AGRICULTURAL EXTENSION JOURNAL
ISSN 2582- 564X

Available Online at www.aextj.com
Agricultural Extension Journal 2024; 8(4):235-244

CASE STUDY

The Role of Air Pollution on Climate Change: Myths and Realities

S. Jeevananda Reddy

Formerly Chief Technical Advisor – WMO/UN & Expert – FAO/UN, Telangana Academy of Sciences, Convenor, Forum for a Sustainable Environment, Hyderabad, Telangana, India

Received: 05-10-2024; Revised: 10-10-2024; Accepted: 02-12-2024

ABSTRACT

After industrialization with high growth in population and associated new lifestyles, air pollution levels have gone up steeply and became a major health hazard activity, which, in turn, doubled the pollution levels with the drug manufacturing industries and corporate hospitals. The major air pollution causing activities are industrialization, transportation, and agriculture. In addition, air pollution is created by burning of agriculture waste, domestic waste, wood for cooking, forest fires, etc. Air pollution is also modifying the climate in diverse ways. One important component is urban-heat-island effect in summer and in winter warming. To account urban warming effect, met network is well covered in urban areas. To account cooling effect in rural areas, met network is not well covered. Same is the case with the oceans/seas that cover two-thirds of the globe. Since 2000–2024 presented a steep rise in temperature which is the result of satellite measurements in place of surface based met stations. Furthermore, several cold related issues were not taken into account in the mean average temperature. Indian Minimum temperature presented 0.011°C/year during 1880–2020. However, maximum temperature presented a depression in the central part of temperature time series. Similar pattern with less intensive is seen in mean temperature. Reports suggested that global warming is making extreme downpours in Spain. It is reported that global warming made Spain's rainfall about 12% heavier and doubled the likelihood. Reports suggest that Emissions for fertilizers occur not during their production, but during their use; soil treated with manure or compost fertilizer stores more carbon than soil treated with chemical fertilizers or no fertilizer; greenhouse gas (GHG) emissions from organic farming measured as carbon dioxide equivalents (CO_2 eq.) and amounted to 1603 kg CO_2 eq., while the chemical fertilizers based conventional system was responsible for 1893 kg CO_2 eq. If this is controlled that proportionately GHGs could be brought-down without any modification in technology and with modification with the technology, this percentage can reach as high as 50%.

Key words: Climate change, global warming, Northeast Brazil rainfall, urban air pollution

INTRODUCTION

Science has empowered mankind with the knowledge and secrets of universe and the role of human beings can play toward ensuring sustainable planet, the "Earth" and ensuring a healthy and happy life within one's life span and transferring the pro-planet growth system and strategies to the future generations. Here, it is pertinent to note what Mahatma Gandhi said, "India has enough resources to fulfill everyone's need but it cannot fulfill one person's greed."[1]

A report observed that "Mexico announces food and agriculture plan that could take the country back to the 1980s." Associated press finance updated October 23, 2024. Mexico's new president announced an agriculture plan could make the country's food production and distribution look a lot

Address for correspondence:
S. Jeevananda Reddy
E-mail: Jeevananda_reddy@yahoo.com

more like it did in the 1980s. Figure 1 presents the Mexico food plan: A farm worker irrigating black beans with wastewater.[2]

CLIMATE CHANGE

The Earth's climate is dynamic and it is always changing through the natural cycles. The humans are experiencing today is part of this system only. It is beyond human control. Humans need to adapt to that. Our forefathers adapted to this but the modern man to meet with the greed destroyed this system and brought in the new concept of global warming to divert from the real issues that humans are facing as in that also they are the main beneficiaries.[3]
According to these definitions, climate change consists of (1) natural variability and (2) man-made trend.

Natural Variability

It consists of (1a) irregular variations that include inter-annual and intra-seasonal variations and (1b) systematic variations/rhythmic variations or cyclic variations. It is applicable to rainfall, cyclones/hurricanes/typhoons and temperature-land and oceans.[4]

Rainfall

I found 52 year cycle in dates of onset over Kerala Coast (published in 1977); later, I found 60-year cycle in precipitation data of Mahalype in Botswana (published 1981); 52-year cycle in precipitation data series of Northeast Brazil (published in1984); 54-year cycle in Mozambique and 66-year cycle in Durban in South Africa precipitation data (published in 1986); and in Ethiopia found 36 year cycle in uplands and 28 year cycle in low lands (Asmara now in Eritrea showed 22-year cycle) (published in 1990). These are included in my 1993 book based on my work in several countries in 80s and 90s.[5]

Figure 1: Mexico food plan: A farm worker irrigate black beans with wastewater

GLOBAL WARMING

Global average annual temperature anomaly of 1880–2010 – there are diverse versions both with surface data and satellite data (most of them are adjusted data series only and not raw data series) – presents 60-year cycle varying between −0.3°C and +0.3°C with a linear trend of 0.6°C/century. Under linear trend if around 50% of this is 2ai (global warming component), then it is 0.3°C/century and the same from 1951 to 2100 it is 0.45°C (as per Intergovernmental Panel on Climate Change [IPCC], 1951, is the starting year of global warming).
A report says that if we are aiming to limit global warming to 1.5°C or 2.0°C above a certain point, we need a common understanding of what we're working from. However, the Paris Agreement does not provide a definition. This becomes key issue as governments expect climate scientists to coherently compare different plans to reach their Paris targets. It is crucial to be clear on what researchers mean when we say "pre-industrial," and what assumptions our projections are based on. However, IPCC put that at 1951 – before that the temperature data presented 60-year cycle – continued up to 2100. Important issue is when the data series present natural variability pre-industrial base line is not an important issue.[6] This is aligned with data series trend if any [Figure 2a]. Figure 2b following Figure 2a.
2023 was the warmest year since global records began in 1850 by a wide margin. It was 2.12°F (1.18°C) above the 20th-century average of 57.0°F (13.9°C). It was 2.43°F (1.35°C) above the pre-industrial average (1850–1900).
From January to September 2024, the global mean surface air temperature was 1.54°C (±0.13°C) above the pre-industrial average, amplified by a warming El Niño, according to an analysis of six international datasets used by the World Meteorological Organization (WMO).

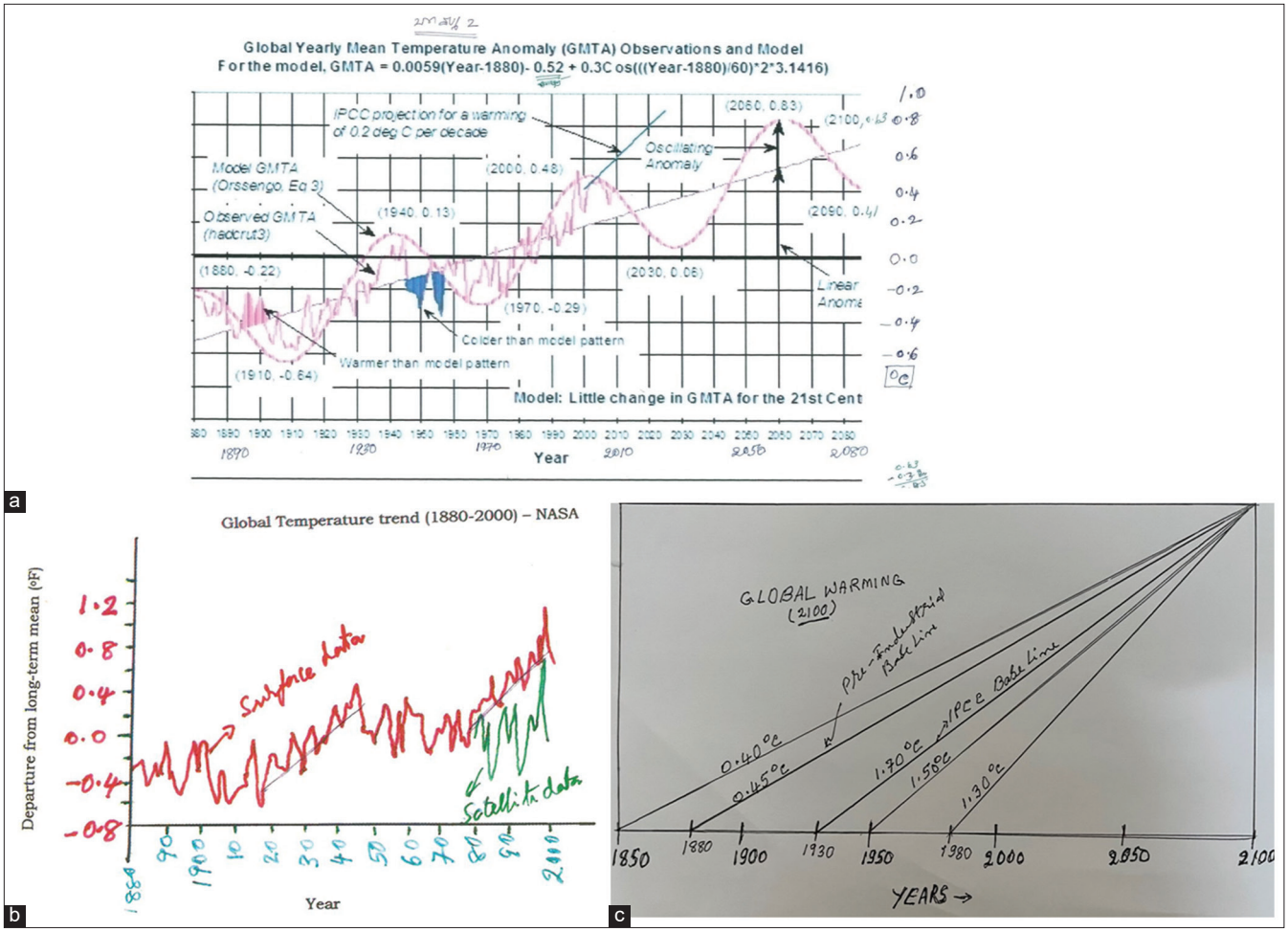

Figure 2: (a) Global yearly annual mean surface temperature anomaly observed and model. (b) Global temperature trend (1880–2000-NASA) in red and satellite data 1980–2000 in green. (c) Global warming under pre-industrial base line and Intergovernmental Panel on Climate Change 1951 base line

A report presented that "The January-September 2024 global mean surface air temperature was 1.54°C (with a margin of uncertainty of ±0.13°C) above the pre-industrial average, boosted by a warming El Niño event, according to an analysis of six international datasets used by WMO." The report was issued on the 1st day of the UN Climate Change Conference, Conference of the Partie (COP 29), in Baku, Azerbaijan. It highlights that the ambitions of the Paris agreement are in great peril.[7]

IPCC proposed 1951 as the starting year of global warming [Figure 2a], this is given as 0.2°C/decade from 1951 (in reality that it is 1931) onward. That means, the trend for 1951–2100 is 3.0°C and 50% of it is global warming, namely, 1.5°C as presented in COP 21 at Paris document. Figure 2c presents trend lines to 2100 from 1850 to 1880 as is the case of Figure 2a; and 1931, 1951, and 1981 as per the line of 0.20°C/decade [Figure 2a].

From 1850, the global warming is 0.40°C for 1951–2100 or from 1880, it is 0.45°C for 1951–2100. Figure 2c presents the global warming under pre-industrial base line and IPCC 1951 as base line. Global warming for 1951–2100 is 1.50°C.

POLLUTION IMPACT ON NATURE

There are various types of pollution, that is, air, water, land, noise, soil, light, thermal, radiation, etc. Accordingly, each and every type of pollution has its own distinguishing causes and environmental effects. Understanding pollution and its various causes can help address the various concerns link to environmental degradation and destruction, and the dangers it brings to human health. Air pollution plays an important role in climate/weather.[8]

Air is the most polluted environmental resource. It is the introduction of harmful substances in the air that

results in detrimental impacts to the environment and humanity. Air pollution reduces air quality by making it unclean or contaminated. It occurs when harmful substances such as foreign gases, odors, dust, or fumes are released into the air at levels that can harm the comfort or health of animals and humans, or even destroy plant life. Air pollution results from both human and natural activities.[9]

Air pollution is caused by emissions from manufacturing industries and power plants, vehicular emissions, smoking, natural events such as volcanic eruptions, dust storms, earthquakes, and wildfire, and burning of waste materials such as agriculture waste, wood, rubber, and plastics. The common air pollutants include hydrocarbons, volatile organic compounds, dust particles, carbon monoxide, sulfur oxides, particulate matter, chlorofluorocarbons, and nitrogen oxides. Figure 3a resents an example of human activities.[10]

Chemical pollution is caused mainly by the industrial wastes. Leakage of chemicals from the landfills and mines causes chemical pollution. Figure 3b presents the chemicals such as dyes, oils, and grease come out as the industrial waste without proper treatment. Chemical pollution also leads to air pollution and are also seen in the air. Burning release, the chemical pollutants in specific the air pollutants in the atmosphere. This is a major issue in recent times due to technological development and growth of industrial sector. Chemicals are also extracted from the pesticides and fertilizers which are given to plants. However, these have an adverse effect on us and also on plants, which, in turn, will affect us. Organic fertilizers are preferable. Inorganic waste or chemicals are highly hazardous to us and also to our environment.[11]

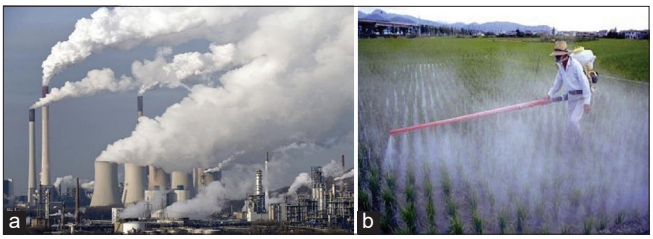

Figure 3: (a) An example of air pollution. (b) Chemical pollution

Figure 4: Burning of paddy stubble at Panipat in Haryana

URBAN AIR POLLUTION

Burning Fields, a Common Practice [Figure 4]

In India, there are two cropping seasons – Kharif and Rabi. The Kharif generally starts from April and lasts till October. The Rabi season starts from November end by April. To prepare their fields quickly for sowing wheat and other Rabi crops, most farmers burn the crop residues after paddy harvesting gets over. Every year in Punjab, about 7–8 million metric tons of paddy residue is burnt openly between October and November. Although erring farmers have been warned by the state authorities, they continue with this practice as it involves no cost.

Experts say lack of adequate machinery makes strict implementation of "not burning fields" impossible. Although farmers are being offered machines on subsidy to clear the stubble, they continue to resort to burning. Between the paddy harvesting and wheat sowing seasons, farmers get just 15–20 days. To clear the paddy stubble, a large number of machines are required at low prices, which are most often not the case.[12]

Most farmers prepare their fields for sowing wheat by burning down the crop residues. This is a bad practice as it leads to severe air pollution over neighboring areas in winter. Come winter, and the air quality in northern and north-eastern India begins to deteriorate. A thick blanket of smog (mixture of smoke and fog) engulfs the National Capital Region which reduces visibility and gives a tough time to commuters. A major reason for the poor air quality is the burning of paddy stubble by farmers in Punjab and Haryana. This practice comes in handy for farmers as they prepare their fields for sowing Rabi crops. However, the thick smoke which emanates as a result of setting fields on fire poses serious health hazards for people. Burning fields also affects the

quality of the soil, robbing it of vital nutrients. The smoke contains toxic chemicals which causes respiratory problems and other diseases. The smoke combined with vehicular emissions make the air we breathe deadly. The national capital is the most affected by bad air quality as it lies close to Punjab and Haryana.[13]

EFFECTIVE AIR POLLUTION POTENTIAL INDEX

Stable air wherein temperature increases with height is conducive for the formation of pollution layer. The layer at a given pressure level will act as a barrier to upward motion of warm air from surface and down coming radiation from above and by which the discomfort will increase. Air pollution refers to the release of pollutants into the air – pollutants that are detrimental to human health and the planet as a whole. According to the World Health Organization (WHO), each year, indoor and outdoor air pollution is responsible for nearly seven million deaths around the globe. Ninety-nine percentages of human beings currently breathe air that exceeds the WHO's guideline limits for pollutants, with those living in low- and middle-income countries suffering the most. In the United States, the clean air act, established in 1970, authorizes the U.S.

In general, maximum effects of pollutants are observed over inland stations in winter and over coastal stations in summer. Out of five stations considered Lucknow has high effective pollution potential and New Delhi, Nagpur, Ahmedabad, and Jodhpur follow. Similarly, out of five coastal stations under consideration, Mumbai has high effective pollution potential and Kolkata, Chennai, Visakhapatnam, and Trivandrum follow.[14]

Method of Estimating Effective Air Pollution Potential Index

Stable air where temperature increases with the height is conducive for formation of pollution layer Figure 5. The layer at P will act as a barrier to upward motion of the warm air from the surface and down coming radiation from above and by which the discomfort will increase. Keeping these points

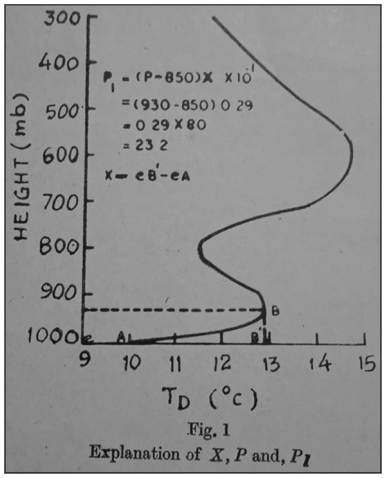

Figure 5: Stable air where temperature increases with the height

in view, the effective pollution potential is defined as follows:

Increase in effective pollution potential corresponds to (i) the increase in the thickness between 850-mb level and inversion point P downwards and (ii) positive increase in the separation between inversion point value (TDi) and surface value (TDs); positive if TDi > TDs where i and s, respectively, stand for inversion point and surface value of TD. Therefore, an effective pollution potential index (Pi) is,

$Pi = ([P–850] \times)/10$

Where × = TDi–TDs in °C

In which TDi and TDs are, respectively, the temperature departure values at inversion point and surface which, respectively, corresponds to B' and A. Pi is the height of the inversion layer, in mb it corresponds to the height of B, given as P.

The layer at a given pressure level will act as a barrier to upward motion of warm air from the surface and down coming radiation from above and by which the discomfort will increase. As the height of the inversion base affects smog density ordinarily, the lower the base the worse is the smog. The high concentration of pollutants corresponds to strong inversion to get an amplified and uniform temperature difference from inversion layer to the surface, the vertical temperature profile is subtracted from the standard atmospheric temperature profile and then the difference is obtained.

In general, maximum effect of pollutants is observed over inland stations in winter and over coastal stations in summer. Out of five stations considered Lucknow has the highest effective pollution

potential and New Delhi, Nagpur, Ahmedabad, and Jodhpur follow. Similarly, out of five coastal stations under consideration, Mumbai has the highest effective pollution potential and Kolkata, Chennai, Visakhapatnam, and Trivandrum follow.[15]

POLLUTABILITY CLASSIFICATION OF INDIA

Air pollution affects the atmospheric properties in a variety of ways (unpublished report by Raman *et al*., 1975; IMD, Pune). With the rapid industrialization, atmospheric pollution is also vastly increasing. Pollutants transfer with human activity by their intensity and residence times which are a function of the meteorological parameters responsible for the transport and diffusion in the lower layers of the atmosphere. In general, low wind speed and temperature inversions associated with high rates of emissions of pollutants result in adverse conditions. A pollutability index was suggested as a measure of the transport and diffusion of pollutants in the atmosphere. The pollutability index is defined in terms of atmospheric stability and wind speed. A pollutability index of India was prepared using the data for clear/winter months (i.e., October to March). Moreover, salient futures are presented below.

Based on the period of pollutability, India was divided in to four zones.

The meteorological parameters governing the transport and diffusion of pollutants in the atmosphere are wind speed and direction, atmospheric stability, and rainfall. A region of high S (99%) seen over Lucknow in the belt of 18°N and tappers off slowly on either side to about 60%. South of 18°N, it is seen gradually decreasing from east coast, where a region of high S is seen over Chennai with 60%. South of 20°N latitude, two regions of high W (i.e., ≥60%) are seen, one over Pune elongated in North South direction and on other over Western parts of Odisha. North of 20°N lat. regions of high W (≥80%) are seen over entire NE India, extreme NW parts of Rajasthan, Western parts of Central Madhya Pradesh, southern parts of east Madhya Pradesh and North, Southern Parts of Madhya p/radish, and extreme southern parts of Uttar Pradesh.

Using the above data, the pollutability indices have been prepared for clear/winter months (i.e., October to March). To assess the potentialities of various regions, the pollutability indices are classified into four groups in the increasing order of pollutability as follows [Table 1].

The meteorological sub-divisions that come under these classifications are as follows:

- Negligible: Kerala, South Tamil Nadu, Rayalaseema, Western parts of Coastal Andhra
- Slight: South Karnataka, North Tamil Nadu, Western parts of Saurashtra, Kutch and Diu and Coastal parts of Odisha; Gujarat (except western parts of Sourashtra, Kutch and Diu), and Coastal parts of Odisha
- Moderate: North Karnataka, Telangana, Maharashtra (except central parts of Madhya Maharashtra), Gujarat State (except western parts of Sourashtra, Kutch, Diu), and Madhya Pradesh (except extreme north east Madhya Pradesh, Rajasthan) (except north-western parts of Rajasthan). Himachal Pradesh, Punjab, Haryana, Jammu, and Kashmir, eastern parts of Bihar plateau, eastern parts of Odisha (excluding coastal regions) and Mizoram;
- Severe: Central parts of Madhya Maharashtra, east Madhya Pradesh excluding extreme northern parts, northern parts of west Rajasthan, Uttar Pradesh, Bihar Plains, Bihar Plateau (excluding eastern parts), western parts of Odisha, West Bengal, Assam, Nagaland, Manipur, and Tripura.

Period of Pollutability over Different Parts of India

The above represents the general intensity of pollutability in different parts of India.

Considering clear months alone except Pune (maximum temperature), Trivandrum, Visakhapatnam, and Calcutta (sunshine duration), all the three meteorological parameters under

Table 1: Pollutability indices classification

Category	Pi
Negligible	≤30
Slight	31–50
Moderate	51–75
Severe	≥75

consideration showed increase on more than 50% of occasions, of all the parameters considered solar radiation exhibited highest on Sundays increased of all the stations Ahmedabad showed highest Sunday vis-à-vis week day values [Table 2].

In conclusion, the study points out that industrial schedule has a pronounced effect on solar radiation exhibiting a weekly cycle – higher on Sundays and lower on week days. Next to solar radiation maximum temperature is being affected by pollution cycle.[16]

RAINFALL PATTERNS OF NORTHEAST BRAZIL VERSUS DROUGHT IN AMAZON RIVER

The Amazon basin, the largest in the world, covers about 40% of South America, an area of approximately 7,050,000 km^2 (2,720,000 sq mi) Figure 6a. It drains from west to east [Figure 6b], from Iquitos in Peru, across Brazil to the Atlantic. It gathers its waters from 5° north latitude to 20° south latitude. Its most remote sources are found on the inter-Andean plateau, just a short distance from the Pacific Ocean.[17]

A report says that the Amazon River and its tributaries are characterized by extensive forested area that becomes flooded every rainy season. Every year, the river raises more than 9 m (30 ft), flooding the surrounding forests, known as ("flooded forests"). The Amazon's flooded forests are the most extensive example of this habitat type in the world. In an average dry season, 110,000 km^2 (42,000 sq mi) of land are water-covered, while in the wet season, the flooded area of the Amazon basin rises to 350,000 km^2 (140,000 sq mi) – that is in dry season, it is one-third of wet season which is covered.[18]

The Auto-regression analysis of 133-year data series of Fortaleza (Region I) during 1849–1981 revealed four cycles, namely, 52, 26, 13, and 6.5 years. Through iterative regression, the normalized amplitudes and phase angles for these four cycles were determined and these are presented in Table 3. The integrated curve of these four cycles was compared with the observed precipitation data for the rest of the stations. In the data series, some period presented reverse pattern – an error in the data. However, there are some errors in data for example Fortaleza/Juazero [Figure 7] with the average rainfall of 425 mm. That is the precipitation presented decreased trend from north coastal stations to inland stations parallel to Amazon River. Others reported a 13-year cycle[18]

Table 2: Percentage of occasions the Sunday value is higher than the other week days

Station	Whole year (in %)			Clear months (in %)		
	Tx	S	Rt	Tx	S	Rt
Trivandrum	56	50	61	61	39	55
Chennai	64	56	70	72	56	66
Visakhapatnam	61	42	61	67	45	66
Pune	47	60	78	23	72	89
Mumbai*	63	50	58	63	50	75
Ahmedabad	61	64	58	61	83	61
Calcutta	75	54	72	67	45	78
Kanpur*	63	54	63	58	50	67
New Delhi	60	58	64	39	78	62

Data for the period 1870–1871 and for the rest 1965–1967. Tx: Maximum Temperature, S: Hours of bright Sunshine; Rt: total solar radiation

Figure 6: (a) Map of Brazil along with pattern of Amazon River. (b) Map of Amazon River

Table 3: Amplitudes and phase angles of four cycles in Fortaleza data

Cycle (years)	Amplitude*	Phase** (degrees)
52	0.1875	6.923
26	0.3125	318.462
13	0.3125	110.769
6.5	0.1875	0.000

*Normalized amplitude presents the deviation from the average as a ratio of average, **The phase angle corresponds to 1911 for Fortaleza

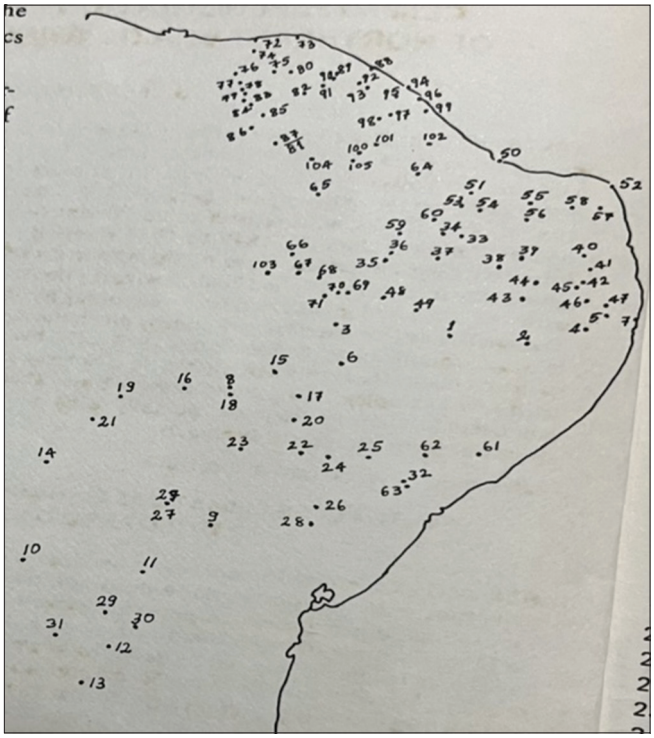

Figure 7: Stations used in the spectral analysis from northeast Brazil

reported 26-year cycle, which found cycles 26 and 13 years as significant. However, they stated that these two cycles explained only 24% of variance in the data series. Reddy[6] found cycle of 52-years in the dates of onset of southwest Monsoon over low latitude Kerala Coast (India). However, this cycle lags behind about 15 years to Fortaleza rainfall data.[19]

CONCLUSION

Misinformation on Hurricanes

Misinformation on hurricanes recently spread like a wild fire. Some are coming up with the theory of geo-engineering and cloud seeding,[10] etc. This is with reference to recent hurricanes Helene and Milton for the sudden change in intensity and heavy rains along with winds. Cloud seeding is a technique of artificial rainmaking at a given place and time injecting artificial condensation nuclei into the clouds. However, cloud seeding is not viable alternative for augmenting precipitation in India. This needs low pressure system clouds – not suitable to seed cyclones in Bay of Bengal as seeding is not possible – this more hazardous to seed hurricanes in the Ocean area.

Intensification of Hurricanes is attributed to Warming of Gulf of Mexico (GOM) Zone with Global Warming

The other phenomenon with reference to hurricanes Helene and Milton attribution to global warming that raised the sea surface temperatures in the GOM. The trend in global warming is associated with not only global warming and other localized/regional factors – non-global warming component. Furthermore, global warming is a global average that it is not applicable to local and regional factors. That is local systems may contribute to cooling or warming like cyclic pattern in ocean temperature. At present, the Atlantic Ocean presents above the average temperature part of Atlantic Multidecadal Oscillation's cycle ending by 2024 and from 2025 onwards, it is below the average for the coming 30-years, and thus, hurricane number will be lower. The GOM zone also presented a 60-year cycle. At present, the period is under above the average condition. The warming condition is associated with this and not to global warming. Furthermore, from 2005 onwards, it presents the below the average 30 years and temperature comes down in GOM zone.

Amazon Drought Condition

This is associated with the below the average rainfall cycles 52, 26, 13, and 6.5 synthesized pattern that ended in 2024, a warming period along with the increased temperature due to deforestation. The coming period will be above the average period. This is nothing to do with global warming a global phenomenon. The maximum discharge from 1998

to 2023 followed the above the average rainfall pattern as predicted by the author.

Urban-Heat-Island and Rural-Cold-Island Effects

The major air pollution causing activities are industrialization, transportation, and agriculture. In addition, air pollution is created by burning of agriculture waste, domestic waste, wood for cooking, forest fires, etc. However, air pollution is also modifying the climate in diverse ways.

One important component is urban-heat-island-effect. Unplanned urbanization, such as converting into concrete Jungle with destruction of water resources and greenery, that is playing a critical role. Air pollution impact causes non-greenhouse effect on temperature. In urban areas, met network are well covered. The other component is rural-cold-island-effect that covers around 90% of the land areas covered sparse met network. This is same with oceans/seas that cover two-thirds of the globe. That means met network is well covered that goes into global average temperature and the sparse met network under rural-cold-island-effect and oceans/seas under-representing in the global average temperature trend component. That means global warming component is over estimated.

In climate change, the main component is natural variability. Recently, there is a spurt in reports relating dry condition in Amazon River zone. In fact, this is part of natural variability in rainfall that form dry and wet conditions that form part of natural cycle in rainfall. High rainfall in Spain is another example.

Air Pollution

Several factors are contributing to air pollution in urban India. With the fuel and vehicle technologies, cost of fuel and vehicles have gone up and reduced the pollution levels. This was countered by other human actions that helped in raising air pollution levels within few years. In Hyderabad adulterated fuel sale by mixing with kerosene, it is sold in Public Distribution System on ration cards and that entering the black market, with diesel and petrol is of major concern today. We are fighting against this menace for the past few decades with zero results as with the cost of fuels zooming unabated, the role of adulterated fuel sale also zooming with zero control. Congested roads also another factor contributing for air pollution is vehicular speed coming down and release more air pollution.

Global Annual Average Temperature

Up to around 2010, the global average temperature presented 60-year cyclic pattern. The inclusion of satellite measured data since 1980 presented steep rise. Carbon dioxide followed the temperature pattern from 1980 onwards. Before 1980, carbon dioxide not followed the temperature. It coincided with the above the average part of the 60-year cycle after 1980.The impacts of air pollution potential causes warming, while the rural-cold-island effect contributes to a cooling effect, highlighting the contrasting influences of urban and rural landscapes on local and regional climate dynamics. The other factor contributing to air pollution is burning of domestic garbage that includes plastics and burning and use of wood by hut dwellers.

Global Warming

Scientists are seeking to define a baseline from which to measure global temperatures. At the moment, researchers tend to use the period 1850–1900, and this will often be described as “pre-industrial” base line. The global warming component, using 1850 as the baseline, is 0.40°C, and from 1880, it is 0.45°C, with the respective trends showing increases of 0.80°C and 0.90°C, reflecting a steady rise in global temperatures over time due to anthropogenic influences. With the same data series, IPCC projected warming of 0.20°C/decade. Here, IPCC used starting year as 1930–1950; then, the trend is 3.4°C and with our projection with the starting year 1880, it is 0.9°C (with 1850, it is 0.80°C). With the IPCC, the global warming projection is 1.5°C with the starting year of 1951.

ACKNOWLEDGMENT

The research is self-financed. The author expresses his grateful thanks to those authors whose work was

used for the continuity of the study. The author also confirms that there is no conflict of interest involve with any parties in the research study.

REFERENCES

1. Reddy SJ. Climate Change: Myths & Realities. Hyderabad, India: Jeevananda Reddy; 2008. p. 76.
2. Reddy SJ. Impacts of pollution on environment: Myths & Realities. Compendium: Platinum Jubilee Celebrations of Andhra Pradesh State Centre (1938-2013). Hyderabad: The Institute of Engineers (India); 2013. p. 9-16.
3. Reddy SJ, Juneja OA, Lahori SN. Power spectrum Analysis of total and net radiation intensities. Indian J Radio Space Phys 1977;6:60-6.
4. Reddy SJ. The estimation of global solar radiation and evaporation through precipitation. Solar Energy 1987;38:97-104.
5. Mitchel JM, Dzerdzeevskii B, Flohn H, Hofmeyer WL, Lamb HH, Rao KN. Climate Change. Geneva, Switzerland: WMO Tech Note 79. WMO, 195 TP 100; 1966. p. 81.
6. Reddy SJ. Forecasting the onset of southwest monsoon over Kerala. Indian J Met Hydrol Geophys 1977;28:113-4.
7. BRMS [British Royal Meteorological Society] USNAS [US National Academy of Sciences]. Overview: Climate Change - Evidence and Causes. Vol. 24. United States: US National Academy of Sciences; 2014. p. 22.
8. Reddy SJ, Maite RK, Seetharama N. An iterative regression approach for prediction of sorghum (*Sorghum bicolar*) phenology in the semi-arid tropics. Agric For Meteorol 1984;32:323-38.
9. Reddy SJ. Agriculture-nutrition-foods: Impact of climate change [temperature and precipitation]. Agric Extn J 2024;8:1-27.
10. Reddy SJ. Cloud seeding-myths and realities. Proc AP Akad Sci 2004;8:109-17.
11. Raman CR, Murthy BP, Reddy SJ. Meteorological Control in Pollution Abatement. IMD/Pune. In: Presented at a Conference in Mumbai; 1974.
12. Raman CR, Murthy BP, Reddy SJ. A Rational Pollutability Classification of India. IMD/Pune. In: Presented at a Conference in Mumbai; 1975.
13. Murthy BP, Reddy SJ. Pollution Cycles and Some Environmental Parameters. IMD/Pune. In: Presented at a Conference in Mumbai; 1975.
14. Reddy SJ, Jayanti S. Effect of air pollution on radiation and human comfort over six Indian stations. Indian J Met Geophys 1974;25:441-4.
15. Reddy SJ. Effective pollution potential over ten Indian stations. Indian J Met Geophys 1974;25:445-8.
16. Reddy SJ. Climatic fluctuations and homogenization of northeast Brazil using Precipitation data. Pesq Agropec Bras 1984;19:529-43.
17. Blackman RB, Tukey W. The Measurement of Power Spectra. 1058: New York, Dower Publ. Inc.; 1983.
18. Girardi C. Accurate prediction: The drought in the Northeast has lasted five years and validates the forecast of the Aerospace Technical Center. Veja 1983;26:60-1.
19. Reddy SJ. Climatic Fluctuations in the Precipitation Data of Mozambique during the Period of Meteorological Period. Comm. No. 39, Series Terra e Agua. Maputo, Mozambique: INIA; 1986. p. 40.