Stendel, of the Danish Meteorological Institute, said the abnormal May temperatures seen in northwest Siberia would be likely to happen just once in 10, 000 years without human-caused global heating. Marina Makarova, the chief meteorologist at Russia's Rosgidromet weather service, said: "This winter was the hottest in Siberia since records began 130 years ago. Average temperatures were up to 6.0°C higher than the seasonal norms." Robert Rohde, the lead scientist at the Berkeley Earth project, said Russia as a whole had seen record high temperatures in 2020, with the average from January to May 5.3°C above the 1951-1980 average. [This is a] new record by a massive 1.9°C, he said.

Intense wildfires are sweeping across the Arctic Circle, surpassing the numbers recorded in June 2019, amid "exceptionally high" temperatures in the Siberian region. NASA satellite images revealed fires dotted across the landscape and billowing clouds of smoke which scientists say will "catch a ride on the jet stream to other areas of the globe". Although Siberian fires have been seasonal, NASA scientists pointed out that the peat fires have the potential to smoulder underground during winter and reappear in the spring, a phenomenon known as "zombie fires". Boreal forest, peat bogs and tundra all have higher concentrations of carbon which spew carbon dioxide ($CO_2$) into the atmosphere when burned. Climate variability was also noted across Europe where temperatures were far above average in the north but below average in the south. Overall, it was the joint 2nd warmest June recorded in Europe. Smoke from Arctic wildfires fills the sky.

**Mainland wildfires:** It is not only confined to polar zone but also to mainland. A staggering 1 billion animals were killed in the Australia bushfires at the start of the year: EPA. California wildfires in USA exceed 4 million acres -- burned by wildfires for days and months. Also, Colorado's Cameron Peak Fire expanded to over 1, 67, 000 acres after burning for two months. More than 10, 849 lightning strikes over 72 hours have sparked at least 367 new fires have burned in around 300, 000 acres. Dryness and wind form the major contributors.

Paddy stubbles burning on farm in the state of Punjab in India, is common. This causes severe air pollution in India's capital Delhi. In winter temperature inversions are common to Delhi and thus cause direct pollution impact on human health and cause urban-heat-island effect [surface to upper layer of the atmosphere]. It is also common burning of domestic waste in urban areas in India. Thus, wildfires [natural or man induced] form the major contributors for the changes in climate & weather at local and regional levels.

**Dust Cloud from Sahara Desert:** Reports state that "Strong warm winds over the Sahara desert typically whip up sand in summer and carry it thousands of miles across the Atlantic Ocean to the Americas. NASA-NOAA has captured satellite images of the plume. According to NOAA, dust and dry air forms above the Sahara Desert each late spring, summer and early autumn which then moves over the tropical Atlantic. "Normally, hundreds of millions of tons of dust are picked up from the deserts of Africa and blown across the Atlantic Ocean each year," explained NASA. "That dust helps build beaches in the Caribbean and fertilizes soils in the Amazon. It can also affect air quality in North and South America." June 2020 Dust Cloud moved in to USA after travelling 5000 km via the Atlantic Ocean. The densest plume, making the cloud larger than the contiguous United States and Western Europe, says NOAA.

**Volcanic Eruptions:** Several other local systems such as earthquakes, tsunamis, volcanic eruptions, etc. contribute significant changes on weather and climate [it is also true with wars]. See for example: An explosive eruption of the most violent type was recorded on June 22, 1980 Mount St. Helens. The Taal Volcano erupted on 12$^{th}$ January 2020 in Batanya, Philippines. Such eruptions result when sufficient gas has dissolved under pressure within a viscous magma such that expelled lava violently froths into volcanic ash when pressure is suddenly lowered at the vent. Sometimes a lava plug will block the conduit to the summit, and when this occurs, eruptions are more violent. Explosive eruptions can send rocks, dust, gas and pyroclastic material up to 20 km (12 mi) into the atmosphere at a rate of up to 100,000 tonnes per second traveling at several hundred meters per second. This cloud may then collapse, creating a fast-moving pyroclastic flow of hot volcanic matter.

**Local conditions:** We have seen above that several localized and regionalized factors affect the local temperature anomalies. In Polar Regions particularly in Green Island has been influenced by human activity. This has severe effects on the ice. Wildfires contribute significantly that increases global averages. These human induced factors also play important role on colder temperatures in these regions.

The World Meteorological Organization (WMO) has recognized a temperature of -69.6°C (-93.3°F) at an automatic weather station in Greenland on 22 December 1991 as the coldest ever recorded in the Northern Hemisphere. The temperature record was uncovered after nearly 30 years by 'climate detectives', including scientists from British Antarctic Survey (BAS), with the WMO Archive of Weather and Climate Extremes. The team that installed the automatic weather station had kept excellent records that enabled to verify rapidly that this was an accurate measurement.

The temperature record was uncovered after nearly 30 years by "climate detectives" with the WMO Archive of Weather and Climate Extremes. It eclipses the value of -67.8°C recorded at the Russian sites of Verkhoyanksk (February 1892) and Oimekon (January 1933). The world's coldest temperature record, of -89.2°C (-128.6°F) on 21 July 1983, is held by the high-altitude Vostok weather station in Antarctica. The WMO Archive of Weather and Climate Extremes includes records such as the world's the highest and the lowest temperatures, rainfall, the heaviest hailstone, the longest dry period, maximum gust of wind, the longest lightning flash and weather-related mortalities.

**Climate Sensitivity Factor**

**Uncertainty on "Climate Sensitivity Factor"**

The word "climate Crisis" is primarily linked to global warming. To know whether there is really global warming, if so how much, climate sensitivity factor plays the main role. Climate sensitivity is a measure [°C/(W/m$^2$)] – how much warming we expect (both near-term and long-term) for a given increase in $CO_2$? According to Mark, D. Zilinka (2020), "Equilibrium climate sensitivity, the global surface temperature response to the CO2 doubling, has been persistently uncertain".

Recent consensus places it likely within 1.5–4.5 K. Global climate models (GCMs), which attempt to represent all relevant physical processes, which provide the most direct means of estimating climate sensitivity via carbon dioxide quadrupling experiments. Here we show that the closely related effective climate sensitivity has increased substantially in Coupled Model Inter-comparison Project phase 6 (CMIP6), with values spanning 1.8–5.6 K across 27 GCMs and exceeding 4.5 K in 10 of them. This (statistically insignificant)

increase is primarily due to stronger positive cloud feedbacks from decreasing extratropical low cloud coverage and albedo. Both of these are tied to the physical representation of clouds which in CMIP6 models lead to weaker responses of extratropical low cloud cover and water content to unforced variations in surface temperature.

Recent modelling data suggests the climate is considerably more sensitive to carbon emissions than previously believed, and experts said the projections had the potential to be "incredibly alarming", though they stressed further research would be needed to validate the new numbers. Johan Rockström, the director of the Potsdam Institute for Climate Impact Research, said. "Climate sensitivity is the holy grail of climate science. It is the prime indicator of climate risk.

The role of clouds is one of the most uncertain areas in climate science because they are hard to measure and, depending on altitude, droplet temperature and other factors can play either a warming or a cooling role. For decades, this has been the focus of fierce academic disputes.

The IPCC is expected to include the 5+°C climate sensitivity figure in its next report on the range of possible outcomes. Scientists caution that this is a work in progress and that doubts remain because such a high figure does not fit with historical records. Catherine Senior, head of understanding climate change at the Met Office Hadley Centre, said more studies and more data are needed to fully understand the role of clouds and aerosols.

With this vital disputes how anyone can say there is global warming without solving this issue; so I said "global warming hysteria factor is climate crisis". In addition to clouds issues, the other major unresolved is aerosols issue. Yet people are talking on predicting temperature for doubling of $CO_2$. Volcanic eruptions pump huge quantities of aerosols in to the atmosphere. Based on the general circulation patterns at that time, they spread for and wide and affect the incoming and outgoing radiations at those places. Also desert dust clouds, is another issue. In addition several other localized issues. Under such scenario, is there a way to achieve quantified solution or we go with qualitative trial and error mode with poor quality results that help in sensationalizing the results.

With all these limitations, MoES (2020) projected that the average temperature in India. The study reports that India's average temperature rose by 0.7°C during 118 years (1901–2018) – that is, 0.6°C per century. Temperatures in the Indian Ocean (including the Bay of Bengal and the Arabian Sea) have risen by 1.0°C during 65 years (1951–2015) == that is 1.54°C per century. In the case of model predictions, (a) under the best case scenario of immediate mitigation of emissions, India's temperature would still rise by 2.7°C by 2099; and (b) under the worst case scenario (Business as usual), a rise of 4.4°C by the end of this century. However, these linear trends don't represent global warming (Reddy, 2016). According to IPCC's AR5, only around half of the linear trend is global warming. MoES presented for India: observed trend = 0.7°C & modelled trend = 2.7 (best case scenario) to 4.4°C (worst case scenario). Thus, global warming respectively is 0.3°C per century or 0.45°C by 2100 – it is the same for global average -- and 1.35 to 2.2°C by 2100. According to the model predictions Paris Agreement limit has already crossed. However, the model predictions are based on the unresolved CSF only.

The Indian Express (3rd July 2020) presented a report of S N Tripathi, head, Department of Civil Engineering, Centre for Environmental Science and Engineering, IIT Kanpur that MoES study sticks to the IPCC's formula of projecting future scenarios based on Regional Concentration Pathways (RCPs) under different trajectories of carbon emissions. Though Tripathi highlighted the issues but like the report he did not comprehend either the science of climate or the Science of Climate Change or Agrometeorology and Agroclimatology. In Tropical warm regions of the world, like India, moisture is the limiting factor for agriculture and not the temperature as crops are adapted to local temperature regimes (Reddy, et al., 1984) that present high seasonal and annual variations.

All these tell us one thing, pro-global warming groups have no quantitative "CSF", and it may be even zero. It is a trial and error process. However, in nature it can't be a linear as the energy factor is constant (Reddy, 2002) [Figure 4]. It must be non-linear (Reddy, 2016) [see Figure 5]. Even in the observed adjusted global average annual temperature anomaly data series the linear trend is not global warming according to IPCC AR5; but it is only around 50% of the trend. Raw data series show no or zero-trend. Papers were published by using the word "climate crisis" as an adjective like the word "Climate Change" by majority. Some used with hypothetical CSF. That is, climate crisis is linked to global warming and global warming to CSF that is yet not resolved issue. So, based on hypothetical global warming, climate crisis is attributed.

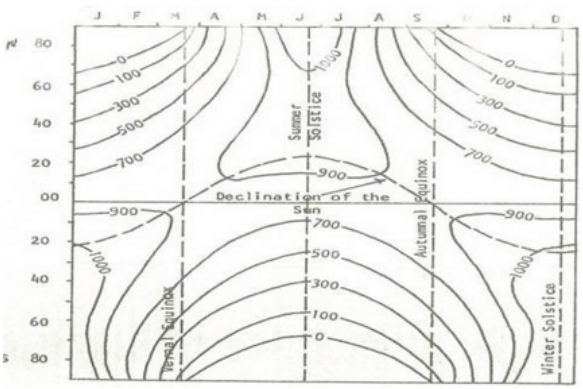


***Figure 4:*** *Total daily solar radiation at the top of the atmosphere [latitude vs seasons].*

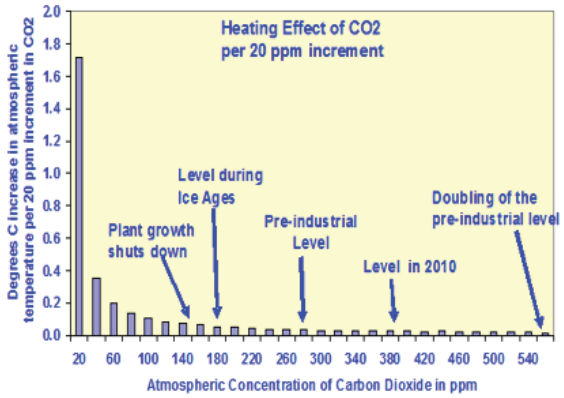


***Figure 5:*** *Climate Sensitivity Factor [CSF] with increased levels of* $CO_2$

**Fights in the court of Law**

With all those limitations international law suits have received momentum. Internationally reports brought out the realities that "With the slow pace of international climate negotiations, lawyers from Switzerland to San Francisco are increasingly filing lawsuits demanding action. And they are getting creative -- using new legal arguments to challenge companies and governments before a judge. Two decades ago, only a handful of climate-related lawsuits had ever been filed worldwide. Today, that number is 1,600, including 1,200 lawsuits in the United States alone, according to data reported 26th June 2020 by the London School of Economics.

Such cases in the past tended to accuse coal-fired power stations or government of failing to limit emissions. Cases now are being fought on arguments such as consumer protections and human rights. This shift has been especially pronounced in the United States, where more than a dozen cases filed by states, cities and other parties are challenging the fossil fuel industry for its role in causing climate change and not informing the public of its harms. – We have seen all are talking "climate change" and afraid to use the correct word, the "global warming".

**Eyes in the sky: Investors reach for new tools to gauge climate change risk**

Matthew Green, Karin Strohecker & Simon Jessop, London Reuters reports that "In the twilight years of past civilisations, astrologers would scour the heavens for signs of impending calamity. In an era where climate change is eroding age-old certainties, a new cast of characters is searching for answers in the sky. A small but growing network of asset managers, academics, start-up entrepreneurs and campaigners are working to harness an armada of recently deployed satellites to better predict the economic impact of global warming."

While climate scientists caution that the discipline is in its infancy, advocates say the early findings have one over-riding virtue: dynamiting any remaining complacency about the scale of the disruption that lies in store. "This is the missing piece of the jigsaw," said Michael Hugman, a portfolio manager at London-based asset manager Ninety One, where the fixed-income team runs $44.3 billion of mostly emerging market debt. "What we can now do is concretely put hard numbers on what climate change means for countries over the next 30 years. This is a whole different way of thinking about risk and return." Asset managers specialising in emerging market debt have been among the first to explore the possibilities, recognising, for example, that more intense hurricanes or heatwaves can upend the finances of countries dependent on agricultural exports. The results can be sobering. Hugman decided to model how climate change might affect a hypothetical debt restructuring plan for Argentina, which is struggling to pay its creditors. He focused on two of the many possible risks -- the prospect of more ambitious global moves to curb deforestation, which could hit farm exports, and more frequent droughts, using numbers based on spatial techniques. The result: what had looked on paper like a viable plan to manage the country's debt was no longer sustainable.

Environmentalists hope such findings can in turn be used to arm governments in Latin America, Africa and Asia with the data they need to identify the most promising investments to cushion populations from climate impacts. "What it gives you is a much richer way of engaging with governments," said Susanne Schmitt, nature

and spatial finance lead at the World Wildlife Fund, an advocacy group. Working with Hugman and other asset managers, Schmitt aims to leverage spatial finance to mobilise investment in climate-friendly projects such as preserving mangrove swamps or forests.

On climate change, none of the models investors were using captured risks of the "magnitude we have today", warned Luiz Pereira da Silva, BIS deputy general manager, speaking on a podcast recorded when the report was launched. "We need to use more and more novel approaches, forward-looking scenarios that instead of just trying to replicate the past, extrapolate from the knowledge that we are accumulating with climate scientists," he said. A stack of research has hammered home the scale of the dangers looming by mid-century if greenhouse gas emissions keep growing. In January, the McKinsey Global Institute pointed out that cities in parts of India and Pakistan could be among the first places in the world to experience heatwaves hot enough to kill a healthy human, under a high emissions scenario. West Africa may see 70-90 more days per year with dangerous levels of heat than at present, according to World Bank data. And even if emissions start to fall moderately, rising sea-levels are projected to hit land in China, Bangladesh and India that is now home to 171 million people, according to a study by Climate Central.

With investor concerns over climate growing, entrepreneurs have spied an opportunity to refine a torrent of data streaming down from space into products for money managers. In Britain, new spatial finance start-ups include Oxford Earth Observation and Sust Global. Based in Charlottesville, Virginia, Astraea Inc. mines data from some of the 1,500 earth-observing satellites in orbit at any given time.

Another business venture using global warming & carbon credits is -- Global environmental non-profit group CDP said on 7th July 2020 it had created a temperature ratings system that will allow investors to track carbon emissions from across the value chain of more than 4,000 companies. The degree to which companies' emissions are on track to support the Paris Agreement on climate change is a focus for investors as they look to pick the leaders in the transition to a low-carbon economy and engage with the laggards. "By providing a clear, science-based and uniform standard for companies' ambition, CDP temperature ratings now allow investors to do that by benchmarking, communicating and reducing the temperature of their portfolios and products." French asset manager Amundi will be the first to use the new rating system as a way to bolster its research efforts, drive engagement with company boards and track the performance of its funds.

With unproven climate sensitivity factor and thus global warming, people started playing games for monitory gains. UN agencies are looking at Green Fund, legal paternity is looking at amass wealth through immature cases on climate change managers specialized in climate change risks looking for a big kill, etc. However the basic problem here is that they lack knowledge on the subject matter in real terms. In fact nobody has come up with quantitative climate sensitivity factor to decide the legality or impacts related to emissions. Unfortunately, nobody cares to read IPCC's AR5, which is drastically modified version of AR4 on complaints to UN Secretary General by scientists.

**Temperature projections for UK**

Lisa Baldini, Lecturer in Environmental Science, Tesside University presented the report in The Conversation on 30th June 2020 "Climate change: 40°C summer temperatures could be common in UK by 2100". Using temperature data and climate model simulations, the researchers tested the likelihood of UK temperatures exceeding 30°C, 35°C, and 40°C each summer over the next 80 years. They found that if global GHG emissions continue to rise, temperatures exceeding 40°C could be reached somewhere in the UK every three-and-a-half years by 2100. In England alone, 2,000 people every year already die from heat related illness. While traditionally warmer climes have adapted over time to soaring summer temperatures, the UK is not prepared to handle these kinds of heatwaves.

**How likely are 40°C heatwaves in the UK?**

The researchers used modelling to simulate four different climate states: the present day climate, a hypothetical "natural climate" unaltered by human activity, and two future climate scenarios with different concentrations of GHG in the atmosphere, known as RCP 4.5 and RCP 8.5. RCP refers to "representative concentration pathways", which are projections of future warming under different GHG emissions scenarios. For instance,

- RCP 1.9 assumes that the world meets the ambitious target for reducing emissions set by the 2015 Paris Agreement, restricting the rise in global mean temperatures by the end of the century to less than 2°C above the pre-industrial average;
- RCP 4.5 as an intermediate scenario, in which emissions continue to rise until 2045 but by 2100, $CO_2$ levels in the atmosphere are half of 2050 levels and the projected global mean temperature rise would be 2°C to 3°C by century's end;

- RCP 8.5 is considered a worst-case scenario in which emissions continue to rise at current rates unabated through the 21st century, resulting in a global mean temperature rise of as much as 4.8°C by 2100.
- With global warming comes an increase in the frequency and intensity of extreme weather in UK:

o Hotter than 35°C currently occur once every five years. But by 2100, under RCP 4.5 heatwaves of this magnitude are likely to occur every year

o Heatwaves of 40°C are currently quite rare in the UK, occurring once in 100 to 300 years, but by 2100

- under RCP 4.5, they are likely to occur once every 15 years
- under RCP 8.5, once every three and a half years

o Regardless of which emissions pathway the global community follows, the researchers found that temperatures in the south of the UK will continue to rise, with 30.0°C, 35.0°C, and 40.0°C heatwaves becoming far more common than they would have under a hypothetical "natural" climate.

These are not real scenarios, so nobody should panic from such exercises; we must simply dump such studies into dustbin but must worry on the wastage of energy from such exercises.

**The role of the jet stream**

Between 1960 and 2016, maximum daytime temperatures rose as much as 1.0°C per decade in the south-east of the UK, whereas temperature changes in Scotland were more variable, with some areas warming slightly and others cooling, according to the new study. Overall, England, with its more southerly latitude and greater distance from the cooling effects of the North Atlantic was found to be most susceptible to temperature extremes of 30.0°C and 35.0°C. The UK's future climate could depend a great deal on how global warming influences the atmosphere over the North Atlantic, and in particular, the North Atlantic jet stream. This is a high altitude band of strong winds that follows the boundary between colder and warmer air and controls the trajectories of storms and the location of pressure centres that strongly influence UK weather. In May 2020, the jet stream slowed, shifted northwards, and buckled, allowing a high pressure centre to stall over the UK (and much of Europe) for weeks. This led to May 2020 being the sunniest month ever recorded in the UK. It was also the warmest May recorded globally.

In a 2018 study, researchers used tree ring records from Britain and the Mediterranean to reconstruct the location of the North Atlantic Jet Stream back to 1725. They found that UK heatwaves tended to increase when the jet stream was positioned to the north, and its position there was for more common from the late 20th century onwards. Rising temperatures in the northern hemisphere, melting Arctic sea ice and GHG emissions are likely influencing the behaviour of the jet stream. While scientists try to understand the jet stream's sensitivity to these factors, the UK should brace itself for the inevitable heat of future summers. The highest temperature ever recorded in the UK was broken on 25th July 2019, when the mercury hit 38.7°C in Cambridge. That same summer, temperatures in France soared to 46.0°C and claimed 1,500 lives. Although devastating, this was nothing compared to the 15, 000 victims who succumbed during France's August 2003 heatwave. France's response to that disaster was to implement a national heatwave plan to keep people informed of imminent danger and provide public health guidance regarding heat-related illness an early warning system. These measures are credited with reducing the number of deaths during the 2019 heatwave. The UK must begin similar preparations in earnest, to weather the intense heatwaves that are to come.

**The role of urban-heat-island effect [UHI]**

Luke Howard, an amateur meteorologist in England, first recorded the heat-island effect and recorded in his book "The Climate of London" in 1818. Now the growth of urban areas outwards, made in to concrete jungle. This raised the temperature both horizontally and vertically. This in turn increased the electricity consumption multifold levels and thus indirectly contributing to release of more $CO_2$ in to the atmosphere [Reddy, 2008]. Yet, this is not considered an important factor but harping on imaginary global warming. Same is the case with from USA House Democrats plan released on 30$^{th}$ June 2020 to address climate change that would set a goal of net zero GHG emissions by 2050 that cause global warming – here climate change is a de-facto global warming only.

**The role of PV-heat-island effect [PVHI]**

Renewable energy is termed as clean energy. The so-called clean energy is not so clean except help changing the business from one area to other. The clean energy system with short life creates huge quantity of waste that occupy good land area and thus as part destroy the forest/water areas. Also require large land areas and power to manufacture them. Is there a 25 year analysis of the environmental impacts of Green Energy solutions? Solar panels, wind

turbines, and batteries, have a manufactured expected life before they must be replaced. Disposal of solar panels, turbine blades, and batteries are high tech pollutants and require high tech toxic disposal processes.

The renewable energy production systems like Photovoltaic (PV) Solar Power Plants & Wind power plants as they come under land use and land cover changes part of human induced local weather changes. Similar to urban-heat-island effect, larger solar power plant create "Photovoltaic Heat-Island Effect" but it is a constant factor unlike urban heat island effect that steadily rises with city expansion. Barron-Gafford, et al., (2016) presented a study that "Larger solar power plants increase local temperatures. We examined the PVHI empirically with experiments that spanned three biomes. We found temperatures over a PV plant were regularly 3–4°C warmer than wildlands at night, which is in direct contrast to other studies based on models that suggested that PV systems should decrease ambient temperatures." Wind energy systems showed an increase in night temperatures and decrease in day temperature but day time heat is transported to neighbouring areas and thus increase in temperature there.

**Temperature at the South Pole**

Cassandra Garrison from Argentina reports that at the South Pole, considered as the coldest point on the Earth, temperatures are rising fast. So fast, in fact, that Kyle Clem and other climate researchers began to worry and wonder whether human-driven climate change was playing a bigger role than expected in Antarctica. Temperature data shows that the desolate region has warmed at three times the global warming rate over the last three decades up through 2018, the South Pole's hottest year on record, the researchers report in a study published in 2020 in Nature Climate Change.

Looking at data from 20 weather stations across Antarctica, the South Pole warming rate was seven times higher than the overall average for the continent. "The South Pole seemed to be isolated from what was going on across the rest of the world," said Clem, who has focused his research at the Victoria University of Wellington in New Zealand on better understanding the Antarctic climate. "But all of a sudden, it ramps up with rapid warming, some of the strongest warming on the planet." Clem and his colleagues wanted to explain why the icy continent began warming rapidly after a period of cooling during the 1970s and '80s: was it natural variability? Or was it part of the wider trend of global warming caused by human industrial activity? The answer, they found, was both – this will also be true for North Pole. Is it not so?

The South Pole warming is partly connected to naturally rising temperatures in the tropical western Pacific being propelled southward by cyclones in the icy waters of the Weddell Sea, off the Antarctic peninsula. But that pattern, believed to be part of a multi-decade natural process, explained only some of the warming trend. The rest, the researchers said, was due to human-induced climate change. "The end result is a massive warming," Clem said, though he acknowledged that it's difficult to determine exactly how much each factor played a part. With temperature records for the South Pole dating back only about 60 years, the region's climate is little understood.

But this "significant" new finding that the southernmost point of the globe is also vulnerable to warming was a surprise for Alexandra Isern, head of Antarctic studies for the U.S. National Science Foundation. "An area of the planet that we felt was very isolated is actually not as isolated as we thought," Isern said. Still, the South Pole is not yet in any danger of melting. "These temperature changes are quite striking, but it's still pretty darn cold," said climatologist Julienne Stroeve, who is a professor in Manitoba, Canada, while working for the National Snow and Ice Data Centre in Boulder, Colorado. So far, temperature changes haven't been significant enough "to translate into any mass loss" in the ice at Antarctica's interior, she said. Temperatures at the South Pole, which sits on an icy plateau a mile and a half above sea level, generally range between minus 50.0 and minus 20.0°C. But the average temperature rose by 1.8°C for 30 years up to 2018, the study found. Globally, temperatures rose about 0.5 to 0.6°C during that time. The new study shows that Antarctica is "waking up" to climate change, Stroeve warned. "That, to me, is alarming." We must remember the fact that $CO_2$ in SH is far lower than that of NH that raises the doubt relating to human induced raise in temperature. Scientists have found a spot within the Atlantic Ocean where the temperature keeps getting cooler with the passing years. The decrease in the temperature is yet another concern. The latest study was published in the journal Nature Climate Change.

**Hypocrisy: Global Warming vs Climate Crisis**

**Introduction**

WMO/UN said on 9th July 2020 that the world could see average global temperatures 1.5°C (2.7 Fahrenheit) above the pre-industrial average for the first time in the coming five years. The 1.5°C mark is the level to which countries have agreed to try to limit global warming. It said that there is a 20% chance that the 1.5°C level will be reached in at least one year between 2020 and

2024. The period is expected to see annual average temperatures that are 0.91°C to 1.59°C higher than pre-industrial averages. The forecast is contained in an annual climate outlook, spearheaded by the United Kingdom's Met Office. WMO chief Petteri Taalas said the study shows "the enormous challenge" countries face in meeting the goals of the 2015 Paris accord. The agreement sets a goal of keeping global warming well below 2.0°C (3.6 Fahrenheit), ideally no more than 1.5°C. Scientists say average temperatures around the world are already at least 1.0°C higher now than during the period from 1850-1900 because of man-made greenhouse emissions.

*From the above discussions, it is clear that it is only a false propaganda to get contributions for Green Fund and can be shared -- see following discussion.*

The latest IPCC report has warned that smaller glaciers in Europe, Africa, the Andes and Indonesia were projected to lose more than 80% of their current ice mass by 2100, if carbon emissions remained high. To high light this, they used some old artefacts from years ago. In one such incident, a US fighter plane from World War II has resurfaced at Iceland's Eyjafjallajökull glacier. According to Iceland Monitor, the American B-17 Flying Fortress bomber had crashed into the glacier on September 16, 1944 that was carrying ten crew members. The crew members survived and sought shelter at a nearby cliff; and later they were rescued after some of them made it to the inhabited places in the country. This shows that at that time the area was free from ice as part of natural cycle. Thus over the years, the snow had buried the wreckage, but now the glacier started retreating as part of natural cycle but not the global warming is the cause of the glacier to retreat, which resulted in the plane resurfacing. Iceland's Met Office says the country's glaciers have retreated by a total area of about 750sq km since 2000 - and are losing an average area of 40 sq. km each year.

**Global Warming!!!**

**Unusual events**

According to Freja Vamborg, a senior scientist at C3S, it is unquestionably an alarming sign that May 2020 has been the warmest month on record globally. However, even more concerning is the facts that average temperatures of the last 12 months have become one of the hottest 12-month-periods ever recorded in our dataset. Of course, this does not as such represent a long-term climate trend, as monthly temperature deviations vary, and some regions showed below average conditions. May 2020 tied with May 2016 for average global land and ocean temperatures, while April 2020 was on par with April 2016 for the hottest temperatures since records began in 1880. The global average temperature for May 2020 was 15.7°C (60.3°F), according to two independent measurements by the European Copernicus Climate Change Service (C3S) and the US National Oceanic and Atmospheric Administration's (NOAA) included in the State of the Climate: Global Climate Report for May 2020.

Both studies found abnormalities over Siberia and the Arctic Ocean with temperatures about 10.0°C (18°F) above average for this time of the year. NOAA reported that the amount of sea ice covering the Arctic Ocean was 7% below the 1981-2010 average - the fourth-smallest May sea ice cover since satellite records began in 1979. Asia had its warmest May on record and the month also marked the first time the region's deviation from its May average temperature had surpassed 2.0°C (3.6°F). May 2020 was the Caribbean's 2nd warmest on record; South America had its 6th warmest May; and it was the 5th warmest May in Africa. The average global temperature increase is being driven by climate change but there are regional variations. For example, in Europe, May was slightly cooler than average over all, and below average over a substantial region extending from Scandinavia to the Balkans and the northern coast of the Black Sea, C3S reported.

However, temperatures were above average over most of southwestern and north-eastern Europe. A historic heatwave affected south-eastern Europe between 16 and 19 May 2020, resulting in numerous maximum temperature records above 40°C (104°F), NOAA found. There were cooler than average conditions across much of Australia in May 2020 and overall the national mean temperature for May 2020 was the coolest since May 2011. In the mainland US, record rain fell mid-month across northern Illinois and central Michigan. Meanwhile, extreme heat and wildfires were reported across the southwest in late May 2020. The 10 warmest Mays have all occurred since 1998, NOAA reported. "May 2020 also marked the 44th consecutive May and the 425th consecutive month with temperatures, at least nominally, above the 20th century average, the agency said. Research suggests that 2020 is unlikely to be the hottest year on record but is predicted to be in the top 10 and may even reach the top five.

Such variations represented by irregular variations [intra-seasonal and intra-annual] in the time series.

**Truncated data series**

If the rainfall follows natural rhythmic variation [all-India rainfall -- annual and SWM -- presenting 60-year cycle] the trend in temperature depends upon the conditions at the start and the end of the data series, namely it is under below the average or above the average. For example: scientists submitted a report to Indian Parliament saying that Indian rainfall is decreasing. They used one cycle data starting with above the average and followed by below the average. Thus it showed decreasing trend [sine curve]. If they would have shifted backwards or forward by 30 years from the starting or ending point of the 60-year cycle, they would have arrived at increasing rainfall trend. So, the condition of rainfall cycle part at the start and at the end part of temperature data series affect the temperature trend also. The temperature series must be corrected/adjusted for such anomalies. Temperature follows rainfall, for example in India during 2002 and 2009 with drought conditions with 0.81 & 0.79% of average annual rainfall presented rise in annual temperature by 0.7 & 0.9°C, respectively (Reddy, 2016).

**Trend needs correction/adjustment**

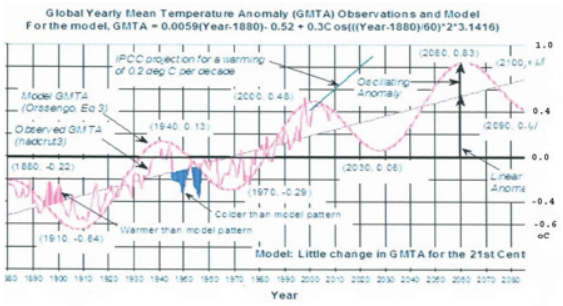


***Figure 6:*** *Global mean annual temperature anomaly for 1880 to 2010.*

WMO (1966) presented methods to separate trend from natural rhythmic variations in rainfall and assessing the cycles if any. (Late) Dr. B. Parthasarathy from IITM/Pune used these techniques in Indian rainfall analysis. Reddy (2008) presented such analysis with global average annual temperature anomaly data series of 1880 to 2010 and found the natural cycle of 60-years varying between -0.3 to +0.3°C & trend of 0.6°C per century [Figure 6; Reddy, 2008]. This is based on adjusted data series but in USA raw data [Figure 7; Reddy, 2016] there is no trend. The hottest daily temperature data series of Sydney in Australia shows no trend [Reddy, 2019a; Figure 8]. Thus, the trend needs correction if the starting and ending point parts are in the same phase of the cycle – below and below or above and above the average parts. During 1880 to 2010 period two full 60-year cycles are covered and thus, no need to correct the trend as the trend passes through the mean points of the two cycles.

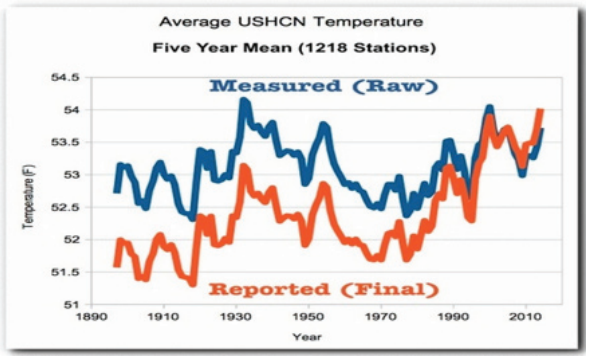


***Figure 7:*** *Average annual temperature series of USA [measured & reported].*

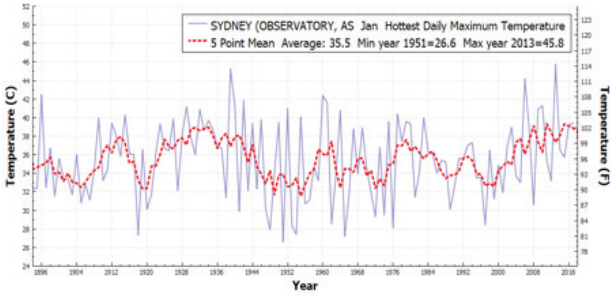


***Figure 8:*** *Annual march of hottest daily maximum temperatures of Sydney in Australia.*

**What is global warming part of the trend?**

According to IPCC AR5, this trend of 0.6°C per century is not global warming but it consists of several factors:

a. More than half is [human induced] greenhouse effect part:

i. It consists of global warming component & aerosols component, etc. If we assume global warming component alone is 50% of the total trend, then it will be 0.3°C per Century under linear trend;

ii. Global warming starting year is 1951 & thus the global warming from 1951 to 2100 [150 years] is 0.45°C under linear trend;

iii. But in nature this can't be linear as the energy is constant [Figure 4] and thus CSF can't be a constant but it should be decreasing non-linearly [Figure 5];

iv. Under non-linear condition [Figure 5] by 2100 the global warming will be far less than 0.45°C and thus the trend will be far less than half;

b. Less than half the trend is ecological changes [land use and land cover change] part – mostly local & regional factors:

i. This consists of urban-heat-island effect and rural-cold-island effect;

1. Urban-heat-island effect – with the concentrated met network overestimates warming;

2. Rural-cold-island effect – with the sparse met network underestimates cooling;

ii. Another important factor contributes rise in temperature is associated with clean energy, etc. It is not trend but lump increase;

iii. Thus, the balance is warming???

iv. The trend will be more than half if (a) comes down as here energy is not involved but only change in ecological conditions are involved;

v. If we have correct representation of cold-island effect, the average may present zero or negative trend – satellite data series in fact showed this pattern but this data series were taken out from internet and put new adjusted data series that matches with ground data series (Reddy, 2008);

vi. Whatever may be the global average, at local and regional levels they show positive, negative and zero zones that really the role;

**Summary & Concluding Remarks**

**Introduction**

Around the globe several types of ex-situ factors over seasons influence the in-situ weather conditions on land and as well over the Oceans, such as heat-waves, cold-waves, dust clouds, smoke clouds, local factors such as heat-island, cold-island, etc. We rarely separate these from the averages to represent true conditions of weather at in-situ level. Modellers compare simulated data trend with observed data trend for extrapolating/forecasting the future trend. The observed data trend is not global warming. Global warming is only a part of trend. For example, MoES (2020) projected that the average temperature in India is to rise by 4.4°C by 2100. If global warming component is 50% of the observed trend [IPCC AR5] then the average temperature in India is to rise by 2.2°C only under linear trend but under non-linear trend it may be negligible. The USA raw temperature data series presented no trend but the global adjusted data series showed a trend as the starting period was lowered. This is the major contributor for pseudo global warming. But showed natural variability – adjusted data series showed 60-year cycle varying between -0.3 and +0.3°C, which will play an important role on year or moth reports.

After looking at reports it is clear that they are not talking clearly on global warming but they tell us why May 2020 recorded higher temperatures. Here it is pertinent to note that a recent report states that "Carbon Dioxide emissions plunged by 17% in April, compared with last year, but have since surged again to within about 5% of last year's level. Also UK stopped coal based power production for more than two months; the coal based energy production over the globe has come down to 36% of total energy, etc. Yet as seen above the global average temperature hasn't stopped its rising. Why? Also, different local regional factors affect temperature in any given year but the global average is steadily rising. How? For example, two years back a spectacular scenario was seen in USA with western half showing warmer than eastern half. Under land use and land cover changes cold-island effect – cooling – gradually increasing over that of heat-island effect – warming either in the form of a trend or a lump-sum rise [this is not accounted]. Don't you think that all these contribute reduction in temperature? It appears that there is something fishy in the steadily rising global average temperature? The following are some observations we need look in to before making hypothetical inferences.

Instead of ritualistically adding extremes in temperatures in certain areas and attribute that to rise in global warming, go deep in to the reasons behind for such high changes. With the steadily raising population, to meet their modern needs land use and land cover are drastically modified. Here heat-island and cold-island effects and other local lump-sum rise or fall due to certain new activities must be accounted properly and corrected the temperature to get correct picture of global average temperatures. Most of the time this is the component that creates fictitious rise in global average temperature! Many a times researchers use truncated data set from a natural variability cycle part and make sensational inferences, a bad science.

This must start at national level and not at global level. Models are heuristic in nature and sow variations from zero to hundreds of per cent, a bad science. Models verify the estimated trend with observed data trend and get high rise. But the trend in observed data is not global warming. Unless global warming component in

the observed data trend, the models overestimate by that amount. Modellers rarely are accounting this.

Those who are harping on global warming as cause for all ills of the society, known as "climate crisis", and environment have little or no basic knowledge on the subject such as agriculture, floods particularly urban flooding, extreme weather events, etc. These are excellently presented in several of WMO reports of 80s & 90s prepared by eminent meteorologists of the world meteorological departments. Very few have the knowledge on such documents. These reports were not biased by fictitious global warming.

Instead of harping on global warming, a non-existent component of temperature, national and international governments must put emphasis on agrometeorological studies that help man-kind in several ways (Reddy, 1993 & 2019a). In rainfall rhythmic variations are present but they differ region to region and these rhythmic variations define the droughts and floods that affect water resources availability and success or failure of agriculture in any given year or period of years and as well temperature. In agriculture we deal with complicated conditions.

**Climate Change & Global Warming vs Climate Crisis**

All ills of the society have been talked as "climate crisis" that was linked to global warming. We see in media thousands of such reports daily. However, the word "climate change" is used either as an adjective or as a de-facto Global Warming as they are sye of using the word "global warming".

Climate is the average weather pattern at a place. In most places, weather can change from minute-to-minute, hour-to-hour, day-to-day, season-to-season and year to year. Earth's climate is dynamic and it is always changing through natural cycles. With modern civilization population growing uninterrupted way that introduced another dimension in the changes in climate. World Meteorological Organization (WMO) of United Nations in Geneva/Switzerland brought out a manual in 1966 on "Climate Change" in which methods were proposed to separate these changes in climate. This was prepared by eminent meteorologists from meteorological departments around the world. However, climate refers to all meteorological parameters, more particularly related to rainfall, temperature and radiation from the Sun & the Earth. I, myself, studied these starting from early 1970s.

The IPCC's Third Assessment Report [also by UNFCCC] defined "climate change" as "statistically significant variation in either the mean state of the climate or in its variability, persisting for an extended period. Climate change may be due to natural internal processes or external forcings or to persistent anthropogenic changes in the composition of the atmosphere or in the land use". Therefore, climate change can occur naturally or from man-made causes.

Natural variability consists of irregular variations that include intra-seasonal & intra-annual variations; and systematic or rhythmic variations expressed by fluctuations or cyclic variations of different durations. These were studied by several scientists including myself using WMO manual (Reddy, 1993 & 2019a). Current wet period in Beira in Mozambique and current dry period in Durban in South Africa were predicted. Agriculture and water resources availability follow these [droughts & floods].

The man induced variations have two parts, namely changes through greenhouse effect and non-greenhouse effect. According to IPCC's AR5, 1951 is the starting year for global warming. Also, more than half of long term trend in global average annual temperature is greenhouse effect and less than half is non-greenhouse effect. It is a qualitative statement.

The non-greenhouse effect relates to changes in land use and land cover. They cover urban heat island effect [in fact in 1818 a book was published based on London Temperature changes] and rural cold island effect (coined by me) that cover irrigated agriculture and artificial water spread areas [dams, lakes, etc.]. In the case of former, met stations present dense coverage and later sparse coverage. That means warm conditions over-emphasized and cold conditions under-emphasized in averaging of temperature. This was reflected in satellite data that presented lower than the adjusted surface data series with little trend (Reddy, 2008). However, satellite data was withdrawn from the internet and released new data series that match with adjusted surface temperature data series.

The greenhouse effect includes global warming and impact of aerosols from volcanic eruptions. If we assume that 50% of the total trend as global warming, then let us see an example:

The global [land & Ocean] temperature data of 1880 to 2010, following WMO 1966 methodology separated. From the trend line it is clear that by 2100, the global [land & ocean] temperature may raise to 1.30oC from 1880. That is in 220 years the rise is 1.30°C; this is

around 0.6°C per century. Thus, global warming component is 50% of 0.6°C is 0.3°C per century or 0.45°C for 1951 to 2100 (for 150 years). That means global warming may be 0.45°C by 2100 under the linear trend.

To provide inputs to the coming IPCC's "AR6 Report" on global warming, institutions around the world have been burning midnight oil by two different types of groups, namely (a) statistical approach using observed data [ground & satellites]; and (b) hypothetical model simulations. Ministry of Earth Sciences of India presented for India: observed trend is 0.7°C for 120 years & modelled trend = 2.7 (best case scenario) to 4.4°C (worst case scenario) by 2100. Thus, global warming respectively is 0.3°C per century or 0.45°C by 2100 – it is the same for global average -- and 1.35 to 2.2°C by 2100. According to the model predictions Paris Agreement limit has already crossed. Also, day-to-day, season to season, year to year variations in temperature presents very high variations when compared to such variations.

In nature trend can't be linear as the other main input Sun's energy is constant which is modulated by natural variations associated with sunspot cycles. However, it is modified by local "soil-climate system" and also there are several other factors affecting the trend. The USA raw temperature data has no trend but the global adjusted data has a trend by lowering the starting period. The hottest daily maximum temperature data of Sydney in Australia has also no trend, but has a natural variability – adjusted data series showed 60-year cycle varying between -0.3 and +0.3°C, which will play an important role on year or moth reports. Such inaccurate data are being used in legal battles and as well by financial institutions; "climate crisis" is attributed to such global warming estimates. Unfortunately in USA Presidential Elections are being fought on such issues by planning to spend trillions of $ forgetting the major issue of pollution [air, water, soil & food]. However agrometeorological studies could help in overcoming climate crisis if any in agriculture & water resources use. .

Temperature is a highly localized/regionalised. Several local conditions define the temperature regime, for example "Climate System" as defined by IPCC in its AR5, General Circulation patterns – for example Western Disturbances define heat & cold waves in India; circumpolar vortex formation at higher latitudes in USA, etc.

Synonimous to the word "urban-heat-island effect", I coined the word "rural-cold-island effect" (Reddy, 2008) to account the drastic & gradual changes in agriculture system of cultivation. That is, dry-land (Rainfed) to wet-land (Irrigated, water spread in dams, etc.).

- Carbon Dioxide ($CO_2$) presents a nearly linear increase with the population since 1960.
- Greenhouse effect if any associated with $CO_2$, it must be far lower in SH compared to NH in proportion to $CO_2$ levels in the respective hemispheres;
- Urban-heat-island effect must be far higher in NH over that of SH in proportion to urban areas in the respective hemispheres;
- Rural-cold-island effect follows area under agriculture, more particularly irrigated areas. In India and China have the same amount of areas under irrigation, though China is three times larger than India;
- Thus,the use of the word "global warming" a misnomer;

After correcting to all those factors, the global warming component is expected to be negligible or even zero. This is what Indian temperature at state levels showed (Reddy, 2020a). CSF will be non-linearly decreasing to reach negligible impact on temperature [see Figure 9b]. Before going to concluding remarks, few important points need to be said. They are:

- In Bay of Bengal & Arabian Sea higher number of severe cyclonic storms occurred in both warm and cold seasons [May in pre-monsoon Season and November in Post-monsoon Season] with wide temperature difference. Same is the case with storms in USA. Thus, temperature magnitude is not the driving force behind the formation of cyclonic storms in general but it is the temperature gradient similar to Sea-breeze, Land breeze, Lake Breeze, etc. They determine the wind speed & direction (Reddy, 2008, 2016 & 2019a);
- The south-eastern part of India receives rainfall in both the SWM and the NEM monsoon seasons. They present 56-year cycle but in opposite direction. If in one rainfall present increasing trend and the other show decreasing trend. Similar pattern is also seen in Australian rainfall [summer & winter] but needs to look in to the cyclic variation issue. We need to analyse historical data of Australia before airing the statements. This is science!
- The cyclonic activity in Bay of Bengal follows the 56-year cycle of SWM – during above the average 28 year period, the number of cyclones were more than 10 per year and in below the average 28 year period they are < 10 per year [Reddy, 2000 & 2008].

Finally, in conclusion, it can be said that Agrometeorology (Reddy, 1993 & 2019a), an applied science, is an answer to avoid climate crisis (if any), for example in agriculture (Reddy, 2019b), water resources (Reddy, 2019c), etc. However, destruction caused by human greed doesn't come under climate crisis (Reddy, 2020a&b), for example urban floods, etc.

**Appeal:** "Dear Secretary General, UN: Forget on pseudo global warming and carbon credits and put emphasis on pollution [air, water, soil & food including adulterated food] that have been causing severe health hazards – rich or poor; developed or developing countries; religion or caste. Please create "Green Fund" on this on the same lines of global warming – carbon credits. As long as there is no green fund no nation or institutions are interested in the pollution issues [carbon dioxide is not a pollution but part of Air]. We appreciate if you could bring this issue at COP26"

**"Flies Flock Sweeteners" – that is Global warming**

**A. Himalayan Tragedy of 7th February 2021**

This tragedy [by 16th Feb. 56 bodies recovered] evoked tremendous media hype with Global Warming theory!

*February temperatures can drop to below zero in the hills of Chamoli and summer is a long way off. Why then, did a glacier burst, to such disastrous effect? Geologists who have been studying the region said climate change is to blame. Himalayan glaciers have been retreating faster than anywhere in the world. --- Scientists say no glacial Lake seen in this region.*

2013 flood tragedy of Uttakhand & Srinagar floods in 2014 [Jhelum River] are primarily due to encroachment of river beds, that caused thousand people death in the former. So also the present case human tragedy is mainly to power project. Sloppy mountains, water flows accelerate that cause severe damage on its way [river course, settlements, etc.].

1. According to a 2013 IPCC report, "glaciers have continued to shrink almost worldwide" over the prior two decades and there is "high confidence" that Northern Hemisphere spring snow continues to decrease. These are false statements. See below:
2. Himachal Pradesh, Jammu Kashmir and Uttarakhand received fresh snowfall on Thursday and Friday [5-6th February 2021]. Shimla got its first snowfall of 2021 on Thursday. The popular tourist destinations of Kufri, Manali and Dalhousie were draped in a white blanket of snow as the cold wave intensified across the state. Shimla received 50 cm snowfall, which is the second-highest snowfall in a day in the last 30 years. Simultaneously, Uttarakhand, Mussoorie received heavy snowfall. Rain and icy winds intensified the cold conditions in Dehradun and temperatures dropped sharply. The Himalayan temples of Gangotri and Yamunotri in Uttarakhand received fresh snowfall on Thursday, while continuous rainfall hit the lower areas. According to India Meteorological Centre, light rain or snow are likely over parts of Ladakh, Himachal Pradesh and Uttarakhand during next 24 hours.
3. In 2014 a study of 2181 Himalayan glaciers from 2000-2011 showed that 86.6% of the glaciers were not receding. This was also informed to Indian Parliament by the minister of forests & environment and climate change after his return from Paris meet in December 2015. Heavy snowfall recording was also reported in the previous two years in Himalayan zone. Also, now government of India's "Water Resources Minister" in the month of May in 2020 said that the snow this year on "Himalayan Peaks" is the highest in 50 years, and reservoirs in downstream will receive very high water inflows from snowmelt during summer and southwest monsoon. In fact the situation is similar to massive floods in last year [2019], but on a bigger scale.
4. Al Gore admitted a mistake of his own observation that "the latest research showed that the Arctic could be completely ice-free in five years" is not based on science but based on "assumed" information. In fact the Inconvenient Truth in which it is a part fetched millions and now second edition is doing the same. Also, IPCC admitted glacier goof-up and says the Himalayan Glaciers won't melt by 2035. IPCC had expressed regret for erring on the Himalayan glaciers in its AR-IV. It says that "It has come to our attention that refers to poorly substantiated estimates of rate of recession and date for the disappearance of Himalayan Glaciers. In drafting the paragraph in question, the clear and well established standards of evidence, required by IPCC procedures were not applied properly". However, R. K. Pachauri, the head of IPCC has previously dismissed criticism by some of us in India on the Himalayas claim as "voodoo science". IPCC and Al Gore withdrew their conclusions only after receiving the Nobel Prize but Nobel Prize was not returned.

**B. Global Warming**

1. Climate Change is a vast subject. It contains natural variation [Rhythmic variations & irregular variations – intra-annual and intra-seasonal] and human induced variations [trend]. In Global Temperature Anomaly, the natural variability presented a 60-year cycle varying between -0.3 and +0.3°C.
2. The word global warming is a misnomer. There is no global warming as such. Carbon dioxide increases in the atmosphere linearly with population growth. This is clearly evident with very low carbon Dioxide levels in the Southern Hemisphere compared to Northern Hemisphere. Also the data recording started at few locations around 1960s. Indian temperature presented increasing trend in some parts, decreasing trend some other parts & no change in major part of India. The increasing and decreasing trends are respectively associated with urban heat island and rural cold island effects.
3. Trend: According to IPCC AR5, more than 50% of the trend caused by human actions is associated with greenhouse component effect in which global warming is a part. The global adjusted temperature data series showed the trend as 0.6°C per century. Even if we assume 50% is global warming, it is 0.45°C for 1951 to 2100. Without data adjustment it is practically zero. In fact satellite data series presented zero trend only but this was latter adjusted to fit in to adjusted ground data series -- though satellite data takes in to account rural cold-island effect unlike ground data where the met network is sparse in rural areas.

**C. Natural Variability in rainfall**

1. Earth's climate is dynamic and it is always changing through the natural cycles. What we are experiencing now is part of this system only. It is beyond human control. We need to adapt to them.
2. No trend in rainfall. As part of natural cycles in rainfall, droughts and floods are common to India. The water availability in rivers follows this cycle. All-India annual rainfall presents a 60-year cycle; -- This is similar to Indian Astrological calendar wherein Prabhava started in 1987/88 & it lags by three years to Chinese Astrological 60-year cycle. 2009 & 2002 are drought years with rise in temperature by 0.9 & 0.7°C at all India level.
3. Water flows in River Brahmaputra are following the tree rings; the 30 year period from Prabhava is above the average part of the cycle – a wet period similar to tree ring part; 30 year period before Prabhava is below the average part of the cycle – a dry period similar to the tree ring part; Also 1830-60 tree ring part of dry period fall under below the average 30 year period [1835-66].
4. The yearly water availability in Godavari River and high magnitude floods in NW Indian Rivers follow the all-India annual rainfall 60-year cycle. Current dry period of 30 years started from 2017-18.

**D. Climate Justice**

PM Modi Address at Sustainable Development Summit - 2021 emphasised on climate justice to fight climate change. Climate Change is not global warming linked to greenhouse effect related carbon dioxide increase in the atmosphere – see WMO report of 1966, IPCC AR3 (2001), AR4 (2007) & AR5 (2014) and UNFCCC Article 1.

The adjusted linear trend in observed global annual average temperature showed to reach less than 0.45°C by 2100 – without adjustment it is Zero Degrees Celsius. However, the natural variability in temperature showed -0.3 to +0.3°C with 60-year cyclic pattern. 60-year cycle is seen in Atlantic Ocean & Pacific Ocean temperature regimes and changes in ice in North Pole and South Pole regions with seasonal changes [summer low and winter high].

Even if we achieve zero raise in carbon dioxide in the atmosphere, the solar & wind power fields raise the temperature. This is nothing to do with greenhouse effect. Here the main issue appears to be profit driven power production wherein huge sums of subsidies change hands. Here green energy is not green as said.

In the last two decades Himalayan Mountains received heavy snowfall and thus this reflects more energy coming from the Sun and thus it causes cooling effect and not warming effect as some vested groups, running for green fund, propaganda.

With the Polavaram project and Godavari Projects in TS, the temperature will come down around these regions with increased levels of water vapour in the atmosphere that reduces incoming radiation. This scenario is seen in Punjab, Hadrian, UP surroundings – decreasing trend in temperature. This is the reality.

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