Environmental dimension of pandemic COVID-19: case studies of Indonesia

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Abstract. Pandemic COVID-19 adversely affects all aspects of life. Industries and transportation reduce its activities, causing a decline in demand for logistics significantly. In Indonesia, 2.8 people predicted will be laid off, 2.9-5.2 million people lose a job, unemployment will increase to 7.5%, poverty increases to 27.5 million people (10.2%), economic growth minus 5.32%. On the other side, the air quality index decreased from 155 at the end of March to 69 in April. The indicator of air quality (PM 2.5) decreased from 63.4 ug/m³ to be 20.8 ug/m³. However, there has been increased in the amount of medical waste and energy consumption. This research aims to identify the impacts of pandemic COVID-19 on the environment and the commitment of the government to deal with climate change-related to SDGs. The result of research shows that the new normal increases the number of people infected by COVID-19 significantly. The government's commitment to dealing with climate change is decreased due to the policy to refocus and reallocate the budget to deal with pandemic COVID-19. It is required to balance the health aspect and economic aspect for the nation's sustainability and people's lives.

1. Introduction

1.1. Research background

COVID-19 outbreak has been the momentum to show the government's ability to handle emergency situations and examine our adaptability and resilience in dealing with uncertainties. As per today (16th of September) 29,155,581 confirmed cases and 926,544 deaths worldwide per today [1]. The government of Indonesia is firstly showing ignorance in the occurrence of this pandemic. All the sudden shift comes after our President having a call with the Director of WHO [2]. There was two months’ gap between international level consideration of COVID-19 as a public health emergency with national level, which started one on 30th of January. Yet, Indonesia has just started on 2nd of March, 2020.

After two months of lockdown-like policy called large scale social restriction (PSBB) being implemented, when economic sector started to collapse, national government choose to promote a shift towards new normal era through Decree of the Minister of Health HK.01.07/MENKES/328/2020 concerning Guidelines for the Prevention and Control of COVID-19 in Office and Industrial Workplaces. It was decided that people are allowed to their normal activities by following the health protocol. For the economic recovery plan, the Indonesian government had ratified Government
Regulation in Lieu of Law Number 1 Year 2020 concerning State Finances and Financial System Stability for Handling the COVID-19 Pandemic. While yet, this measure is criticized as not to take a side on environmental management.

Further environmental management post-pandemic becomes a concern to be taken into account. During this pandemic, the researcher reported that nature is healing. Lockdown policy that restricts any kind of travel to reduce viral transmission impacted improved environment conditions such as improved air quality as the pollutants reduced [3]. While the economy is collapsing, the government that is still having a lack of awareness and commitment towards climate change could do whatever it takes to bring back the profit-oriented activities that give less attention to the environment.

Discussion on the environmental dimension of COVID-19 had predominated by focusing on environmental as it is a single component such as containment of greenhouse gases in the atmosphere [3–6], medical waste in the water body [4,7]. Moreover, some proposed research agenda is still being directed into a long list of the environment's chemical, physical, and biological aspects [8]. On the other side, developing further implications towards developing a strategy in governing the changing environment is rising as climate change keeps happening while our preparedness is still lacking [9,10]. This research would fill that niche by trying to picture an understanding between the human-environment system. Also, we give an effort in portraying pandemic-related measures taken by the government of Indonesia and how it could impact environmental management.

1.2. Literature review

Craving into understanding environmental management could be started from portraying the nexus between humans, society, and the environment as how the changing environment affects human activity [9]. Saadaat et al. (2020) had developed a preliminary conceptualization where the SARS-CoV-2 acted as the source of risk that impact the human body, and then the secondary impact is happened afterward [7]. But it could not figure out the secondary impact, what aspect that is being impacted, and how severe it is being affected. A more complete conceptualization was proposed by Sarkar et al. (2020) called the coupled human-environment system (CHES) concept in linking COVID-19 and the environment that proposed by [11]. The framework could help us understand our position in the environment, so that we could be able to adapt better towards this changing environment.

Mentioned that both direct and indirect impacts of COVID-19 outbreak towards the environment were theoretically driven by two drivers. It resulted from combination between virus Sars-CoV-2 and the severe respiratory acute disease itself and government measures such as a lockdown. As proposed, the direct impact is found in humans and civilization, while the indirect impact is found in the environment.

As shown in figure 1, it proposed that human society experienced negative impacts more than the natural environment. Because the billions of deaths followed by economic recession and other sociopsychological problems have been threatening people's future, at the other side, through the lockdown policy, nature is healing. There were reported worldwide air pollutants (such as PM 2.5; PM 10; NOx; CO; SOx) are reduced to improve the air quality [12]. The world is being cleaner and quieter [6]. This concept does not imply that there were also reported environmental degradation due to irresponsible medical waste management and spikes in impunity waste sources, domestics, due to stay-at-home policy [11].

Also, the environment has a two-sided coin regarding to COVID-19. COVID-19 related events could impact it, but it could be its cause [8]. Believes that being common in this outbreak is that transmission could be happening by direct contact with the patient of COVID-19. But yet, there's also the indirect transmission in which the environment could influence spreading the virus [13]. This perspective comes from the fact that even tough lockdown policies had been implemented and followed by people, there were still positive cases confirmed [13]. The possible actors are air pollution, sewage system, water, or the wastes where the virus could spread.
As in the aforementioned nexus between humans and environment, the socio-economic issues should also be considered in talking about COVID-19 and the environment. In which recession had about to begin after months of closing the gate of international and local transportation. Not to mentions the collapsing workforce sectors because closing down of industries that cannot stand in this situation.

We develop a preliminary umbrella concept to guide and limit the discussion of the environmental dimension of COVID-19. Figure 2 follows, showing the external forces are the COVID-19 (including the virus, SARS-CoV-19), and the government measures adversely affect the environment. The environmental dimension would distinct the natural and built environment as how we distinct the abiotic and biotic. We also added human society to represent the socio-culture of human civilization.

Table 1. Grey literature sources that is used in this research to portray empirical evidence of the environmental dimension and the government's measures.

| Objectives                  | Types of grey literature                      | Sources                                                                 |
|-----------------------------|------------------------------------------------|-------------------------------------------------------------------------|
| Empirical evidence          | Newspaper article                              | Various reputable mass media such as Kompas, Detik, Tirto, etc          |
| Government’s measures       | Governmental press-release and an official announcement | Government’s official site of COVID-19 <covid.go.id>                     |
|                             | Fiscal management strategy                     | Official report published on site of Ministry of Finance <fiskal.kemenkeu.go.id> |
|                             | Climate change-related policy report and evaluation | Taken from Climate Policy Initiatives official site <www.climatepolicyinitiative.org> |
2. Methodology
This research used the qualitative method through desk research. Various grey literature sources mentioned in such as government releases, reports, mass media articles, and webinar notes, were collected and criticized to obtain the socially constructed environmental dimension. Using those literatures is categorized as a literature review research method which is commonly used to "introduces the context and current thinking" [14]. A multidisciplinary approach is also used in this research to gain a bigger picture of the correlation between COVID-19 and Indonesia's environment.

3. Results and discussion
3.1. COVID-19 and the natural environment
During the large scale social restriction (PSBB) implementation, better air quality was reported in Jakarta, Bandung, Surabaya [15,16,17,18]. In Indonesia's capital city, people on social media share the mesmerizing pictures of blue skies, indicating better air quality. Also, it proved that PM 2.5 concentration had dropped from 40.10 mcg/cbm in 2019 to 15.48 mcg/cbm from the end of March to first week of April 2020 [19]. Environmental Office, the government of Surabaya City reported that the reduction in transportation and industrial activities are primary causes for air pollutants decrease. In Bandung, the work-from-home policy had successfully brought air quality to good rank as per before had never been reached this high [16]. It resonates with worldwide report on impacts of lockdown policy towards air pollution [5,11].

Different conditions were reported in Semarang City. The local government chose to implement community activity restriction (PKM) rather than following national government instruction to conduct large-scale social restriction. The air quality before and after the policy, remains the same [20]. Another intriguing fact is when government starts to loosen up the lockdown-like policy and began the transition to a new normal era. The air quality in DKI Jakarta is worsened or more likely to go back to its usual pollution before the outbreak [21,22].

Despite only discussing the sky's better picture, scholars had proved that air pollution is also related to COVID-19 severity [5]. Pollutants could affect humans' lungs' condition and make them more vulnerable to infections [13]. In Indonesia, there were no specific reported cases from the airborne transmission. But, it had been believed by Indonesian health experts that comorbidities from air pollution could worsen COVID-19 positive cases and deaths in regions where the air quality is low [23].

Related with water pollution, some areas reported degradations. Surabaya had reported degradations because the domestic wastes are polluting the water body [18]. It resonates with a previous study confirming that stay-at-home policies contributed to increasing domestic waste [11]. Also, as people enhancing their hand-washing and use of disinfection, chlorine content had reported increasing in the river of Malang City, East Java, Kali Mas river in Surabaya [24,25]. In Cisadane river, West Java a river that stretched from Bogor to Tangerang –near Indonesia's capital city, there found medical waste floating [26]. It threatened people around the river that are still using its water to fulfill their daily needs.

3.2. Government's commitment on climate change
Indonesian government had proved their commitment to climate change through Nationally Determined Contribution (NDC) and ratified the Presidential Law Number 59/2017 about Implementation of Sustainable Development Goals [27]. In 2009, the government formed Indonesian Climate Change Trust Fund as a leading institution in bringing better development and in 2019 established the Environmental Fund Management Agency under the Ministry of Finance and Ministry of Environment and Forestry [28]. In 2011, the Climate Policy Initiative reported that allocation of government spending towards climate financing reached IDR 8,4 trillion [27]. In 2016, 2017, and 2018, the budget plan for climate change was escalated from IDR 72,4 trillion; to IDR 95,6 trillion; IDR 109,7 trillion respectively. As shown in figure 3, although the amount is decreasing, the percentage of climate change financing in the annual state budget is slightly upraising from 4,7% in 2017, become 4,9% in 2018. However, to finance
an emission reduction by 29% in 2030, it is estimated that Indonesian government still needs to allocate IDR 288.4 trillion yearly [28].

![Figure 3. Portrait of Indonesian government’s climate change financing.](image)

Pandemic COVID-19 had forced the government to reallocate and refocus the budget plan towards funding healthcare-related expenses. In April 2020, it was reported that IDR 56.57 trillion had been reallocated [29]. Two issues came up from this policy. The first is that climate financing that has previously been limited is supposedly being reduced as affected by budget reallocation and refocusing policy. Moreover, a physical improvement that has been the majority sector on climate change financing in 2016-2018 [28], is forced to be reduced wisely or if it is not as important as health infrastructure should be stopped [30]. As to how Indonesian’s climate financing has never been enough, the commitment to climate change is questionable. But to reach further conclusion on this issue, we still need further research or wait until next year where another biennale report on climate financing is released.

Regarding the National Economic Recovery Plan, the second issue is that fiscal stimulus planned is mostly still on sectors that contributed to greenhouses emission. As mentioned in the brief report by Greenpeace Indonesia and INDEF: Institute For Development of Economics and Finance (INDEF) [31], fiscal stimulus tends to be business as usual rather than brought into a greener one, which promotes no positive impacts towards climate change. This stimulus plan is assessed "(...) not building a long-term economy, a long-term health system, or controlling climate change" [31]. Given this, the achievement target of SDGs (Sustainable Development Goals) will be threatened. Among the SDGs targets related to the environment include reducing emission at the amount of 29% in 2030. The contribution of renewable energy for energy mix in 2019 was 10-16%, improved land coverage, and reduced disaster risk index.

4. Conclusion
There is a complex relationship between COVID-19 as a public health emergency and as a stressor to human civilization. Nature is healing, yet the government is in a trial on how they are capable of tackling the crisis. The dilemma between forecasted economic recession and public health because of health facilities that started to collapse is real, thus really needs the bravery to take on what side. Back and forth forces between those two sectors, whatever it takes, should also consider its effect on natural environment.

The government's policy to refocus and reallocate the budget dealing with pandemic COVID-19 reduces the commitment to climate change and threatens the target of SDGs achievement. It is required to plan a “build back better” principles by promoting low carbon development synergizing economic growth, social justice through employment opportunities and environmental sustainability.

Acknowledgment
We are thankful to Faculty of Social and Political Sciences, Diponegoro University for awarding the International Collaboration Research Grant.
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