CLIMATE CHANGE: UPCOMING DROUGHT IN SOUTH-EAST ASIA

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ABSTRACT

The near future is forecast to face droughts and other climatic crises, leading to the world's end. Hence, this research article is about the natural disasters related to climate, which began a long time ago and are still getting worse from time to time. It talks about the forms of climate change, kinds of drought, and their impacts on mankind, other lives, and the whole planet. It mentions the fatal effects of global warming on the earth, its species, and how they are caused. The article, specifically, highlights the results of climate change in Southeast Asia, the steps taken therefor, and the ways to get rid of this catastrophe and its upcoming greater consequences.

CLIMATE CHANGE

The incessant shifts in temperatures and weather patterns are referred to as climate change. The varied activities of the sun or large volcanic eruptions can cause such shifts to occur naturally. However, since the 1800s, climate changes have been led by human activities, mainly. Carbon dioxide, nitrous oxide, methane, chlorofluorocarbons, and water vapor are greenhouse gases that play crucial roles in this regard. Despite the role of the sun in past climate changes, the current warming seems to have no relevance to the sun. Currently, since the Industrial Revolution, the global average temperature has been increasing due to the burning of fossil fuels by humans. The impact on the environment is increasing widely through climate change.[1]

The current changes in climate globally are continuous and faster than the natural variations of climate that had previously occurred. Factors like trends of global average temperature, rise in water level, upper-ocean heat content, land-based ice melting, depth of seasonal permafrost throw thaw, etc. are compatible with global warming.[2]

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[1] World Health Organisation, 'Climate Change' (World Health Organization, 12 October 2023) https://www.who.int/news-room/fact-sheets/detail/climate-change-and-health, p. 8, accessed 22 June 2024

[2] The World Bank Group , 'World Bank Climate Change Knowledge Portal' (Climate Change Knowledge Portal, 2021) https://climateknowledgeportal.worldbank.org/overview ,p. 2, accessed 22 June 2024

A dynamic fluid that is frequently moving is called an atmosphere. A variety of factors, including solar radiation, the geography of the continents, ocean currents, the location and orientation of mountain ranges, atmospheric chemistry, vegetation from the earth, etc., influence the physical properties and rate and direction of motion of the atmosphere. So one radiation, the above-mentioned factors, is ready from time to time. Nevertheless, some of them change in a very short period, like ocean heat content (OSC), atmospheric chemistry, and vegetation. While others take a long time to change, like the geographic position of the continents, location, and height of mountain ranges, etc.[3] According to the researchers, a population of approximately 3.6 billion people lives in such areas, which are highly vulnerable to climate change. Additionally, it is expected that climate change will cause approximately 250,000 additional deaths per year between the years 2030 and 2050, through malnutrition, water-borne diseases, heat stress, etc. Data, given by the World Health Organisation (WHO), revealed the figures of 2 billion people suffering from a lack of safe drinking water, 6 million people going through foodborne diseases, and around 30% of infants undergoing foodborne deaths.[4]

The shifts in the ambient temperature of the globe cause heat stress, leading to alterations in rainfall patterns and a rise in sea level, which results in saltwater intrusion, loss of biodiversity, pollution, and ultimately, drought and depletion of freshwater. These are all consequences of climate change.[5]

We have reached a point where climate change has become a defining issue. The impacts of climate change, from risky changes in weather patterns to flood-causing sea level rise, have become worldwide and unprecedented.[6]

DESERTIFICATION

In 1994, a treaty was adopted by the parties of the United Nations, which was named the United Nations Convention to Combat Desertification (UNCCD), under which desertification was defined. Under that definition, desertification means "land degradation in arid, semi-arid, and

[3] Jackson ST, 'Climate Change' (Encyclopaedia Britannica, 20 June 2024) https://www.britannica.com/science/climate-change, p. 2, accessed 22 June 2024
[4] World Health Organisation, 'Climate Change' (World Health Organization, 12 October 2023) https://www.who.int/news-room/fact-sheets/detail/climate-change-and-health, p. 2, 12, accessed 22 June 2024
[5] Philander SG, '(PDF) Climate Change, Effects' (Research Gate, January 2008) https://www.researchgate.net/publication/306106658_Climate_Change_Effects, p. 5, accessed 22 June 2024
[6] United Nations, 'Climate Change' (United Nations) https://www.un.org/en/global-issues/climate-change accessed 22 June 2024

dry sub-humid areas resulting from various factors, including climatic variations and human activities. The term desertification is an all-around term for soil erosion in areas where water is very scarce. The collective term for arid, semi-arid, and dry sub-humid areas is drylands. Such areas are expected to have less precipitation.[7] The increase of global warming by 1.0°C above the pre-industrial levels is anthropogenic, and this increment would, probably, increase to 1.5°C between the years 2030 and 2052, if the current speed of human activities continues.[8]

The redoubling of drought, or, in other words, the phenomenon in which the land, already in a dry environment, is degraded, is called desertification.[9] Simply put, it is a condition of anthropogenic soil. The modern criteria of desertification refer to:

Human activities as a catalyst

Soil erosion is the urge.

Reduced outcome of the ecological community that is advantageous to mankind and its animal support system. Such reduction is constant and applicable to a land's productive system. The significant effects of land degradation are the threshold limit of fall in the prospective capacity, i.e., 15%.

Climate change, inclusive of temporary and permanent conditions of drought, and management, is modifying productivity loss.

Drylands' domain as prior initiatives. Subject to the United Nations Environment Programme (UNEP) of 1992, the areas with 0.05 to 0.65 precipitation to potential evapotranspiration (P/ETP) should be declared open to desertification. Such territories are dry, seasonally.[10]

[7] Harrisson T, 'Explainer: Desertification and the Role of Climate Change' (Carbon Brief, 2 September 2020) https://www.carbonbrief.org/explainer-desertification-and-the-role-of-climate-change/ , p. 7, 8, 9,, accessed 23 June 2024

[8] Hailu F, 'Climate Change as a Trigger for Desertification and Possible Alternatives to Reduce Biodiversity Loss' (Journal of the Selva Andina Biosphere, May 2023) http://www.scielo.org.bo/scielo.php?script=sci_arttext&pid=S2308-38592023000100094, p. 2, accessed 23 June 2024

[9] Salvia R, Egidi G, Vinci S, Salvati L. Desertification risk and rural development in Southern Europe: Permanent assessment and implications for sustainable land management and mitigation policies. Land 2019;8(12):191. DOI: https://doi.org/10.3390/land8120191

[10] Katyal JC and Vlek PL, 'Desertification: Concept, Causes and Amelioration' (Google scholar, 2000) https://scholar.google.com/scholar?hl=en&as_sdt=0%2C5&q=Desertification%2B%E2%80%93%2BConcept%2C%2BCauses%2Band%2BAmelioration&btnG=#d=gs_qabs&t=1718470348106&u=%23p%3Dm1XNzrg5MEgJ , p.30, 31, accessed 23 June 2024

For many years, rising deficiency and overuse of natural resources, for example, land and safe drinking water, have been known to be a relentless issue. Such conditions are calling up a different sort of migration of people, which is persuaded by the environment.

DROUGHT

Overview

Areas with extreme trends in rainfall are the platforms of drought. The availability of water to society is the ultimate result of several natural and unnatural elements. A shortage of water occasionally concurs with the high temperature, low humidity, and/or high wind speed. This shortage is a relative factor of drought, not an absolute.[11] Drought is defined as the shortage of rain so much that it causes a substantial imbalance of water, which ultimately leads to a shortage of water, crop damage, reduced channel runoff, and depletion of groundwater and soil moisture. It happens when evapotranspiration exceeds the precipitation by a considerable amount.[12] Usually, a high amount of global warming is the result of droughts, but, sometimes, the former might have a direct relationship with the latter.[13]

The Pacific Ocean is held as the influencing factor, having control over the natural phenomenon. The position of the sun and heat are the factors affecting the changes in temperature and variability of pressure, which result in the fluctuation of rainfall. The greater the faculae, the greater the number of rainfalls within the first half of the year. The sun emits more heat while changing the sunspot because, in this phenomenon, hot tropical air rises and moves towards the poles and gets substituted by a flow of low and cold polar air. Such temperature changes are also followed by increased rainfall. Construction work may also be responsible for the failure of rain. Until and unless the causes of drought are properly understood, the actual reason for the decaying climate will remain discounted.[14]

[11] Wilhite, D. A., & Glantz, M. H. (1985). Understanding the drought phenomenon: The role of definitions. DigitalCommons@University of Nebraska – Lincoln. https://digitalcommons.unl.edu/droughtfacpub/20/ , p. 3, 8, accessed 23 June 2024

[12] Britannica, E. (2024) Drought, Encyclopaedia Britannica. Available at: https://www.britannica.com/science/drought, p. 1, accessed: 23 June 2024

[13] K Trenberth , 'Global warming and changes in drought' (Nature climate change , 20 December 2013) https://www.nature.com/articles/nclimate2067 , accessed 23 June 2024

[14] JR Tannehill, 'Drought, its causes and effects' (Google scholar , 1947) https://scholar.google.com.pk/scholar?hl=en&as_sdt=0%2C5&q=causes+of+drought+&btnG=#d=gs_qabs&t=1719144793179&u=%23p%3D4JCASI884ooJ, p. 3, 4, 5, accessed 23 June 2024

TYPES OF DROUGHT

The most frequent of the natural disasters occurring in the world is drought, which is further divided into different classes.[15] Drought is a bewildering event that is strenuous to track and expound. Hurricanes, on the one hand, for instance, have an exact starting and ending point and are easy to observe. Drought, on either side, is the absence of water and is not easy to monitor; it impacts many sectors of the economy and runs through different time scales. Consequently, four types of drought are introduced by the climatological community:

Meteorological Drought

Agricultural Drought

Hydrological Drought

Socio-Economic Drought[16]

The first three types define drought as a physical phenomenon. The last one connects drought with market equilibrium, linking the shortage of water with the socioeconomic systems of the world.[17]

[15] Chenkai Cai, 'The Main Impact Factors for the Propagation from Meteorological Drought to Socio-Economic Drought from the Perspective of a Small Area, Based on a Practical Survey' (Google scholar , 2024) https://scholar.google.com.pk/scholar?as_ylo=2024&q=overview+of+meteorological+drought+&hl=en&as_sdt=0,5#d=gs_qabs&t=1718474092918&u=%23p%3DTBY0NQYAxPkJ, p. 1, accessed 23 June 2024

[16] National oceanic and atmospheric administration , 'Definition of Drought ' (National Centers for Environmental Information , June 2024) https://www.ncei.noaa.gov/access/monitoring/dyk/drought-definition#:~:text=As%20a%20result%2C%20the%20climatological,weather%20patterns%20dominate%20an%20area. Accessed 23 June 2024

[17] University of Nebraska , 'Types of Drought ' (National Drought Mitigation Center , 2024) https://drought.unl.edu/Education/DroughtIn-depth/TypesofDrought.aspx, p. 2, accessed 23 June 2024

Meteorological Drought

It is deemed to be the get-go of a drought,[18] emerging from precipitation mostly.[19] The type of drought that is usually based on the degree and duration of dryness is termed a meteorological drought.[20]

Socio-Economic Drought

The feasible ultimate result of a meteorological drought is a socioeconomic drought.[21] It connects economic factors with any of the other three types of drought. Unlike other types, it depends on demand and supply to indicate droughts. The supply of water, food grains, fish, hydroelectric power, and other economic goods depends on the weather. Due to the natural variability of climate, water supply seems to be short for these few years but, ultimately, unable to fulfill the needs of mankind and the biome in the next few years.[22]

Hydrological Drought

A periodic natural disaster commences with this event.[23] This type of drought may be defined as a hydrologic imbalance in which water depletes in lakes, reservoirs, and groundwater at peculiarly low levels and in rivers, etc., at peculiarly low streamflow.[24] It influences crop

[18] Chenkai Cai, 'The Main Impact Factors for the Propagation from Meteorological Drought to Socio-Economic Drought from the Perspective of a Small Area, Based on a Practical Survey' (Google scholar , 2024) https://scholar.google.com.pk/scholar?as_ylo=2024&q=overview+of+meteorological+drought+&hl=en&as_sdt=0,5#d=gs_qabs&t=1718474092918&u=%23p%3DTBY0NQYAxPkJ, p. 1, accessed 23 June 2024

[19] Zhang Ruqing , 'Assessing meteorological and agricultural drought characteristics and drought propagation in Guangdong, China' (Google scholar , 2024) https://scholar.google.com.pk/scholar?as_ylo=2024&q=overview+of+meteorological+drought+&hl=en&as_sdt=0,5#d=gs_qabs&t=1719148874029&u=%23p%3DOYLvVyXApqEJXApqEJ, p. 2, accessed 23 June 2024

[20] University of Nebraska , 'Types of Drought ' (National Drought Mitigation Center , 2024) https://drought.unl.edu/Education/DroughtIn-depth/TypesofDrought.aspx, p. 3, accessed 23 June 2024

[21] Chenkai Cai, 'The Main Impact Factors for the Propagation from Meteorological Drought to Socio-Economic Drought from the Perspective of a Small Area, Based on a Practical Survey' (Google scholar , 2024) https://scholar.google.com.pk/scholar?as_ylo=2024&q=overview+of+meteorological+drought+&hl=en&as_sdt=0,5#d=gs_qabs&t=1718474092918&u=%23p%3DTBY0NQYAxPkJ, p. 1, accessed 23 June 2024

[22] University of Nebraska , 'Types of Drought ' (National Drought Mitigation Center , 2024) https://drought.unl.edu/Education/DroughtIn-depth/TypesofDrought.aspx, p. 7, accessed 23 June 2024

[23] Wilhite, D. A., & Glantz, M. H. (1985). Understanding the drought phenomenon: The role of definitions. DigitalCommons@University of Nebraska – Lincoln. https://digitalcommons.unl.edu/droughtfacpub/20/ , p. 34, accessed 23 June 2024

[24] Tallaksen LM, Van Lanen HAJ. Hydrological drought: processes and estimation methods for streamflow and groundwater. In: Developments in Water Science, vol. 48. Amsterdam, the Netherlands: Elsevier Science B.V.; 2004.

productivity through irrigation, drinking water supply, waterborne transpiration, hydropower, recreation of quality water, and other sectors of water.[25]

Agricultural Drought

For fifty years, the meteorological and agricultural droughts have been decreasing from coastal areas to inland areas. Agricultural droughts have increased in the last two decades. It is notable that, as compared to the flood season, this drought appears in the non-flood season more. The primary factors in this type of drought are potential evapotranspiration, actual evapotranspiration, and temperature.[26] It is a linkage between droughts, i.e., meteorological or hydrological, and agriculture through shortages of precipitation, potential and actual evapotranspiration, soil water deficit (W), decreased groundwater or reservoir levels, etc.[27]

All these types of growth commonly affect crop production by reducing and limiting it and threatening food security all around the world, with average drought stress.[28]

DIFFERENCE AMONG KINDS OF DROUGHT

The above-mentioned types of droughts have been differentiated by climatologists, hydrologists, and disaster management specialists:

In a meteorological drought, less than-average rainfall continues for a significant period, often a month or so.

As a second step after a meteorological drought, concerning agriculture, an agricultural drought takes place when less rainfall causes soil water deficiency, resulting in pastures and non-irrigated crops. Showing the rainfall records and conditions of vegetation on maps is a better way of visualizing an agricultural drought.

[25] F Anne, 'Hydrological drought explained' (WIREs, 14 April 2015) https://wires.onlinelibrary.wiley.com/doi/full/10.1002/wat2.1085, p. 3, accessed 23 June 2024
[26] Ruqing Zhang, 'Assessing meteorological and agricultural drought characteristics and drought propagation in Guangdong, China' (Google scholar , 2024) https://scholar.google.com.pk/scholar?as_ylo=2024&q=overview+of+meteorological+drought+&hl=en&as_sdt=0,5#d=gs_qabs&t=1718474770267&u=%23p%3DOYLvVyXApqEJ, p. 2, accessed 23 June 2024
[27] University of Nebraska , 'Types of Drought ' (National Drought Mitigation Center , 2024) https://drought.unl.edu/Education/DroughtIn-depth/TypesofDrought.aspx, p. 6, accessed 23 June 2024
[28] Vincent Vadez, 'Crop traits and production under drought' (Nature reviews earth and environment , 6 February 2024) https://www.nature.com/articles/s43017-023-00514-w accessed 23 June 2024

The meteorological drought also results in a hydrological drought, i.e., a significant reduction of water in rivers, lakes, and underground;[29]

Whereas the socioeconomic type of drought occurs when the water demands cannot be met by the amount of water supplied from the regional water resources.[30]

CLIMATE CHANGE IN SOUTH-EAST ASIA

Southeast Asia, one of the most efficient regions of the world for the economy and number of people, is expected to catch a high pace of urbanization in the future. The Intergovernmental Panel on Climate Change (IPCC) gave the Sixth Assessment Report (AR6), which confirmed SEA to be highly susceptible to climate change and, therefore, open to the impacts thereof.[31] Vulnerability was depicted by Smit and Wandel in 2006 as a product of three essentials:

Exposure

Sensitivity

Adaptive capacity [32]

EXPOSURE

That is how much a person is exposed to climate hazards, like heat, etc. It includes the frequency of outdoor activities a person engages in.

SENSITIVITY

How sensitive are people to climate hazards due to factors like age and health condition? It includes old age, tender age, asthma, etc.

[29] University of nevada, 'What is Drought ' (Living with Drought , 2024) https://livingwithdrought.com/what-is-drought/, p. 2, accessed 23 June 2024

[30] Suning Liu, 'Socioeconomic Drought Under Growing Population and Changing Climate: A New Index Considering the Resilience of a Regional Water Resources System' (Advancing Earth and Space Sciences, 26 July 2020) https://agupubs.onlinelibrary.wiley.com/doi/10.1029/2020JD033005, p. 1, accessed 23 June 2024

[31] G Srinavasan, 'Climate change impacts on water resources and agriculture in Southeast Asia with a focus on Thailand, Myanmar, and Cambodia' (Google scholar , 2024) https://scholar.google.com/scholar?hl=en&as_sdt=0%2C5&as_ylo=2024&q=crop+productivity+impacted+by+agricultural+drought+in+South+east+Asian+countries+&btnG=#d=gs_qabs&t=1718700169026&u=%23p%3D0MGfU25BHtcJ, chapter 2, p. 1, accessed 23 June 2024

[32] Barry Smit and Johanna Wandel, 'Adaptation, adaptive capacity and vulnerability ' [2006] 16(3) Global Environmental Change https://doi.org/10.1016/j.gloenvcha.2006.03.008, p. 11, accessed 26 June 2024

ADAPTIVE CAPACITY

A person's ability to adapt plays a role in helping him to adjust, take advantage of, or respond better to climate hazards. Like their living situation, age, access to health care, etc.[33]

The climate crisis, in the form of disturbances in rainfall patterns, is a challenge faced by SEA, and it is exaggerated because most developing countries are failing in resilience and adaptive capacity.[34] Climate change also exhibits other harmful forms, like a rise in water level, drought, high temperatures, scarcity of freshwater, loss of biodiversity, and certain other aspects of land and environmental degradation, which negatively impact the economies and societies of the SEA.[35] All these events are going to boost future global warming events.[36]

A few examples of drought in the SEA are given below

The productive capacity of Myanmar, a tropical region, is likely to come down by 15–50% by the end of the 21st century. In addition to this, pests, weeds, and diseases are also expected to spread more, consequently endangering global food security and leading to poverty. Extreme rainfalls, heat stress, and coastal agricultural losses would impact the economy due to the sea level rise.

Unfavorable impacts on agriculture and water resources are distinctly possible to face in Thailand, as well, from climate change due to its tropical location. While, in Northern Thailand, in the 2080s, the productivity of rice would rise to 25%. The factor contributing to the decline in rice yield is higher evapotranspiration rates, which would be immense even in the event of higher rainfall in the future. Likewise, the rate of production of sugar cane would reduce to

[33] Environmental protection agency , 'Climate Change and Human Health ' (EPA, 2024) https://www.epa.gov/climateimpacts/climate-change-and-human-health, p. 6, 7, 8, accessed 23 June 2024
[34] Hijioka, Y., Lin, E., Pereira, J. J., Corlett, R. T., Cui, X., Insarov, G. E., Lasco, R. D., Lindgren, E., and Surjan, A.: Asia, in: Climate Change 2014: Impacts, Adaptation, and Vulnerability, Part B: Regional Aspects, Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change, edited by: Barros, V. R., Field, C. B., Dokken, D. J., Mastrandrea, M. D., Mach, K. J., Bilir, T. E., Chatterjee, M., Ebi, K. L., Estrada, Y. O., Genova, R. C., Girma, B., Kissel, E. S., Levy, A. N., MacCracken, S., Mastrandrea, P. R., and White, L. L., Cambridge University Press, Cambridge, UK and **New** York, NY, USA, 1327–1370, ISBN 978-1-107-05816-3 (Hardback), ISBN 978-1-107-68386-0 (Paperback), 2014. a
[35]Jasparro, C. And Taylor, J.: Climate change and regional vulnerability to transnational security threats in Southeast Asia, Geopolitics, 13, 232–256, 2008. a
[36]Ali, H. And Mishra, V.: Contrasting response of rainfall extremes to increase in surface air and dewpoint temperatures at urban locations in India, Sci. Rep., 7, 1–15, https://doi.org/10.1038/s41598-017-01306-1, 2017. a

25%, at least, in the 2050s because of the fall in production. The minimum production is possible in the eastern and central regions.

Cambodia's communities are most sensitive to droughts following climate variation because it impacts the agricultural yield highly. Durable drought events are anticipated in the wet and dry seasons established by the forecasted climate. It would convert the modus operandi of water management into an intimidating one. Such conditions would inevitably cause a loss of yield. In Cambodia, climate change is probable to cause some of the highest yield losses in net rice in the SEA. Recently, a report revealed that, by the 2040s, an estimated 10-15% of rice would be reduced to high temperatures. An issue of a fall in labor productivity has arisen from increased temperatures, and it can further fall by 20% in the 2050s if the same condition prevails.[37]

The Three Gorges Dam in China, the biggest dam in the world, has played a role in climatic variations and even alterations in the Earth's rotational rate.[38] These variations are positive, according to the experts; for instance, they make winters warmer and summers cooler.[39]

Apart from these, the high and low streamflow caused by climate change is expected to happen in the upcoming times.[40]

The World Water Council has concisely stated:

"The crisis is not about having too little water to satisfy our needs. It is a crisis of managing water so badly that billions of people and the environment suffer."[41]

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[37] G Srinavasan, 'Climate change impacts on water resources and agriculture in Southeast Asia with a focus on Thailand, Myanmar, and Cambodia' (Google scholar , 2024) https://scholar.google.com/scholar?hl=en&as_sdt=0%2C5&as_ylo=2024&q=crop+productivity+impacted+by+agricultural+drought+in+South+east+Asian+countries+&btnG=#d=gs_qabs&t=1718700169026&u=%23p%3D0MGfU25BHtcJ, chapter 2, p. 25, 28, 30, accessed 23 June 2024

[38] Rayhan Khan , 'Three Gorges Dam: A Climate Change Catalyst and Earth's Rotational Slowdown' (Medium , 29 March 2023) https://medium.com/coinmonks/three-gorges-dam-a-climate-change-catalyst-and-earths-rotational-slowdown-56acb0ae8bf4#:~:text=However%2C%20recent%20studies%20have%20shown,altering%20the%20earth's%20rotational%20speed., p. 1, accessed 23 June 2024

[39] ENGR 125cs, 'Three Gorges Dam, Yangtze River, China' (Montana, 2024) https://www.montana.edu/rmaher/engr125_fl06/Three%20Gorges%20Dam.pdf, p. 31, accessed 23 June 2024

[40] G Srinavasan, 'Climate change impacts on water resources and agriculture in Southeast Asia with a focus on Thailand, Myanmar, and Cambodia' (Google scholar , 2024) https://scholar.google.com/scholar?hl=en&as_sdt=0%2C5&as_ylo=2024&q=crop+productivity+impacted+by+agricultural+drought+in+South+east+Asian+countries+&btnG=#d=gs_qabs&t=1718700169026&u=%23p%3D0MGfU25BHtcJ, chapter 2, p. 8, accessed 23 June 2024

[41] Mike Muller , 'The Different Types of Drought ' (UNIVERSITYOFTHEWITWATERSRANDJOHANNESBURG , 21 November 2019)

SUGGESTIONS

The following steps are suggested to be taken in this regard:

Anthropogenic Efforts

Efforts, like building dams and other water reservoirs, shall be made to prevent the Earth from going towards destruction.

Protection Of Ecosystem

Bats and other animal species, which play a role in the protection of the ecosystem, shall be protected by banning bat hunting on a large scale.

Ban Deforestation

Deforestation should be banned all over the world to protect the amount of oxygen in the environment.

Laws For Environmental Protection

Agreements related to environmental protection should be made internationally; the countries that have already become parties to any such agreement shall enforce them strictly in their territories. Every country should add such reforms to their domestic laws, especially in the Constitution, like the Indian Supreme Court's recent action about environmental protection.

Formation Of Land Restoration Department

A department for land restoration shall be formed in every country by their government.

Strengthening Relationship Between Environment And Mankind

Further steps should be taken to make the relationship between humans and the environment more pleasant and strong.

https://www.wits.ac.za/news/latest-news/opinion/2019/2019-11/the-different-types-of-drought.html#:~:text=A%20meteorological%20drought%20occurs%20when,pastures%20and%20rain%2Dfed%20crops., p. 21, accessed 23 June 2024

CONCLUSION

Over time, an issue has evolved on earth, in the form of long-term shifts in earth's temperature, under and above the ground, irregular and unexpected rainfalls, variability in the Ocean Heat Content (OHC), increased number of heatwaves, irregular permafrost thaw, etc., which has given one name by the experts, i.e., "climate change". Natural fire in Australian forests, industrialization, deforestation, human activities, and other natural and unnatural factors have come to sight, as reasons for these climatic variations. Despite many efforts, they could not be resisted and have caused depletion in the ozone layer, droughts, threats to global food security, and much more, and these consequences are even increasing day by day. Experts are trying to compensate for the climate crisis by making efforts favorable to the climate but have not succeeded, yet. According to the predictions of climatologists, the world is going to face a dry and food-scarce environment, which will result in the end of mankind, by the end of this century, if the situation remains constant. Efforts like building the Three Gorges Dam and land restoration, etc. have been made but could not prove to be helpful enough, to restore the climate. Therefore, Earth seems to be lifeless in the future, ultimately. Extreme focus and concentration are required for securing the climate and globe.

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