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ANALYSIS OF GLOBAL CLIMATE CHANGE ON DEVELOPMENT AND ENVIRONMENT

Effri Satrio Dewanto [1)],Kirana Pramesti Rachmadiya [2)], Himmatus Suroyya[3)], Siti Nur Rahma Nabila[4)]

[1)]Development Economics Study Program, Faculty of Economics and Business, Universitas Negeri Semarang, Indonesia
[2]Development Economics Study Program, Faculty of Economics and Business, Universitas Negeri Semarang, Indonesia
[3)]Development Economics Study Program, Faculty of Economics and Business, Universitas Negeri Semarang, Indonesia
[4)]Development Economics Study Program, Faculty of Economics and Business, Universitas Negeri Semarang, Indonesia

Corresponding author: dewaeffri@students.unnes.ac.id

Abstract

Climate change is currently one of the most worrisome environmental phenomena at the global level. As a result of human activity, the quantities of gases that generate the greenhouse effect have increased, harming the world climate as a whole.The impact is not only limited to the earth's changing temperature, but also affects various aspects of life, including biological systems and social conditions. This study intends to ascertain the relationship between development and the environment, the effects of climate change on development and the environment, the causes and consequences of heat waves in Asia, and the measures taken to combat heat waves in Asia. Qualitative research is the methodology employed in this study. The study's findings suggest that while development and the environment are related, they frequently contradict one another. Development that doesn't take the environment into account will lead to a number of issues down the road. The effects of the current climate change on ecosystems and development are extensive and intricateRising sea levels, altered rainfall patterns, increased average temperatures, and an increase in the frequency of natural disasters are all having a growing impact on the environment and the development sector.In 2020, the Indonesian government officially included climate change as one of the National Priorities in the 2020-2024 National Medium-Term Development Plan (RPJMN).Three priority programs—the environmental quality improvement program, disaster and climate change resilience, and low carbon development planning—are used to implement the national priority on climate change.

Keywords: Climate Change, Development, Environment

Introduction

Climate change is currently among the most worrisome environmental phenomena at the global level. Because of human activity, the concentrations of gases that generate the greenhouse effect have increased, which has negatively impacted the world climate as a whole. Global warming is brought on by these gases because they prevent the planet from reflecting solar energy. The environment and climate change have a complicated relationship in this setting.The impact is not only limited to the earth's changing temperature, but also affects various aspects of life, including biological systems and social conditions. The Holocoenotic concept explains that environmental changes in one ecosystem will have an impact on the state of other environments. Global warming is one of the primary problems of the current global shift that has a significant effect on the entire world.

Global warming is the phenomenon of gradually increasing temperatures throughout the world, caused by increased greenhouse gas (GHG) emissions. Shortwave radiation is how sunlight enters the earth. It is absorbed and reflected back as longwave infrared radiation once it reaches the earth's surface. The earth's surface temperature rises as a result of some of this radiation being trapped in the atmosphere. The earth's surface retains more heat when greenhouse gases build up in the atmosphere, raising the average yearly temperature. (UNFCCC, 2006). Therefore, reducing GHG emissions has become one of the global focuses in an effort to address global warming

Climate change is the result of global warming affecting environmental temperatures. Although the increase in temperature may not seem very significant, in some countries in Asia including Indonesia, the impact can be very significant. Humans themselves are highly vulnerable to threats associated with climate change, such as floods, long dry seasons, strong winds, landslides, and forest fires. Most parts of Asia including Indonesia have been hit by extremely hot temperatures even causing deaths. In Indonesia, BMKG recorded an increase in heat that caused the air to feel hotter during the past week but the maximum surface air temperature was classified as not experiencing a wave period, but this condition is certainly troubling.

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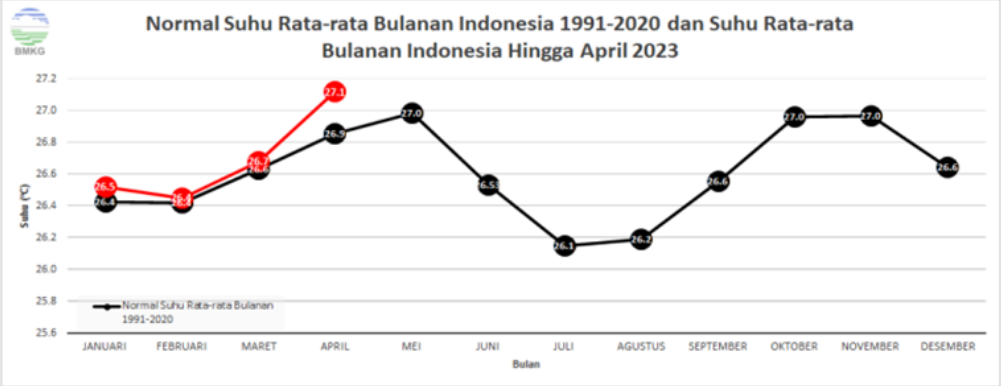

Figure 1
Normalized Monthly Average Temperature of Indonesia 1991-2020 and Monthly Average Temperature of Indonesia Until April 2023
Source: Meteorology, Climatology and Geophysics Agency (BMKG), 2023

According to data from 117 BMKG observation stations, April 2023 will see an average air temperature of 27.1 °C. For the years 1991–2020, Indonesia's April climatological normal air temperature is 26.9 °C, falling between the typical range of 20.1 °C and 29.1 °C. With a value of 0.2 °C, the average air temperature anomaly for April 3, 2023, is positive based on these statistics. The April 2023 air temperature anomaly in Indonesia ranks seventh in terms of anomaly values throughout the monitoring period since 1981.

Figure 2
Average Air Temperature Difference April 2023-March 2023
Source: Meteorology, Climatology and Geophysics Agency (BMKG), 2023

The variation in April 2023's average air temperature compared to March 2023,from 162 BMKG observation stations in Indonesia generally shows an increase in temperature (positive values). The largest temperature increase was recorded at Tarempa Meteorological Station, Riau (1.5°C), while the largest temperature decrease was recorded at Mathilda Batlayeri Meteorological Station, West Southeast Maluku (-0.7°C).

The Government of Indonesia has paid serious attention to the issue of climate change and the environment, as evidenced by the establishment in 2016 of a budget tagging system for climate change (Budget Tagging for Climate Change) as a form of policy support, especially in budget allocation that is transparent and accountable. implementation of the Nationally Determined Contribution (NDC) or climate change control targets, which were set in 2016 and call for a reduction in greenhouse gas emissions of 29% on their own and 41% with help from other countries by 2030. Climate change was formally added as a National Priority by the

Indonesian government in 2020 as part of the National Medium-Term Development Plan (RPJMN) 2020–2024.

Methods

Qualitative research is the methodology employed in this study. Using verbal descriptions and discussions in a unique natural setting, the qualitative research method applies a variety of scientific techniques to gain a comprehensive understanding of the phenomena that research subjects experience, including behavior, perceptions, motivation, and actions. (Moleong, 2017). This study uses a literature review as a method of gathering data.Literature study is a method of data collection that involves research on various literature, books, notes, and reports that are relevant to the problem to be solved.

In qualitative research, the researcher needs to understand the research subject from the framework that has been formulated previously. The analysis of literature pertaining to development, the environment, and climate change is the research topic in this instance. The goal is to determine the influence and link between the many factors being studied. Understanding the study objectives from the viewpoint of actual occurrences is the primary goal of qualitative writing.As such, the end result of qualitative research should not only provide a discussion that cannot be found through quantitative research, but should also produce a discussion that has significant meaning. In addition, qualitative research can also generate new hypotheses or even new scientific contributions that can be used to help understand and solve new and complex problems that have not previously been revealed.

Results and Discussions

Linkages between Environment and Development

Environment and development are two interrelated but often conflicting concepts. Environment refers to all physical, biological, and social aspects around us, including natural resources, ecosystems, air, water, and land. Meanwhile, development refers to human endeavors in achieving economic, social, and infrastructural progress. The goal of sustainable development is to satisfy current demands without endangering the capacity of future generations to satisfy their own.In the context of the environment, sustainable development considers the protection and management of natural resources and the preservation of biodiversity. Its primary goal is to strike a balance between the demands of environmental sustainability and social and economic development.

Development and economic development that occurs without disturbing the environment is not only supported by physical aspects but with social support. 8 Unsustainable development can lead to various environmental problems such as air pollution, water pollution, land degradation, loss of natural habitats, global warming, and climate change. In the long run, these problems can have a negative impact on humans and ecosystems. Achieving sustainable development requires an approach that considers environmental factors in all development decisions.

Environmental degradation is a significant problem for every country, both developed and developing countries. The growing concern stimulates efforts in starting to take more serious steps towards problems due to the environmental degradation that occurs. In this instance, the issue is that economic development involves a trade-off between environmental conservation measures and development. (Drews & Bergh, 2017). Development that takes place without considering environmental factors will lead to a number of issues down the road.

Externalities arise as a result of economic activities carried out by humans without regard to the principles of environmentally sound economics resulting in the inefficiency of unmet resources. Externalities can be positive and negative. Positive externalities are activities carried out by a person or group that provide benefits to other individuals or groups (Sankar, 2008). Negative externalities occur when activities by an individual or group result in harmful impacts to others.

SDGs (Sustainable Development Goals) are sustainable development goals that exist worldwide until 2030. The SDGs cover a wide range of aspects of development, including social, economic, and environmental. The SDGs aim to address the many challenges facing the world today, including poverty, hunger, climate change, inequality and environmental degradation. These goals provide a global framework to direct sustainable development efforts in all countries, and involve the active participation of governments, the private sector, civil society, and individuals to achieve the goals.

Impacts of Climate Change on Environment and Development

Climate change has a significant influence on the environment. The current climate change has wide-ranging and complex impacts on ecosystems and development. Proper understanding and action on climate influences on the environment is critical as it can increase the vulnerability to disasters that can affect, among other things, infrastructure in development as well as significant economic losses. Understanding the influence

of climate on the environment is important in efforts to maintain sustainable development. Mitigation measures such as reducing greenhouse gas emissions and adaptation such as sustainable ecosystem management are needed to protect and restore 9 environments affected by climate change.

As a result of human activities, the global climate is changing negatively. This is brought on by a rise in the concentration of gases that prevent sunlight from reflecting off the globe, intensifying the greenhouse effect and making the planet hotter. Degradation of the soil, alterations in the water system or cycle, a decline in the diversity of life, and the ozone layer in the stratosphere are other signs of damage to the earth's physical and biological processes.

Heat Wave Phenomenon in Asia

A substantial alteration in the climate or climate variability that lasts for ten years or more is referred to be climate change, according to the IPCC. Evaluating scientific data on climate change is the responsibility of the Intergovernmental Panel on Climate Change (IPCC), an intergovernmental scientific group.The IPCC collects the latest research from various disciplines and issues reports that summarize the understanding of climate change. Climate change that occurs can be caused by internal and external natural change processes. Internally, such as the motion of El Nino storms, which is one of the weather phenomena that affect rainfall in a region that causes changes in climate. External factors include long-term alterations brought on by human activities, such as modifications to the composition of the air and land use.

In the results of the sixth assessment synthesis report (AR6) delivered by the IPCC in a press conference that followed online, Monday (20/3/2023) evening time Indonesia sets and reaffirms the emission reduction targets that must be achieved by all countries until 2050. Since AR5, mitigation-related legislation and policies have continuously being expanded. The nationally determined contributions (NDCs) revealed in October 2021 implied global GHG emissions in 2030, which make it difficult to keep warming below 2°C and likely to surpass 1.5°C in the 21st century.

Temperatures on the Earth's surface have increased significantly since the 19th century, and most of this increase is due to human activities. Global temperatures are set to continue to rise in the future if greenhouse gas emissions are not reduced. According to the scenarios taken into consideration and the pathways studied, the best projections for the near future indicate that continued greenhouse gas emissions will cause global warming to increase by 1.5°C. There is a considerable probability that any increase in global warming will exacerbate several concurrent threats. A significant slowdown in global warming within roughly 20 years and a discernible shift in the composition of the atmosphere within 10 years would result from significant, quick, and long-term cuts in greenhouse gas emissions (high confidence).

Not every nation will experience the same consequences of climate change. One of the factors causing heatwaves to occur more frequently and with greater intensity in many places, including Asia, is global climate change.The increase in global average temperature due to increased greenhouse gas emissions is causing widespread climate change, including an increase in extreme temperatures. In April, most of the countries in South Asia were still affected by heatwaves. Meteorological services across Asian nations, including Bangladesh, Myanmar, India, China, Thailand, and Laos, have recorded heat waves over 40°C for many days, setting new regional records for the highest temperatures.In Indonesia, the daily maximum temperature was recorded at 37.2°C at the BMKG's observation station in Ciputat last week, although in general the highest temperatures recorded in several locations have been in the range of 34°C - 36°C to date.

April heat in the Asian region is climatologically influenced by the apparent motion of the sun, but the heat spike in the South Asian sub-continent, Indochina and East Asia in 2023 is among the most significant spikes. Climate experts conclude that the ongoing trend of global warming and climate change has contributed to making heat waves more likely to occur more frequentlyGlobal climate change, according to the Ministry of Environment, is the process of altering the earth's atmosphere's physical characteristics, such as temperature and rainfall patterns. Numerous facets of human life are directly impacted by these situations. Indicators of global climate change are not only about the earth's temperature but also about cloud conditions, wind, precipitation, and solar radiation.

Impact of Heat Wave in Asia

Heatwaves can have serious impacts on human health, the environment, and economic sectors. Heat exhaustion and heat stroke are the most prevalent heat-related disorders, according to the Centers for Disease Control and Prevention (CDC).Experts say humans experience heatstroke when their internal temperature rises quickly, and the body cannot cool itself. Heatstroke can lead to other illnesses or even death and is most common in the old and young population. The number of deaths that occur depends on the level of heat experienced in some regions.

Figure 3
Asian Cities with the Highest Daily Maximum Temperature in the Second Decade of April 2023 (April 11-20, 2023)
Source: Meteorology, Climatology and Geophysics Agency (BMKG), 2023

According to the aforementioned figure, Umarkhali, a city in Bangladesh's Kushtia district, had temperatures of 51.2°C, making it the hottest region among ten Asian cities. The heatwave that occurred in Asia was mostly in the countries of Myanmar and India. India itself is wary of more heatwaves, following a rise in temperatures in April that prompted school closures in several states. The phenomenon also led to at least 11 people dying from heat stroke. According to AccuWeather a change in weather patterns across Asia triggered the heatwave caused by a large building of high pressure from the Bay of Bengal to the Philippine sea and then according to meteorological experts the high pressure prevented the formation of clouds and rainfall . The scale of this heat wave also has a distinctive feature related to climate change because human-caused warming makes heat waves in the region last longer and have high intensity.Asian Cities with Highest Daily Maximum Temperatures in the Second Decade of April 2023 (April 11-20, 2023)

Efforts to Curb Heatwaves in Asia

The hot air phenomenon that occurred in Indonesia in April, according to BMKG, when viewed in terms of phenomenon characteristics and statistical indicators temperature observations, is not included in the heat wave category. The Government of Indonesia itself has paid special attention to the issue of climate change and the environment, as evidenced by the establishment in 2016 of a budget tagging system for climate change (Budget Tagging for Climate Change) as a form of policy support, especially in transparent and accountable budget allocationimplementation of the Nationally Determined Contribution (NDC) or climate change control objective in 2016, which calls for a 29% reduction in greenhouse gas emissions on their own and a 41% decrease with foreign help by 2030. In the National Medium-Term Development Plan (RPJMN) 2020–2024, the Indonesian government formally designated climate change as one of the country's national priorities in 2020. Three priority programs—the environmental quality improvement program, 12 disaster resilience and climate change, and Low Carbon Development Planning (PPRK)—are used to implement national priorities pertaining to climate change.

Efforts to fulfill commitments to reduce world emission levels that pose threats to international security due to global warming and climate change were carried out with the 26th Conference of the Parties or abbreviated as COP26 which was attended by 121 heads of State. This conference is the first meeting to evaluate the Paris Agreement held in 2015. In the Paris Agreement, it was agreed to maintain the earth's temperature to avoid global warming . Compared to the pre-2015 era, when important nations like the US and Australia were absent, the Paris Agreement was endorsed by 195 nationsIf at least 55 nations that account for at least 55% of greenhouse gas emissions ratify the Paris Agreement, it will come into effect. The Paris Agreement was also signed by nations with high emissions, including the US, China, the EU, Russia, Japan, and India.

Implementation by countries of the Paris Agreement is increasingCountries have been submitting nationally determined contributions (NDCs), or national climate action plans, since 2020. Every new NDC is meant to represent a greater degree of ambition than the one before it. For developing nations in need, the Paris Agreement offers a framework for financial, technological, and capacity-building assistance. A growing number of nations, regions, towns, and businesses are establishing carbon neutrality goals as a result of the Paris Agreement. Across all economic sectors, zero-carbon solutions are starting to compete and account for 25% of emissions. The power and transportation industries are where this trend is most noticeable, and it has given early adopters a lot of new economic prospects. Zero carbon solutions might be competitive by 2030 in industries that account for over 70% of world emissions.

Conclusion

It is clear from the foregoing explanation that development and the environment are two ideas that are connected but frequently at odds with one another. Development that occurs without considering environmental aspects will cause various problems that will occur in the future. The world's environment and development are greatly impacted by global climate change. The development and environmental sectors are being impacted more and more by rising sea levels, altered rainfall patterns, rising average temperatures, and an increase in the frequency of natural disasters.Unsustainable development and over-utilization of natural resources are contributing factors to changes in global climate. Industrial activities, intensive agriculture, deforestation, and the use of fossil fuels are some examples of activities that cause greenhouse gas emissions.

The heatwave that occurred in Asia is one of the impacts of global climate change. The factors include rising average global temperatures and altered weather patterns that lead to longer and more intense heat waves.Heatwaves can have serious impacts on human health, the environment and economic sectors. In the National Medium-Term Development Plan (RPJMN) 2020–2024, the Indonesian government formally designated climate change as one of the country's national priorities in 2020Three priority programs—the environmental quality improvement program, disaster resilience and climate change, and Low Carbon Development Planning (LDRP)—are used to implement national priorities pertaining to climate change.

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Authors' Bibliography

Effri Satrio Dewanto [1)]
Sukoharjo, Januari 11, 2003
Effri Satrio Dewanto is currently a student at Semarang State University, Indonesia, majoring in Development Economics. Her research focuses on issues related to Global Climate Change On Development And The Environment.

Kirana Pramesti Rachmadiya [2)]
Temanggung, Juli 1, 2002
Kirana Pramesti Rachmadiya is currently a student at Semarang State University, Indonesia, majoring in Development Economics. Her research focuses on issues related to Global Climate Change On Development And The Environment.

Himmatus Suroyya[3)]
Kudus, April 5, 2003
Himmatus Suroyya is currently a student at Semarang State University, Indonesia, majoring in Development Economics. Her research focuses on issues related to Global Climate Change On Development And The Environment.

Siti Nur Rahma Nabila[4)]
Pekalongan, September 17, 2003
Siti Nur Rahma Nabila is currently a student at Semarang State University, Indonesia, majoring in Development Economics. Her research focuses on issues related to Global Climate Change On Development And The Environment.