

Indonesia Under the Radar: An Evaluation of the Archipelago's Climate Challenges and Policy Response

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Abstract: How should nations come together to confront our global climate crisis? The purpose of this article is to explore Indonesia's role in contributing to and addressing climate change. I examine Indonesia's key climate challenges and then discuss the nation's corresponding responses in the context of international policymaking. After reflecting on concepts like climate justice, I propose further efforts that Indonesia as a whole can take to strengthen its sustainability endeavors. With a call for increased ambition at the 2019 United Nations Climate Change Conference, the urgency of highlighting Indonesia's importance in global climate negotiations is paramount.

Introduction

Home to the world's fourth-largest population of over 250 million people, Indonesia encompasses a wide variety of ethnic and geographic diversity.¹ It is thus unsurprising that the archipelagic state faces many environmental challenges and has a growing presence in international climate change dialogue. As the fourth-largest emitter of greenhouse gases in 2015, Indonesia has not been enacting enough measures to reduce its immense footprint.² Despite having a track record as alarming as other major polluters like China, India, and the United States, Indonesia seems to have avoided as much widespread criticism.³ More effective, streamlined efforts are needed in order to mitigate and adapt to climate change within Indonesia, and it is worth examining the factors that led to such dire circumstances.

With a call for increased ambition at the 2019 United Nations Climate Change Conference, the urgency of no longer letting Indonesia fly under the radar in global climate negotiations grows even more pronounced. This paper thus aims to provide a focused snapshot of Indonesia's current climate challenges and corresponding policy responses.

Physical characteristics and geography. Indonesia is a unique archipelago that bridges Asia and Oceania at a juncture of the Earth's tectonic plates.⁴ With almost 14,000 islands that comprise a land area of approximately 200 million hectares,⁵ 50-60 million Indonesians directly depend on the country's extensive and biologically diverse tropical forests.⁶ The entire population lives on approximately 6,000 of

the total islands, which are primarily made of volcanic mountains that slope downward into swamps and coastal plains.⁷ Because Indonesia encompasses such diverse terrain, it is particularly susceptible to an assortment of climate risks, such as intense flooding, seismic activity, and land subsidence.⁸ At least 110 million Indonesians, or just a little under half of the population, are at some form of climate risk.⁹

Overview of the economy and energy. Given the rich forests and natural resources that characterize the country's landscape, Indonesia's economic development has been largely based upon related industries. Even though Indonesia, the largest economy in Southeast Asia, is listed as a G20 country, it heavily relies on mining, agriculture, and forestry, all of which have significant implications for the environment.¹⁰ The largest portion of Indonesia's total GDP is industry, which contributes 41% and encapsulates mining, manufacturing, energy production, and construction.¹¹ Petroleum and natural gas are the largest of these industries, and their expansion presents major challenges to sustaining the nation's natural capital, particularly its forests.¹² Agriculture, including farming, fishing, and forestry, is also a leading cause of Indonesia's deforestation;¹³ comprising 13.7% of the nation's total GDP, the agriculture sector, which depends on rubber, palm oil, poultry, and beef as its key products, requires substantial forest conversion.¹⁴ More than half, 54.7%, of Indonesia's GDP is thus tied up in practices that significantly contribute to one of its primary environmental concerns. It is also worth

noting that over half of the entire working population is employed by these two sectors. Almost a third of the labor force, 32%, works in agriculture, and 21% works in industry.¹⁵ The nation is thus caught in a fragile situation where it must structurally reform its reliance on heavy carbon-emitting sectors but also ensure the livelihood of its people.

Indonesia needs to better address the fact that its growth is highly unsustainable and inconsistent with creating a safe climate future. As seen in Figure 1, the most recent data distributed by the Indonesian government in 2014 indicates that the main sectors contributing to Indonesia's emissions were land use, land-use change, and forestry (LULUCF) at 53% and energy at 33%.¹⁶ These emission sources align with the aforementioned key contributors to Indonesia's economy: industry and agriculture. While LULUCF emissions are considered separate from agriculture emissions, they are inextricably linked because much of the land-use change in Indonesia is related to clearing land for the prominent palm oil industry and other extractive farming practices.¹⁷

With regard to energy, Indonesia has been consistently struggling, in that energy emissions between 2010 and 2014 had an annual increase of approximately 5.2%.¹⁸ Furthermore, Figure 1 shows that if LULUCF emissions were not counted, energy would comprise 70% of Indonesia's emissions.¹⁹ According to a 2019 report on G20 countries, Indonesia in particular burns an increasing amount of coal for electricity.²⁰ It is also worth noting that even though the nation appears to have plenty of power fueled by coal, the government admits that it struggles to adequately fulfill energy demands.²¹ Indonesia has more than 28 million people below the national poverty line, and a large section of the population lacks access to basic services like electricity.²² The Indonesian government also recognizes that climate change will only make it more difficult for people to escape this kind of poverty.²³

Given that the majority of Indonesia's emissions come from its land-use and energy sectors, it is important to consider how the systems that allowed for these unstable foundations can be adjusted. If business and government stakeholders are unable to change their ways, the consequences of climate change will only worsen as a pervasive strain on the lives of everyday people.

Climate Challenges

The biggest challenge faced by contemporary society is finding ways to sustain both people and the natural environment. Even before widespread outcry about climate change, Indonesia has struggled with this concept and been characterized as a "supermarket" of natural disasters.²⁴ In the past 20 years, the government has officially recorded over 24,000 disaster events, including flooding, seismic activity, and volcanic eruptions, among other incidents.^{25,26} Unnatural levels of greenhouse gas emissions are at the heart of these issues, disrupting environmental phenomena's natural equilibrium and intensifying their harmful effects. For Indonesia in particular, high emissions, rapid-onset disasters like massive flooding, and more slow-onset problems like deforestation and peat burning have emerged as some of the country's main environmental concerns.

Emissions. International bodies like the United Nations Environment Programme (UNEP) have found that emissions are following a highly discouraging trend worldwide; as of November 2019, UNEP asserts that emissions need to drop 7.6% every year between 2020 and 2030 if the world is to reach its 1.5°C Paris Agreement goal.²⁷ G20 countries, which include Indonesia, comprise more than 78% of the world's emissions, so it is vital to hold Indonesia and other member countries that lack a net-zero emission target especially accountable.²⁸ Another report states that by 2030, G20 countries need to reduce current greenhouse gas emissions by a minimum of 45% in order to meet the 1.5°C target.²⁹ Indonesia thus has one of the biggest opportunities to demonstrate that society is willing to change and lead the world into a sustainable, prosperous future. As one of the most physically vulnerable countries as well, Indonesia has a unique position to prove that climate change is a threat multiplier, exacerbating issues not only in Indonesia but on a global scale.

Flooding. As an archipelago with up to 42 million people living in low-lying coastal zones, rising sea levels—as a direct consequence of greenhouse gas emissions—are one of the largest and most immediate threats to the people of Indonesia.³⁰ In 2004, the Indian Ocean Tsunami killed 167,000 people in Indonesia alone and cost around 10 billion dollars in damage.³¹ The frequency of these kinds of catastrophes may very well increase as a result of anthropogenic climate change, and since May 2016, Indonesia has been experiencing an unusually

high number of floods and landslides such that their ability to respond to future disasters has been negatively affected.³² Climate-related migration and displacement may become a harsh new norm for Indonesians, especially the 20.19% of the population that is vulnerable of falling into poverty.³³ It is not easy for people to be uprooted from their homes, and trying to recover from this kind of displacement can easily put citizens and the country as a whole into a difficult situation.

Deforestation. Deforestation is another major climate challenge because it decimates carbon sinks, thus making itself not only a detriment to biodiversity and ecosystem services but also a prominent contributor to Indonesia's greenhouse gas emissions. In fact, emissions from destroyed forests are higher than those from cars, trucks, ships, and planes combined.³⁴ Deforestation also directly hurts Indonesia's citizens because the loss of forests often increases the burden on people in rural areas who depend on forests for food, firewood, and other materials. With around 45% of the Indonesian population living in rural areas, natural resources are paramount to their way of life.³⁵ Despite this fact, Indonesia still has one of the highest deforestation rates in the world in part because of its economy's reliance on the palm oil industry.³⁶ As seen in Figure 2, palm oil mills scatter the entire country and are located near major population and forest hubs on the archipelago. While the production of palm oil has been the country's biggest historical driver of deforestation,³⁷ it is also important to note that a massive amount of LULUCF emissions in Indonesia are a result of a specific type of deforestation: the destruction of peatlands.

Peat burning. Peatlands are a type of wetland that hold about 12 times more carbon than other tropical rainforests.³⁸ Peat is often degraded by humans clearing it for agricultural land, and as water leaves the peat during the dry season, its carbon material becomes highly flammable and leads to fires that are catastrophic to both people and the atmosphere. One hectare of peatland can release around 6,000 metric tons of carbon dioxide when destroyed, and in 2015, these effects were felt internationally.³⁹ An intensified El Niño led to an especially dry season in which there were so many peat fires that the resultant toxic smoke caused tens of thousands of deaths in nearby

Singapore and Malaysia. 2.6 million hectares of land and forest were also lost, and billions of metric tons of carbon were released.⁴⁰

These rapid-onset and slow-onset climate change impacts make adequately addressing climate change even more difficult, and Indonesia's internal challenges are important to consider because the nation will ultimately have a global impact as one of the biggest contenders in ensuring a sustainable future. Therefore, its proposed policy responses to these climate challenges merit significant discussion.

Policy Response

As a signatory to the 2015 Paris Agreement, Indonesia details its climate objectives and action plan through 2020 and beyond in a nationally determined contribution, or NDC.⁴¹ This essential document describes the nation's two main policy types: mitigation that reduces greenhouse gas emissions and adaptation that promotes resilience in the face of climate challenges. In accordance with typical climate response measures, Indonesia's NDC highlights the particular importance of sustainable forest management and technological innovation for addressing its own climate priorities.

Nationally determined contribution. Published in November 2016, Indonesia's first NDC shared an overall vision for achieving "archipelagic climate resilience as a result of comprehensive adaptation and mitigation programmes and disaster risk reduction strategies."⁴² By 2030, Indonesia pledged to unconditionally have a 29% reduction of business-as-usual (BAU) emissions or conditionally have up to a 41% reduction of BAU by particularly focusing on land-use, including agriculture and forestry, as well as energy.⁴³

Unfortunately, the Climate Action Tracker, an internationally-recognized and independent scientific analysis conducted by Climate Analytics and NewClimate Institute, found these pledges to be "highly insufficient."⁴⁴ According to the 2019 Emissions Gap Report, the levels of ambition in all NDCs must increase at least fivefold to reach the 1.5°C goal and threefold for the 2°C goal.⁴⁵ Indonesia's key promises and claims to address climate change were rather vague and lacking in tangible actions and results. As seen in Figure 3, Indonesia's policies as a whole have proven to be rather low-performing

while other major polluters such as China have had some high-performing initiatives.

REDD+. Given Indonesia's key concern of mitigating LULUCF emissions, most of their most successful policy measures are related to the land-use sector. The government cites "Reducing Emissions from Deforestation and Forest Degradation" (REDD+), a mechanism developed by the United Nations Framework Convention on Climate Change (UNFCCC) to incentivize sustainable forestry,⁴⁶ as an "important component" of their NDC target.⁴⁷ Indonesia's commitment to REDD+ is evident from the fact that it contributed \$250.6 million dollars for climate change mitigation, which is more than 30 times the \$7.87 million dollars that were committed from donor grants.⁴⁸ The NDC also referenced "significant steps" that have been made with regard to a moratorium on the clearing of primary forests and the promotion of "social forestry," or sustainable forest management with active participation from the private sector, civil society organizations, and local communities in order to "ensure greater and more enduring benefits from these initiatives."⁴⁹ From these small excerpts, one can see that the Indonesian government prides itself on attempting to involve more stakeholders in climate discussions.

Technology. Given dismal predictions for the future, international organizations like the Global Green Growth Institute indicate that achieving the needed level of climate response requires investing in technology that complements global initiatives like REDD+.⁵⁰ Since 2010, Indonesia has been conducting technology needs assessments in order to receive assistance with implementing much desired climate technologies.⁵¹ According to the Climate Change Technology Centre & Network, past projects in Indonesia include a hydrodynamic flood model that better supported sustainable city planning in the capital of Jakarta.⁵² The most recent submission for technical assistance is a 2019 request for support with a "e-mobility transition" in Jakarta; by introducing electric vehicle technology in the capital and assessing the use of solar roofing for transit, Indonesia can potentially find long-term strategies for more sustainable development.⁵³ While all of these projects are steps in the right direction, the inefficiency that hinders the widespread accessibility of these kinds of solutions throughout Indonesia, as well as the major lag time between new innovation proposals, must be addressed.

Recommendations

Based on Indonesia's current policy response, the most promising way for Indonesia to reduce greenhouse gas emissions and combat its climate challenges seems to be by strengthening existing measures in its NDC. More developed countries should extend a helping hand toward Indonesia because all parties would benefit; climate change is not an isolated issue and requires collaborative efforts from all stakeholders. It is vital that Indonesia and other countries take the time to discuss the plan of action for enhancing their NDCs in 2020. More specifically, the following ways of delivering concrete, positive outcomes should be considered: promoting overall ambition, fostering diversity and inclusion in the policymaking process, increasing sustainable finance initiatives, and expanding access to climate technology solutions.

Raising ambition & capacity-building. One of the main goals of the Paris Agreement is to promote the highest level of ambition possible, and Indonesia's situation as a major emitter requires them to scale all their pledges such that they appropriately line up with the aforementioned 2019 Emissions Gap Report. Ambition can be promoted by framing climate change not just as an issue of science but as a moral one, and this approach appears to already be spreading among leaders in the European Union.⁵⁴

By also building more technical capacity, successful implementation of Indonesia's NDC will be much more within reach. The greatest opportunities for fundamental transformation in the long-term lies in major reforms in the land-use and energy sectors, as existing measures in both are already proving to be helpful. As seen in Figure 4, by increasing capacity for renewable energy and incorporating energy conservation programs, emissions could be reduced from the business-as-usual baseline by almost half. Furthermore, the graphical representation suggests that extending Indonesia's forest moratorium and restoring even more degraded peatland will double their respective emissions reductions. Other research also indicates that protecting the primary forest of the Papua province in conjunction with the restoration of degraded lands could avoid 2.8 to 3.3 gigatons of carbon dioxide emissions, which is a similar quantity to the baseline emissions projected for 2030 in Indonesia's NDC.⁵⁵ With international assistance, it is likely that meeting these higher targets is completely feasible.

Inclusion. Moving forward, Indonesia should strengthen cooperative efforts with other relevant bodies both within and outside of the UNFCCC. To raise ambition and promote capacity-building, including all stakeholders in both the creation and implementation of NDCs is critical. The impact of climate change does not discriminate, yet societies choose to prioritize certain voices and livelihoods over others. Women in particular are often excluded from all levels of climate policymaking, but they should be heard at local, national, and international scales. In Asia, Indonesia has the third-largest number of women in charge of households.⁵⁶ These women are often tasked with gathering and preparing food and water, so naturally, they directly face climate challenges and are best-prepared to identify adaptation priorities and what measures would serve their people best. Women must infiltrate all levels of decision-making such that their perspectives are brought to the forefront.

A successful pilot program in Indonesia's island of Sumatra has supported women with education about organic farming, finance management, and nutrition. Throughout the project, the women found themselves better able to support their family's health and nutrition, increase family income through finance lessons on concepts like selling surplus vegetables, and overall be more aware of sustainability measures. Now, the women dream of becoming a local hub for organic vegetable production and are researching ways to expand the reach of their newfound business.⁵⁷ By consulting with women like these in a human-centered design approach, more projects that better fit the needs of the people they are intended to aid could provide opportunities for more equitable growth. It is crucial to include those who are most affected by climate issues in problem-solving negotiations, as they are likely to provide unique insight that cannot be gleaned otherwise. Communities are more resilient to climate change risks when they are able to define for themselves the challenges that they face and work together to find solutions.

Enhanced finance. To finance grassroots initiatives led by women, as well as more technical capacity, major systemic overhauls are needed. A 2018 study by the Global Greengrants Fund and Prospera International Network of Women's Funds found that grantmaking foundations only

dedicated 0.2% of funding to explicitly support women-led environmental initiatives.⁵⁸ In order to truly champion inclusivity in creating a healthy environment, this percentage needs to increase dramatically.

Successful climate finance already exists and should be able to simply make its way into both Asia and other regions of the world. According to the CEO and President of Nordic Investment Bank (NIB), the organization has "developed environmentally sound solutions that can be replicated and scaled in other parts of the world."⁵⁹ Given NIB's growth and success, other organizations should also prioritize loans for proposals that emphasize sustainable growth. Providing "soft loans," or loans that turn into grants if a project fulfills agreed goals and criteria, could hold borrowers accountable without permanently increasing their debt burden, as well as incentivize the acceleration of their sustainable projects.⁶⁰

At the same time, though, NIB warns of "victims of green solutions," or "those who could lose their jobs when industries change," and seems to reiterate the idea of financial institutions helping to ensure a just transition for all, where sustainable finance must consider not only capital but also social impact.⁶¹ Once again demonstrating the importance of including all voices in climate change response, another sustainable finance institution has experienced major benefits from promoting gender equality in development projects. The Energy and Environment Partnership Trust Fund for Southern and East Africa found that in a project to distribute clean cookstoves and biogas solutions throughout the regions, women provided "valuable inputs in the design, manufacturing, and distribution of these products," as well as a unique credibility to sell the products throughout their societies that their male counterparts lacked.⁶² This technology could certainly be transferred into rural Indonesian communities, which could benefit from not only biogas's cleaner burn but also the resultant decrease in deforestation as people are able to move away from wood-burning. With appropriate financing, the development of biogas can be widely mobilized and perhaps help reduce the reliance on fossil fuels with additional action-oriented research.⁶³ From this example, it is evident that multiple sustainability goals can be achieved in one initiative. To not only empower women but also make progress with

capacity-building, foundations and other donors can fund training for women so that they can become more well-respected advocates and advance important climate dialogue.

Technology transfer & implementation. The Intergovernmental Panel on Climate Change (IPCC) recognized in 2018 that limiting global warming to 1.5°C would require “rapid, far-reaching and unprecedented changes in all aspects of society,” and in 2019, the situation has continued to escalate. Therefore, fostering a culture of innovation is more essential than ever before. Technology is very much interconnected with capacity-building and financing, and a natural next step in the fight against climate change would be to employ the technology used in developed countries in areas that are less able to afford the kind of research required to implement transformative technology. Upon evaluating Indonesia’s current policy efforts, it appears that the most potential for revolutionary technology lies in tangibly supporting what its NDC calls for: energy reforms.

However, the plans should be more specific for items like phasing-out coal and delineate a specific course of action.⁶⁴ The 2019 Emissions Gap Report recommends above all else the decarbonization of the energy sector through renewables and heightened energy efficiency, which by 2050, could help reduce emissions by the annual output of nearly 2.5 million coal power stations; the electrification of transport could then reduce the sector’s emissions by up to 72% in the same time period.⁶⁵ Given Indonesia’s high energy sector emissions, the transfer of this kind of technology would serve as a tremendous boon. Promoting renewable energy sources offers significant abatement potential, reducing carbon emissions from the BAU baseline by approximately 266 million metric tons by 2030, and this number could increase to approximately 544 million metric tons if combined with an energy conservation policy.⁶⁶ By taking these actions sooner rather than later, infrastructure can avoid being locked into “emissions-intensive pathways,” where it becomes too expensive or difficult to later change a dependence on fossil fuels.⁶⁷ Finally, Indonesia can also learn from successful technologies in nearby countries. Palm oil waste lagoons have major potential as an alternative biofuel that could be used not only in existing palm oil biomass plants in Malaysia but also

in Indonesia, as both countries’ economies heavily rely on the palm oil industry.⁶⁸

Unfortunately, sharing climate technologies is not as easy as it may initially seem because of the difficulties to distribute funding. In the case of Indonesia, the Green Climate Fund approved \$200 million in funding for their projects, yet they have only received around \$281,000 and have thus not actually been able to make much headway with their projects.⁶⁹ Until climate finance becomes more accessible, countries with many natural amenities like Indonesia should take advantage of cheap, natural-based solutions. Indonesia’s forests are capable of providing 23% of the cost-effective climate mitigation needed before 2030, yet forests accounted for less than 3% of climate mitigation funding in 2018.⁷⁰ It is evident that this natural-based solution could serve as a more than worthwhile substitute for complex, expensive technologies like carbon capture and storage.

It is also worth noting that countries like Indonesia should assess non-financial barriers to climate technology. The aforementioned lack of diversity in policymaking may very well be an issue that aligns with global movements aiming, for example, to involve more women in science and engineering-related disciplines such that new technologies are able to better serve all its unique users and meet their variety of needs. Ensuring a “just transition,” where new opportunities are created for those who may be phased out by climate technologies, is essential.

Conclusion

The bottom line is that Indonesia must work especially hard to cut its emissions. While it is a G20 country, it is also a member of the Global South; the nation’s most vulnerable people face internal inequalities and need international assistance with capacity-building, financing, and technology transfer in order to have a chance at finding workable solutions for the climate crisis.

Out of the aforementioned recommendations, first raising ambition ultimately seems to be the most promising for Indonesia, as it serves as the foundation that will inspire stakeholders to invest in climate’s future. A sense of urgency needs to be instilled throughout the entire Indonesian population, and those expressing concern from particularly marginalized communities should be

given a platform to be listened to seriously. The responsibility for addressing climate change lies not only in the hands of powerful multilateral institutions, businesses, and governments but also in civil society. As we consider who is to pay for the harms of climate change, one must remember that this issue is not isolated from social justice and that the climate issue is very much an “imperative of human rights.”⁷¹ Each stakeholder must forge partnerships with others such that they are well-attuned to the capabilities of each sector and the ways they can support one another in the most effective manner possible.

Above all, there must be a collective focus to ensure that Indonesia as a whole receives the support that it deserves in order to shift its development to sustainable means. The challenge for Indonesia lies in generating the growth it needs to continue improving in terms of quality of life and, at the same time, protecting its natural resources and long-term development prospects. Effectively confronting climate change requires action now, and the onus of this responsibility has in part fallen upon developed countries because these countries’ past resource exploitation has ultimately led to the current climate crisis.

As a nation of rising prominence in global society, Indonesia must not only overcome its climate challenges for its own benefit but also to ensure a sustainable future for everyone across the world. It is important that the nation receives more attention in major climate negotiations; the information that is not broadcasted about Indonesia’s current circumstances is just as important to note as what is public, and existing policy measures need to be strengthened and implemented on a greater, more transparent scale. However, we can have well-measured optimism if we remember that our choices as consumers, voters, and everyday people can have an effect higher up the chain. Indonesia has the potential to meet its policy goals, and it will be more than feasible if society continues to raise ambition, push for immediate systemic change, and emphasize Indonesia’s critical, often forgotten role as we enter yet another decade of growing climate emergency.

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Appendix A: Relevant Data and Figures

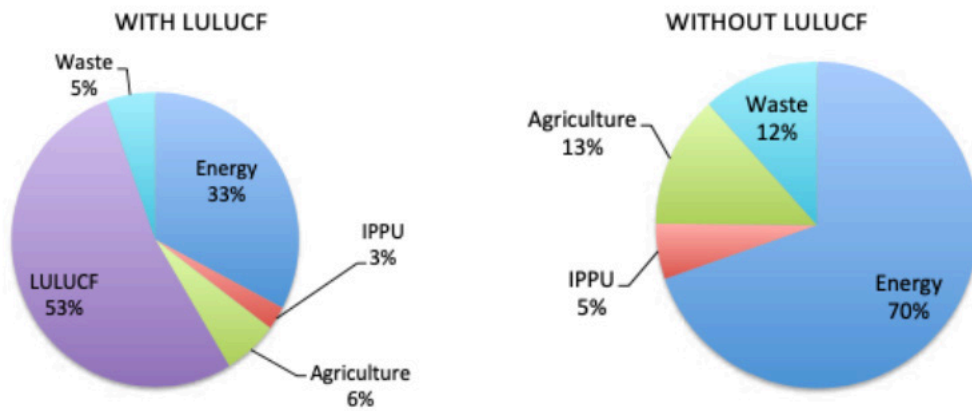


Figure 1. National GHG emissions by sector in 2014. This figure shows the Indonesian government’s most recently provided break-down of greenhouse gas emissions. Adapted from: Republic of Indonesia. (2017). Third National Communication: Under the United Nations Framework Convention on Climate Change [PDF file]. Retrieved from: https://unfccc.int/sites/default/files/resource/8360571_Indonesia-NC3-2-Third%20National%20Communication%20-%20Indonesia%20-%20editorial%20refinement%2013022018.pdf

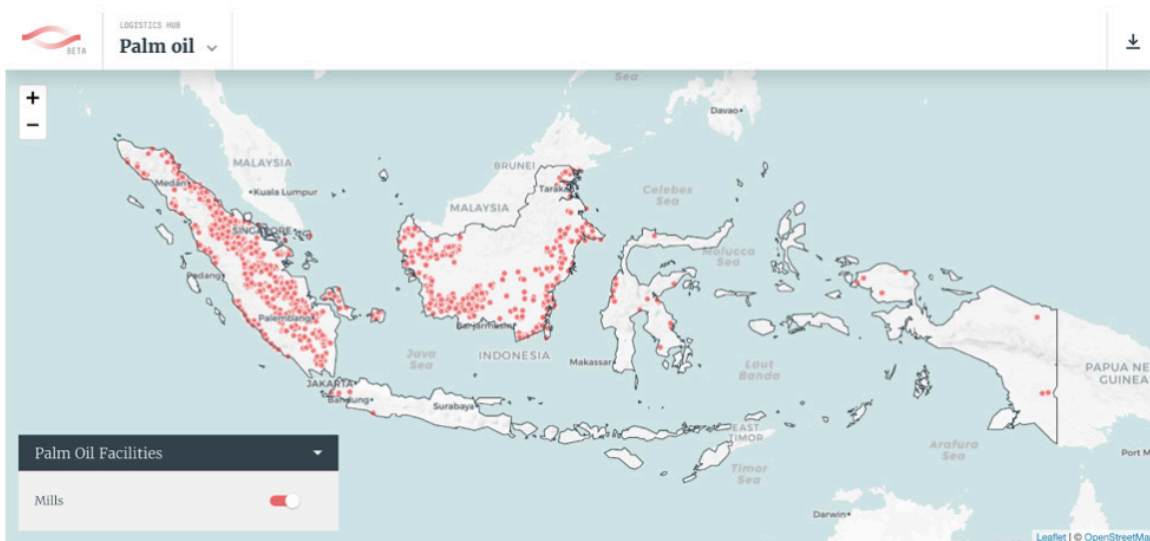
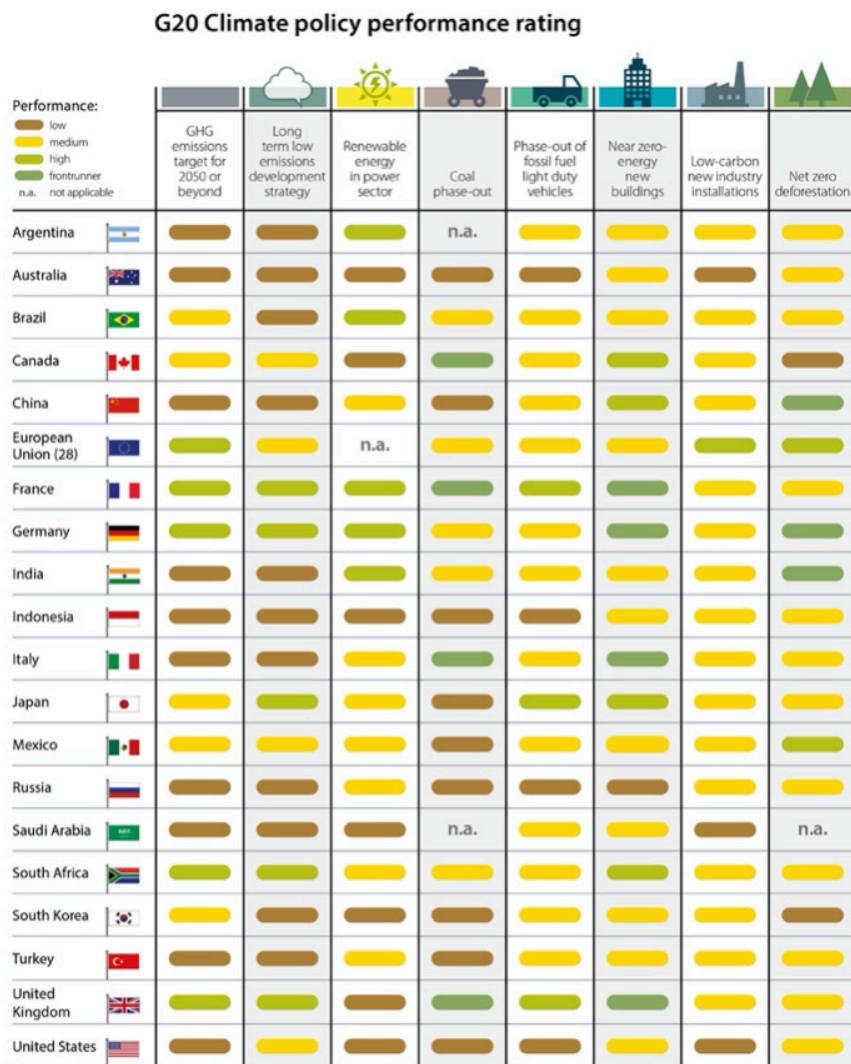


Figure 2. Palm oil facilities in Indonesia. Adapted from: Trase. (2018). Retrieved from: <https://trase.earth/logistics-map?commodity=palmOil&layers%5B%5D=mills>



Note: There is no renewable energy rating for the EU as the Allianz Climate and Energy Monitor does not include data on the EU.



Figure 3. G20 climate policy performance ratings. This figure compares the success of different climate change policies in different G20 countries. Adapted from: Climate Transparency. (2018). Retrieved from: https://i2.wp.com/www.climate-transparency.org/wp-content/uploads/2018/11/5_G20-climate-policy-performance-rating.jpg?ssl=1

Comparison of Projected Mitigation Options in Indonesia's Land-use and Energy Sectors (2030)

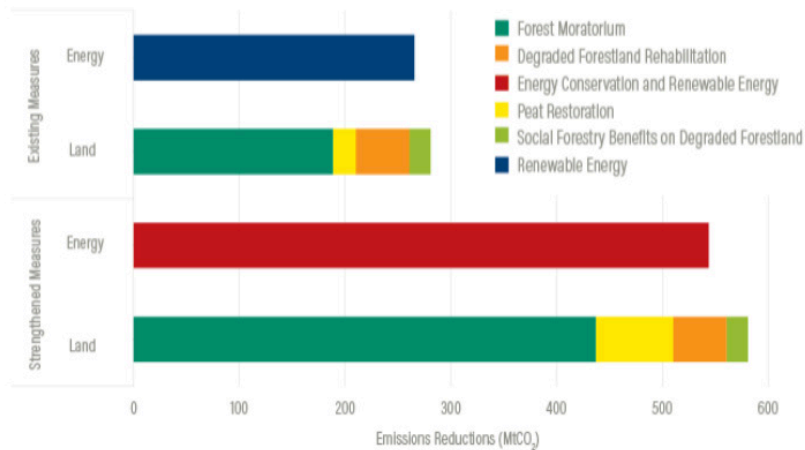


Figure 4. Comparison of projected mitigation options in Indonesia's land-use and energy sectors (2030). This figure shows the mitigation potential for existing climate solutions if they were to be strengthened by 2030. Adapted from: World Resources Institute. (2017). Retrieved from: <https://www.wri.org/blog/2017/10/evaluating-indonesias-progress-its-climate-commitments>