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A STUDY ON THE CONSEQUENCES OF CLIMATE CHANGE

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ABSTRACT

Climate change has become a widespread topic in recent years. This a problem that resulted from the emission of greenhouse gases that affect our environment. Therefore, it raises questions on whether the problem is caused by human activities or it's just a part of nature's cycle. This paper discusses and compares the factors that contribute to climate change by humans and nature, some effects of climate change, and some solutions that have been developed to prevent or slow climate change from progressing.Climate change is recognized as a serious threat to ecosystem, biodiversity, and health. It is associated with alterations in the physical environment of the planet Earth and affects life around the globe. Adaptation to the consequences of climate change and prevention of aggravation of climate change are key challenges for the society. Policymakers must implement personalized strategies, especially in the vulnerable populations. Climate, from Ancient Greek "klima" (meaning inclination), is defined as the weather averaged over a long period (the standard period is 30 years). The instrumental record of climate change is based on thousands of temperature and precipitation recording stations around the world.Climate change causes a cascade of side effects for the physical environment of the planet Earth and the living organisms on the globe All the changes in the physical planet Earth's environment affect the life of plants, animals, and humans. Coral reefs, forests, and coastal human communities are particularly vulnerable to climate change.

Keywords:climate change,Earth's, environment, populations,

INTRODUCTION

Climate change has always happened on Earth but its rapid rate and important magnitude occurring now are of great concern. Climate change occurs as a result of an imbalance between incoming and outgoing radiation in the atmosphere. The global warming associated with climate change is different from past warming in its rate. It is anticipated that there will be a rise in global mean temperatures of up to 5.4°C by 2100. There is overwhelming evidence showing that human activities have contributed to climate change over the past century while changes in solar activity and volcanic eruptions have played a minor role. Over the last several decades, humans have engaged in large-scale transformation of natural systems causing a net accumulation of carbon dioxide in the atmosphere. Climate change is recognized as a serious threat to ecosystem, biodiversity, and health. It is associated with alterations in the physical environment of the planet Earth and affects life around the globe. Adaptation to the consequences of climate change and prevention of aggravation of climate change are key challenges for the society. Policymakers must implement personalized strategies, especially in the vulnerable populations.

Climate

Climate, from Ancient Greek "klima" (meaning inclination), is defined as the weather averaged over a long period (the standard period is 30 years). The instrumental record of climate change is based on thousands of temperature and precipitation recording stations around the world.

Climate change versus global warming

Climate change and global warming are often used interchangeably but have distinct meanings and refer to different physical phenomena. Climate change includes warming and side effects of warming (e.g., heavy precipitation and increased wind speeds) while global warming refers only to long-term Earth's rising global mean surface temperature.

Climate change causes

Climate change occurs as a result of an imbalance between incoming and outgoing radiation in the atmosphere. The increase in heat-trapping greenhouse gases (e.g., carbon dioxide, methane, and nitrous oxide) in the atmosphere raises Earth's mean surface temperature. The levels of greenhouse gases are higher now than at any time in the last 800,000 years. As temperature increases, more water evaporates from the oceans and other water sources into the atmosphere, causing further increase of the temperature Atmospheric carbon dioxide comes from two primary sources, natural and anthropogenic (human-induced). Natural sources of carbon dioxide include most animals which exhale carbon dioxide as a waste product. Anthropogenic sources of carbon dioxide have been primarily driven by human activities since the early 20th century (industrial revolution), mainly fossil fuel burning), but also agricultural emissions and deforestation. The top 5 countries responsible for emissions of carbon dioxide are China, United States of America (USA), India, Russia, and Japan .In 2017, the USA emitted approximately 5.1 billion metric tons of energy-related carbon dioxide for a global worldwide emission of approximately 32.5 billion metric tons. Deforestation of the Amazon in Brazil (loss of the equivalent of almost one million soccer fields of forest cover each year), mainly for agricultural purposes, is significantly contributing to climate change.

Climate change consequences

Climate change causes a cascade of side effects for the physical environment of the planet Earth and the living organisms on the globe All the changes in the physical planet Earth's environment affect the life of plants, animals, and humans. Coral reefs, forests, and coastal human communities are particularly vulnerable to climate change. Some of the effects of climate change may be through the enhancement of the susceptibility to chemical pollution . Although most impacts of climate change are likely to be adverse, some health benefits may result in some regions. For example, warmer winters may reduce the number of temperature-related health events and death.

Effects of Climate Change

Climate change has affected many aspects of our planet. One aspect that has been greatly affected by climate change is the weather. In Romania, for instance, extreme weather events have multiplied since 2002. Burghila et

al. stated in "Climate Change Effects- Where to Next?", that the country's 2007 drought was the severest in 60 years (408). By increasing the concentration of the greenhouse gases, we are increasing the amount of heat that is in our atmosphere (NASA). Hurricanes have also become more aggressive largely because of warmertemperatures that mainly resulted from the emission of greenhouse gases. Warmer temperatures result in warmer water in the oceans. As the result of warmer oceans, hurricanes and tornados become more intense. Wuebbles stated, "Warmer atmosphere result in more energy in the atmosphere. When hurricanes start, they usually pick up energy from the oceans and as the result of warmer water in the oceans because of greenhouse effect, hurricanes have more energy. Therefore, hurricanes become more intense. Now if the water was colder that gives less energy to hurricanes and make it less intense" (phone interview). Also, warmer temperature means the atmosphere holds more water vapor and that makes rainfalls more extreme and intense (Riebeek).

Climate change also resulted in playing a major role in shrinking of ice sheets (Riebeek). The melting of ice results in the rise of sea levels and that endangers many islands to disappear completely (Riebeek). According to NASA, up to 10 percent of the world's population lives in areas where there about 30 feet above sea level (NASA). Furthermore, Greenland and West Antarctic ice sheets are melting about 125 billion tons of ice per year (Riebeek). Wuebbles said, "As the earth warming its leading to melting more ice and glaciers. We could see as much as 6 feet sea level rise in this century" (Phone interview).

According to Weiwei Mo, Haiying Wang, Jennifer M. Jacobs in "Understanding the influence of climate change on the embodied" the energy of water supply is commonly perceived that climate change has a negative impact on water quantity and quality as well as drinking water treatment. However, some issues such as, geographical locations, local water resources, and water technologies that could potentially influence the effect of climate change on drinking water supply are still unsettled.

The study also concluded that most of the variations in chemical and energy uses were attributed to water quality and climate variations except for the use of soda ash. The study also found that future climate change might slightly reduce energy and chemical uses under both the highest emission and the lowest emission levels generated by the intergovernmental panel on climate change (IPCC). Another major finding of this study that the effects of climate change on the volumetric life cycle energy use in the water supply (reduction by 3-6%) could outweigh the increase in demand for water due to a warmer climate in the case of study system by the end of the century.

Findings of this study reveal the importance of considering factors, such as geographical locations, local environment, water treatment technologies, and water resource management, on appreciating and identifying the potential impact of climate change on the quantity and the quality of drinking water.

REVIEW LITERATURE

The history of climate change discussion among people goes farther back in time than one might think. Weart (2007) notes that climate change was conceptualized in ancient times, with knowledge of the subject growing as the technology to study it improved over time. An important figure in climate science history who warned of possible problems was Guy Stewart Callendar, whose idea of carbon dioxide as a heat trapping agent was indeed borne out by computer climate simulations in the 1970s- "Even subtle changes in the Earth's orbit could make a

difference. To the surprise of many, studies of ancient climates showed that astronomical cycles had partly set thetiming of the ice ages. Apparently the climate was so delicately balanced that almost any small perturbation might set off a great shift" (Weart, 2007. Para. 10).

More recently, Earth's climate has been studied by the Intergovernmental Panel on Climate Change, an organization made up of many scientists who specialize in climate studies. The IPCC has issued four reports over recent years that have studied the connections between human activity and climate change. The most recent report, "Climate Change 2007", declared that the consensus of the group is that there is 90% certainty that global warming is directly related to human greenhouse gas emissions. The IPCC was awarded with the Nobel Peace Prize for their efforts in raising world-wide attention to this issue.

In a study written by Leiserowitz, (2007), the point is made that people's understanding of climate change is critical to addressing the issue because it is in the public domain that political pressure emerges. "Public opinion is critical because it is a key component of the socio-political context in which policy makers operate. Public opinion can fundamentally compel or constrain political, economic, and social action to address particular risks. (p. 3) Although there is not a substantial amount of data from which to draw conclusions about American citizens' perception of climate change risk, various surveys in recent years can inform questions on current thought in the country.

While it can be seen from this data that many Americans have accepted the idea that global warming is a contemporary issue of concern, it should also be noted that there are many people who are less certain about it. Perhaps some of the most interesting information from Leiserowitz's data is the following: while 71% of Americans believe that global warming is happening, only 48% of them believe that there is scientific consensus on the issue of why it is happening, and 40% believe that there is substantial disagreement on the issue. (Leiserowitz, 2007).

Chimes (2007) discusses some of the reasons that teachers face difficulties in addressing the topic of climate change in their classrooms. One of the main points is that currently there are few textbooks that feature it as a subject. This is partly because of the newness of global warming discussion in the secondary education domain. Another issue discussed is the tendency of publishers to avoid controversy.

Wilson (2003) describes a study using satellites that also supports the idea that the sun plays a role. Measurements in this study correlate higher solar output since the 1970s with recent warming. As quoted in this text, Wilson cannot be sure that this is not a shortterm trend, because the data does not go back further, but he states that if the higher solar activity has been present over this last century, then it could be "a significant component" of observed warming. In an interview with the senior science writer for Space.com, however, Wilson also states "that does not mean industrial pollution has not been a significant factor" (Para. 8). This statement is not mentioned in the Singer/Avery text.

OBJECTIVES OF THE STUDY

1. to study on the consequences of climate change.

2. to study on the climate change versus global warming.

METHODOLOGY

A large human population living in coastal areas, that would be adversely affected by changes in sea level. About half of the world population lives within 200 km of a coast. As sea level continues to rise, more of these people will be affected by flooding and coastline erosion (Perez et al., 1999). The sea level rise due to climate change is a serious global problem. For developing countries this is more big threat. A study on sea level rise and developing countries has been done by Dasgupta et al. (2008). In this work, they analyzed the sea level rise of 84 countries. GIS software has been used to overlay the best global data elements, land, population, agriculture, urban extent, wetlands and GDP (gross domestic production). Data has been used from various public sources, including CESR, CIESIN, CIAT, IFPRI, NASA, NOAA and The World Bank. The analysis proceeded in different steps. In first step has constructed a base elevation data set for the identification of different zone. The second step was to construct a country indicator surface for each of the elements at risk. The results indicate that almost 0.3% of the 84 developing countries would be impacted by a 1 meter sea level rise and this would increase to 1.2% in a 5 meter sea level rise scenario. In first case 56 million people may be affected under 1 meter sea level rise and in second case 89 million people will be affect under the impact of 5 meter sea level rise.

DATA ANALYSIS

The Impact of Climate Change on Livestock

The performance, health and well being of cattle are strongly affected by climate. Sirohi and Michaelowa (2007) studied sufferer and causes of Indian livestock and climate change. This work,they have reviewed the livestock production and climate change effects. In the respect of sensitivity, the performance of livestock has strongly affected by climate, due to direct and indirect effects. Local cows, Haryana cows and Sahiwal cows showed a decline in productivity and milk due to increase in temperature and humidity. Extreme climatic events also effects the livestock, like in 1978, due to drought 168 million cattle were affected in India 18 million in Gujrat, and 34.5 million in Rajastan. Livestock is an important sector of India and this contributes 26% to agriculture GDP and having employment of 18 million people. Methane emissions by livestock has related to level of intake and digestibility, high methane production high intake.

Zockler et al. (2008) concluded the potential impact of climate change and reindeer density on tundra indicator species in the Barents sea region. The problem have evaluated through the vegetation and reindeer study. In this paper have the estimate present open land and preserved by 2080 as a grazing land for reindeer. For vegetation behave LPJ-GUESS model has been developed. This research work was started under the basic data of (IPCC-SRES B2) after that ECHAM4/OPYC3 models were developed and later on for present study REMO has been developed by (Jacob, 2001), and then REMO was turn to drive the LPJ-GUESS (for vegetation). Reindeer distribution for 2080, were compared to vegetation model. The results showed of greatest influence of reindeer within model and stabling their succession at tundra stage, because LPJ-GUSSE indicates the domination of deciduous forest. Vegetation model projects the big change of tundra vegetation with associated species. Eight species show results more than 20% by 2080, but may be these species are not threatened at present time.

Mech (2004) has been concluded a comprehensive and brief account on Wolf reproduction in the high Arctic in Canada. The study area selected for this paper is in north of Eureka, 960km from the North Pole. Wolves groups from 1986 to 1997 were active and they preyed on Oxen and Hares, and produced new population. Due to low temperature and high precipitation from last six summers (1996-2002) groups of wolves dropped in the area. The data of snowfall of 1997 to 2002 showed a heavy snowfall and destroyed the foraging by this snow. Their results claim that the shortage of food of hares and oxen causes adversely reproduce population of wolves rapidly dropped.

Climate Change Impact on Different Field of Studies

Tourism a major sector of the global economy, and it is strongly influenced by climate. Tourisma multi-dimensional group of business and its clients that include the airline industry, travel agents, tour operators, car rental companies and reporters. Gossling and Hall (2006) has conducted a research on uncertainties in predicting tourist flow under scenario of climate change. In 2005 a model developed by Gossling and Hall (2006) and this research has pointed out some draw back of this model. Temperature is a dominant parameter in this model. The non-climatic factors included political instability, health problems and role of unseeded events such as terrorism or any natural disaster. For case study Eilta, Israel and Zanzibar, Tanzania has been selected. Wind and cloudiness had a significant influenced on the tourist perceptions. Both studied places results confirmed that the role of climate, in destination choice is more complex and difficult than assumed in current models. The behavior of tourist attitude of travel, weather conditions, travels costs, distance of destination, economic wealth and political conditions of destinations are particular to explain in start. This model has not been expressed in a wide range for comprehensive results and travel motives and might not showed separately such as visiting relatives and friends or the visit of an heritage site or a travel for natural beauty to mountains.

changing gradients of climate change in southern Africa during the past millennium, implications for population movements. The records of both regions Makapansgat valley in South Africa and Lake Naivasha in Kenya, has discussed on same resolution. Both record of Makapansgat and Naivasha high responses in hydrological system on decadal to century scale. The period of droughts induces famine, political instability and large scale human migration between 1390 to 1429, 1560 to 1625 and 1760 to 1840. This migration is associated with low level of lake Navasha, but when lake level were high, the age of prosperity, agriculture and population growth can be seen easily from the mid of 16th, mid of 17th and the mid of 18th centuries. Gradient of climate change between east Africa and South Africa have varied regularly over the last Millennium. Cultural and environmental factors influence the people in South Africa in the first tow millennium AD. It does not mean that climate is the single one factor to determine the human migration.

Climate Impact on Cultural Heritage

the evidences and responses. This research was based on UKCIP02 climate scenarios and the impact on natural conservation and gardens. UKCIP02 is the output of the regional climate model HadRM3 resolution is 50km over Europe, model run over the period of 1961-90 and 2070-2090. Confidence projection model for 2080 in UK has experience rising temperature, warm summer and wetter winter, and decreases snowfall. Methodology of this study is very interesting i.e., try to make empirical evidence and more strong by cross checking of data. Fordata collection a questionnaire was prepared, around 18 questions had set for information. Policy makers analyzed the data and

focus on five issues like, temperature, soil moisture, extreme rainfall and wind, river flooding and coastal flooding. They pointed out a number of recommendations i.e., how cultural heritage adapt to a climate change. For historical site one department cannot stand alone, there is a need to be collective efforts, share all things and speak with unity.

the impacts of a growing world population on climate change. The rapid growth of population is alarming impact on climate change. Every nation has started the race of development, for follow up this development a huge amount of greenhouse gases released into the atmosphere. The development of medical sciences, living standards, safer foods, safer transports, and purify water program responsible for the rapid growth of population in 20th century. Two component sex and age are most important for population growth and effect indirectly on climate. Agriculture is the primary activity of the people, and the people are going to adapt the trend of intensive agriculture, but the intensive agriculture is the primary responsible for the increased methane gas as well as waste management. Developing countries are affected seriously by this problem. For the reduction of this problem there are immediate actions required by the private sectors, government policies, advance technologies and energy alternatives. If these suggestions can implement then the growing human population reduces its affect on climate change.

Climate Change Impact Assessment

In this study a hydrology model SWAT (Soil and Water Assessment Tool) has been used. About 40 year of the taken data of 12 rivers has been used in this study. The first 20 years data belonging to present time (1981-2000) and the remaining 20 years data has for future climate (2041-2060). The main purpose of this study was quantified impact of climate change on the water resources of Indian rivers. Two rivers have been selected for prediction; one is Krishna river (with flood scenario) and second is Mahandi (with droughts scenario). Weather data determine by the Hadley Center for Climate prediction UK. Overall run off quantity will reduce under the future scenario. One fourth of Gujrat and 60% of Rajastan shell face water shortage conditions. The basin of the river Mahi, Pennar, Sabermati and Tapi face also water shortage. Basins belong to Cauvery, Ganga, Narbada and Krishnawill experienced water stressed. River Godavari, Brahmani, and Mahandi are predicted to face severe flood conditions.

Concluded research on the issue of global climate impact on regional air quality. This is a thematic study about climate change and its impact on air quality. This airquality disturbed the near surface composition and affect the air where we breath. These changes not stay in urban areas, even spread out to suburbs regions. A global increase of all primary emissions is predicted for the end of the century, due to massive economic development and population increase in several developing countries. Predicting the future changes in air quality and results were found negative. The main air quality problems in respective regions arise from the increasing population. The big cities of the future are not located in the center of the developing cluster or exclusive in developing countries. The climate of northern Europe should become wetter, which is favorable to air quality improvement, but that of southern Europe becoming drier, which is unfavorable. The three major causes of changes in regional air quality for Europe are climate change, regional emissions change and global emissions changes. This study provides an overview of the global climate change impact on air quality and its related effects on human health.

Climate Change On Water Resources

the west part of USA. This is an overview on the Columbia, San Joaquin, and Colorado rivers basin in the western states. This study is the part of the project "end to end" by the state department of energy, USA. The objective of this study was the quantitative assessment of the climate driven environmental impacts and demonstration and to provide useful information to regional states and local decision makers. Special emphasis on the changes over the next 50 years has which indicated to the range of climate variability. Project indicated generally large scale warming over the west. The most affected regions are the northern Rockies, Great Basin and Southwest region. By 2070 the length of the fire season could be increased by two to three weeks in these regions. All individual models should be studied collectively and in future studies, these assessments need serious linked in a consistent end to end analysis to obtain more fine results.

CONCLUSION

This is a brief study of climate change and various field of research. Current knowledge has been summarized in this paper. Agriculture and climate change is an important field of research. Climate variability is highly affected to agriculture, such as droughts, storms and severe floods. Some studies identified the several climate and weather adaptation for sustainable agriculture practices. A few studies are currently conducted in various part of the world to determine the value of climate forecasts. Most of the researchers have used the outputs of GCMs and regionalclimate model with climate variability. With the development of science and technology, these models have been developed and have become the main method of analyzing the impact of climate change on agriculture.The sea level rise is a serious problem, especially for developing countries in south-east Asia. Millions of people will displace by sea level rise within this century. Economic and ecological system will be affect severely also. Various researches showed the international community has a seriously considered the sea level rise and population location and infrastructure planning in developing countries. Climate change is a huge challenge for the growth rate of livestock. The performance and health of cattle strongly affect by climate. Similar, tourism, cultural heritage, global population, water resources, and air quality are showed the impact of climate change.

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