The Analysis of Indonesia's Climate Change Policies in Response to the 2021 Intergovernmental Panel on Climate Change (IPCC) Assessment Report/AR6 Group 1 (2021-2023)

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ABSTRACT

The Intergovernmental Panel on Climate Change (IPCC) provides scientific-based assessments regarding the climate change as the reference for its member countries to formulate the best possible climate change policies. Based on the 2021 *The Intergovernmental Panel on Climate Change Working Group I Sixth Assessment Report/*AR6 Group 1 IPCC, Southeast Asia was predicted to be one of the most vulnerable regions. This report shows the need for all Southeast Asian countries to further adapt their policies to cope with the future risk of climate change. As one of the members of IPCC, Government of Indonesia is expected to formulate and implement its climate change mitigation-oriented policies in the most effective way.

This research aims to analyze the implementation of climate change policies in Indonesia as the follow-up from the 2021 IPCC Assessment Report. To ensure the validity of the work, this research uses data from various secondary sources. This research also tries to elaborate the connection between the policies and one of the 2020-2024 National Medium-Term Development Plan (RPJMN) Agendas.

The Government of Indonesia shows positive efforts in slowing down the land degradation and were able to reduce the levels of GHG emissions in the past few years. Indonesia even managed to surpass the targets of GHG emissions reduction in the year of 2021, and 2022, respectively. In terms of disaster prevention, the data from BNPB shows that the disaster in Indonesia is decreasing in the last few years.

Keywords: *IPCC, Climate Change Policies, Government of Indonesia, RPJMN*

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INTRODUCTION

Climate change is a critical phenomenon that has brought the international attention for decades now. The issue of climate change is crucial, since it does not only affect certain regions but the world as a whole. Some of the impacts of climate change, such as the rise of sea level to the increase of heat proves that the world is now facing environmental crisis, which brought severe damages to all the aspects of people's lives. Climate change itself is indicated by the abnormal changes in temperature, the shift of seasons, the rainfall pattern and so on. These have resulted from the global warming due to the significant increase of the greenhouse gas levels in the air and atmosphere (UNCC, 2023).

Beside the natural causes, the occurrence of climate change is mostly triggered by human activities. The frequent non-environmental-friendly activities in almost all aspects of life, such as factories, industries, mining etc. have resulted in the great amount of waste which damaged the ecosystem. This has also accelerated the temperature

increase and reduced the quality of people's lives due to the greater risk of environmental disaster.

Since the problem is mainly caused by humans, then human should be the one to take responsibility. In order to tackle the issue, the various inter-governmental meetings, programs and agreements were conducted over the last few years, such as Kyoto Protocol, Paris Agreement and UN Scientific conferences and many more. Despite the efforts, the climate change issue is yet to be resolved. In response to the circumstance, United Nations Environmental Program along with World Meteorological Organization agreed to establish a more scientific-focused forum called The Intergovernmental Panel on Climate Change (IPCC, 2023).

IPCC itself focuses on providing the governments all over the world with dependable scientific-based reports regarding climate change. IPCC consists of 195 member-states who are also the members of United Nations. The reports provided by IPCC are meant to be the basis for governments to formulate the best possible climate policies to cope with the recent phenomenon. Thousands of people from all over the globe become the main contributor to help IPCC develop a sophisticated climate change report (Ibid).

Furthermore, the recent report of IPCC showed distressing results with regards to the current environmental condition. In this case, the 2021 *The Intergovernmental Panel on Climate Change Working Group I Sixth Assessment Report/*AR6 Group 1 IPCC highlighted the severe symptoms of current environmental crisis as happened in certain parts of the world. By the year of 2019, the concentrations of CO2 in the atmosphere were higher than at any year in the last 2 million years (high confidence), and the concentrations of CH4 as well as N2O reached the highest levels within aat least 800,000 years (very high confidence). There is also a concerning decrease in the Arctic ice levels throughout 2011-2020 which reached its lowest since 1850, in fact, the data shows that the recent size of the Arctic ice area is the smallest in the past 1000 years (SPM). Moreover, the mean sea level has been rising extremely fast, and reached its fastest rate since 1900 and faster than any century in the past 3000 years and the temperature of the global ocean has warmed rapidly and faster in the past century than since 11,000 years ago (SPM). There is also a significant increase in the number of heatwaves and hot extremes which occurred in the land areas as they have now become more frequent since 1950s (SPM).

The rise in global temperature has affected almost all regions across the globe, and Southeast Asia is among the most affected by this phenomenon. The rise of global temperature generates much worst extreme climate such as hot extremes and heavy precipitation. According to the 2021 *The Intergovernmental Panel on Climate Change Working Group I Sixth Assessment Report/*AR6 Group 1 IPCC, Southeast Asia is one of the regions that suffer from more intensive hot extreme weather while also experiencing heavy precipitation such as heavy rainfall like never before. These phenomena will greatly contribute to numerous hazards not only to the ecosystem but also to human beings. The long drought, crop failure and many other natural disasters such as flooding, landslides and many more will likely occur more frequently than before across nations in Southeast Asia (SPM). While the report shows that humans will be the one who

disadvantaged by the event, but the report also shows there is a strong evidence that these abnormality were caused by human activities.

Indonesia as the largest country in the Southeast Asia and the biggest archipelagic state in the world is also highly vulnerable to the climate change. Indonesia consists of more than 17.000 islands with most of the regions rely on the agricultural sector, not to mention the vast water region of Indonesia that has been one of the great contributors to the Indonesia GDP. This heavy reliance on nature makes Indonesia fragile to any critical changes occurred in the ecosystems. In line with the IPCC assessment report, further data shows that climate change has been a prolonged problem in Indonesia. Among the issues is deforestation, as data indicates that there is a constant decline in Indonesia's forest area since 1990s to 2000s by which Indonesia lost its forest to only around 48 % of the total land in 2006 (World Bank, 2008). This has worsened throughout the time as in 2021, Indonesia has lost approximately 203 kha of its primary forest, which is equal to 157 Mt of CO2 emissions (Global Forest Watch, 2021).

Indonesia also suffers for gradual increase in temperature from year to year. Although annual average temperature statistics show fluctuations, the overall trend during 1981-2021 period proves that Indonesia has consistently gotten warmer over the years (Ainurrohmah & Sudarti, 2022). Not to mention that Indonesia is among the top countries contributing to the greenhouse gas emissions (GHG) in the world as it ranks 7th out of the 20 most significant greenhouse gas producing countries (CCPI. 2018). The levels of GHG in Indonesia rose steadily in many vital sectors, including waste management, energy, agriculture, land exploration, and industry, and according to the BPS data, the forest fire contributes the most in GHG production, followed by land and food production sector, waste, agriculture sector, industry and product use, and energy sector (Badan Pusat Statistik, 2022).

Climate change worsened ecological condition in Indonesia which has been facing the preceding critical environmental issues. Among the prior problems exacerbated by climate change are flooding, destruction of marine ecosystems, air pollution, clean water, land or soil pollution, abrasion, forest destruction, garbage and global warming (Novita, 2021). As a consequence, Indonesia also experiences the increase in the total number of natural disasters in the past decade (BNPB 2019; Novita, 2021). Beside the direct or natural damages, Indonesia also suffers for indirect effects of climate change. These include how climate change damages people's livelihoods and living quality, especially to those who live in the environmentally fragile areas. This can even potentially go as far as impending the economic development and costing Indonesia's Gross Domestic Product (Asian Development Bank, 2009).

To cope with those environmental problems, along with the climate change and its risks as reported by IPCC, Indonesia needs to come up with the right policies. These policies should be formulated carefully in order to ensure their effectiveness in preventing further catastrophe. Indonesia must put the climate change issues as its top priority. All policies implemented by Indonesian Government should not overlook the environmental risks, including the realization of Nasional National Medium-Term Development Plan (RPJMN) 2020-2024.

This study specifically aims to outline steps, strategies, and policies implemented by Indonesia to realize environmental recovery and climate change mitigation as well as

their association with the Indonesia's vision to achieve the Sustainable Development Goals. More importantly, this study also aims to make an analysis on all those policies and determine the effectiveness of all the strategies taken by Indonesia so far. To meet the objectives of this study, the research questions are constructed as follows:

1. What are the main strategies implemented by the Government of Indonesia to battle the environmental problems and the impacts of the climate change?
2. How far those strategies are considered successful and effective in resolving the environmental problems and reducing the impacts of climate change in Indonesia?

MATERIAL AND METHODS

This research uses the library research method to find the most suitable data in analyzing the efforts of Indonesian Government to cope with the climate change risk based on the 2021 IPCC reports. After gathering all the needed data, we then divided the data into structuralized analytics, such as the data of IPCC reports and Indonesia's policy in coping with the climate change risk. Data used in this research is secondary data which were gathered from various sources, both official websites, journals and reports. This research also uses descriptive analytics method to be able to explain the gathered data in a more comprehensive way. After finished analyzing the data, we then formulate the conclusion from the research.

RESULT AND DISCUSSION

A. The Main Strategies of Indonesia in Battling Environmental Problems and Climate Change

The climate change mitigation needs to be assessed seriously by the Government of Indonesia. The collaboration between national and international process should be the main focus. On the international level, climate change mitigation in Indonesia is discussed within the UNFCCC, IPCC framework and many other environmental conventions. For the countries who have ratified the convention, a comprehensive discussion and negotiation to reach mutual agreements need to be done immediately. As for Indonesia, who has ratified the UNFCCC, law number 6 year 1994 was enacted as well as Law number 17 year 2007 as the result of Indonesia's ratification of Kyoto Protocol. These International environmental conventions need to internalize into the domestic law of the countries in order to support their national development which aligned with the environmental protection.

In the case of Indonesia, the direction of national development is written on the National Medium-Term Development Plan (RPJMN). Within the RPJMN, there are several development agendas, and one of them is "Building the Environment, Improving Disaster Resilience, and Climate Change". Within this agenda, there are three main focuses which are environmental quality improvement, improving disaster and climate resilience and low carbon development. Each of these points has its own strategy in order to achieve the desirable outcome.

A.1 Environmental Quality Improvement

In terms of environmental quality improvement, some of the strategies taken are starting from preventing the pollution and damage to natural resources and the

environment to strengthening the law enforcement in the field of natural resources and environment. In a nutshell, Indonesia's policies in this area consist of prevention, countermeasures, recovery, and reinforcement. Prevention involves the monitoring of land, air, and sea quality, awareness rising for all the relevant stakeholders, the forest fire prevention, etc. while countermeasures involve the management of plastic and household waste as well as environmental pollution. Recovery focuses on the restoration of land, forest, and coastal areas while reinforcement aims at strengthening the law, institution and regulation regarding environment and natural resources in Indonesia (Kementerian Perencanaan Pembangunan Nasional/ Bappenas, 2020)

A.2. Improving Disaster and Climate Change Resilience

There are mainly two main strategies to reduce the risk of natural disaster in Indonesia as well as maximize disaster and climate change resilience. First, disaster management, which is implemented by strengthening data, information, and disaster literacy; Strengthening the system and regulation of disaster management; Improvement of infrastructure for disaster mitigation and so on. Second, enhancement of climate resilience, which is carried out through the protection of the vulnerability of the coastal and marine sector; Water security protection in climate risk areas; Protection of food security against climate change; and Protection of public health and the environment from the impacts of climate change (Kementerian Perencanaan Pembangunan Nasional/ Bappenas, 2020).

A.3 Low Carbon Development

Low carbon development is performed through numerous efforts to reduce the emissions and the intensity of emission in priority sectors, including land, energy, industry, waste, and maritime sectors. Strategies to accomplish these objectives as pointed out by the National Medium-Term Development Plan (RPJMN) include:

1. Sustainable Energy Development, which is carried out through Renewable Energy Management through the development of renewable energy generators and increasing the supply of biofuels from low-carbon raw materials, and Energy Efficiency and Conservation. The actual step taken by Indonesia in this particular issue is the substitution of coal as the source of energy. Coal is still the primary source of electricity in Indonesia and in order to significantly reduce dependence on coal, Indonesia is committed to not to establish new coal plants and initiated a vision to deactivate all coal plants by 2056 (Congressional Research Service, 2023).
2. Sustainable Land Restoration which is carried out through Peatland restoration; forest and land rehabilitation; reducing the rate of deforestation; and increasing agricultural productivity and efficiency towards sustainable agriculture. One actual policy undertaken by the Government of Indonesia is to initiate the vision of Forestry and Other Land Uses (FOLU) Net Sink 2030. Responding to the IPCC report revealing that GHG emissions has contributed to the earth's temperature rise to above 1.5℃, Indonesia's FOLU Net Sink aims at making sure that carbon absorption out of all the FOLU is equal to, or even higher than the overall emission by 2030 (Ministry of Environment and Forestry, 2023). More specifically,

Indonesia targets the absorption of emissions from forestry sector to reach minus 140 megatons (Mt) CO2e by 2030 and then will further decrease until minus 304 Mt CO2e by the year of 2050 (Ministry of Environment and Forestry, 2023).

3. Waste Management which is carried out through Household waste management, and liquid waste management.
4. Development of Green Industry which is carried out through: Conservation and audit of energy use in industry; Application of the modification process and technology; as well as Industrial waste management.
5. Low Coastal and Marine Ecosystems carried out through the inventory and rehabilitation of coastal and marine ecosystems.

A.4 Monitoring and Evaluation

All the programs related to climate change adaptation activities are assessed through particular monitoring and evaluating system. The system includes the climate budget system from the APBN (state funding) and the implementation of climate change Registration System initiated by the Ministry of Environment and Forestry. Specifically, the monitoring and evaluation are carried out by Indonesia through two mechanisms: (1) Climate budget tagging: This program aims at monitoring and evaluating the allocation of APBN and the effectiveness of the climates activities performed by the stakeholders, through this mechanism, every single government agency is required to report all climate activities and outputs on the website of the Ministry of Finance; (2) National Climate Change Registration System: The National Climate Change Registration System or SRN are available to all environmental stakeholders, such as government agencies, NGOs, private, universities, community groups, etc. and provides the detailed information regarding specific components, namely (1) climate change adaptation policies; (2) climate change adaptation planning; (3) implementation of programs and activities; (4) scientific analysis or studies; (5) capacity building; and (6) the monitoring and evaluation mechanism (Novita, 2021).

B. The Effectiveness of Indonesia's Effort in Resolving the Environmental Problems and Reducing the Impacts of Climate Change

Indonesia's National Medium-Term Development Plan (RPJMN) shows that climate change mitigation is on the list of Indonesia's top priority issues. Within the RPJMN, it is written that there are several strategies implemented by the Government of Indonesia to cope with this issue, but the effectiveness of the policies is quite hard to be defined. In order to see the effectiveness, this research will show the current situation in Indonesia with regards to these three strategies: environmental quality improvement, improving disaster and climate resilience and low carbon development.

B.1 Land Degradation

In terms of environmental quality improvement, land degradation becomes the main issue. Deforestation is the top contributor to land degradation. Activities such as illegal logging and land clearing caused the main forest to decrease and affected the whole ecosystem. The land degradation in Indonesia had drawn the international attention, since Indonesia is one of the countries that has a large region of forest that is important to maintaining the global temperature. From year 2000 to 2006, the average

amount of deforestation in Indonesia was 1.13 million hectares per year. This rate is equivalent to the area of 180 football fields per hour. Within the timeframe of 2020-2021, Indonesia had successfully slowed down the deforestation to 0.11 million hectares. In 2022, MoEF tried to further slowdown the deforestation by revoking 3.1 million hectares of concession license and oblige the concession holder to protect the forest area. The Peat and Mangrove Restoration Agency (Badan Restorasi Gambut dan Mangrove: BRGM) had restored about 1.3 million hectares of peat land. With the help of private companies, the restoration of peatland has reached 3.6 million hectares (World Bank Group, 2023).

B.2 GHG Emission

Low Carbon Development is one the focuses of Indonesia's climate change mitigation's strategy. Lowering the Green House Gases emission is an international commitment that should be supported by each country. In the effort to slow down the rise of global temperatures, Indonesia has committed to decrease the GHG emissions by 29%. This target will be easier to realize if Indonesia is able to work as a team with other countries. The collaboration with other countries not only facilitates Indonesia to reach its target, but by the help of international support the target could be set to be much higher, which is 41% in 2030 (Ministry of Energy and Mineral Resources, 2023).
For the last few years, Indonesia had shown its seriousness in reducing the GHG. In 2019, Indonesia managed to surpass the emission reduction target, in which the target was 51 million tons, and the realization was 54.8 million tons. The trend seems to be continuing positively for the next few years. In 2021, Indonesia also surpassed the emission reduction target by 64.4 million tons, while the target was 58 million tons. The latest data on GHG emissions was in 2022, where Indonesia also shows a positive progress. The targeted emission reduction was 91 million tons, while Indonesia managed to reach 91.5 million tons. The data of Indonesia's GHG emission for the 2019 to 2022 indicated that Indonesia is on the right track in reaching its goal of reducing GHG as a way to help slowing down the rise of global temperature (Ministry of Energy and Mineral Resources, 2023).

B.3 Renewable Energy

Despite the efforts of switching to renewable energy, Indonesia is still heavily dependent on fossil fuels as the main source of energy. In fact, among all the Southeast Asian countries, Indonesia is the biggest fossil oil user, followed by Malaysia, Thailand, Philippines, and so on. Although the target has been set by the Government of Indonesia to reach the renewable energy use by 23% in 2025, the current state has yet to show any significant progress (ESDM, 2019; Erdiwansyah et al., 2020).

Beside oil, another prominent energy source for Indonesia is coal. The reliance on coal needs to be managed in order to reduce the waste and mitigate emissions. Indonesia has set up the vision of substituting the coal to other alternative sources and to eliminate all the use of coal energy as well as shut down all coal power plants by 2056. As of now, dependence on coal is still quite high as the coal contributes to 60 % of electricity in Indonesia (Congressional Research Service, 2023). Hence, the progress of

renewable energy efforts in Indonesia and the substitution of energy to other alternatives, such as wind, or hydropower remain to be seen until years to come.

B.4 Disaster Management

The outcome of disaster resilience strategies indicates fluctuations over the years. Indonesia, as an archipelagic country located in the ring of fire areas is fairly vulnerable to the effects of natural disasters, not only by the natural, or ecological impacts but also social impacts associated to the loss of lives and displacement of people (IDMC and Asian Development Bank, 2023). The number of disasters in Indonesia began to rise significantly in 2020 to 5.003 incidents compared to 3.904 incidents in 2019 (BNPB, 2023). Yet, the number gradually decreased to 3.520 incidents in 2021 and 2.391 in 2022 (BNPB, 2023). If the trend continues in the coming years, it is safe to assume that the disaster management efforts carried out by the Government of Indonesia result in successful outcome.

CONCLUSION

The IPCC Assessment Report 2021 pointing out climate change and environmental vulnerabilities in the Southeast Asian countries has been followed up by a series of policies undertaken by the Government of Indonesia. With regards to land restoration, Indonesia managed to revoke 3. 1 million hectares of concession license as well as restore approximately 1.3 million hectares of peat land and with the supports from privates, the restoration of peatland has reached 3.6 million hectares. Although being one of the top GHG emissions producers in the world, Indonesia is proven to be able to reduce the levels of GHG emissions in the past few years. Indonesia even managed to surpass the targets of GHG emissions reduction in the year of 2021, and 2022, respectively. This positive trend signals promising paths for Indonesia to overcome the problems of land degradation and low carbon development. On the other hand, Indonesia has declared the commitment to the vision of renewable energy, yet the realization requires more time as the reliance on fossil oil and coal is still relatively high. Last but not least, the efforts to mitigate natural disaster seem to be showing positive results since there was a decrease in the number of disasters in the last two years (2021-2022). However, the fluctuation in this sector remains high as the number once rose significantly in 2020 to 5.003 cases, before it went down again in the following year. Thus, it is necessary to look for further data of natural disasters in the coming years to come up with a complete assessment.

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