NATURAL CLIMATE SOLUTIONS IN INDONESIA

INTRODUCTION

There is a growing awareness that the recently coined concept, Natural Climate Solutions (NCS), can significantly help countries to tackle climate change in the effort to stabilize global temperature below 2 degrees Celsius as stated in the Paris Agreement goal (Griscom et al. 2017). NCS are a suite of protection, restoration and improved land management pathways (strategies) that generate climate change mitigation outcomes (Griscom et al. 2017). Each NCS pathway is a discrete and quantifiable type of action to avoid greenhouse gas (GHG) emissions and/or increase carbon sequestration in forest, savannah, agricultural lands or wetlands. Despite the large potential of NCS, land-based sequestration efforts receive low budget of climate mitigation and confusion persists about the specific set of actions in improved land stewardship that should be taken to keep limit temperature rise. Then, how can Indonesia accelerate and strengthen its climate mitigation efforts to contribute to the global climate goals? The Natural Climate Solutions in Indonesia is a prominent option to achieve and even increase Indonesia's climate commitment stated in Indonesia's Nationally Determined Contributions (NDC).
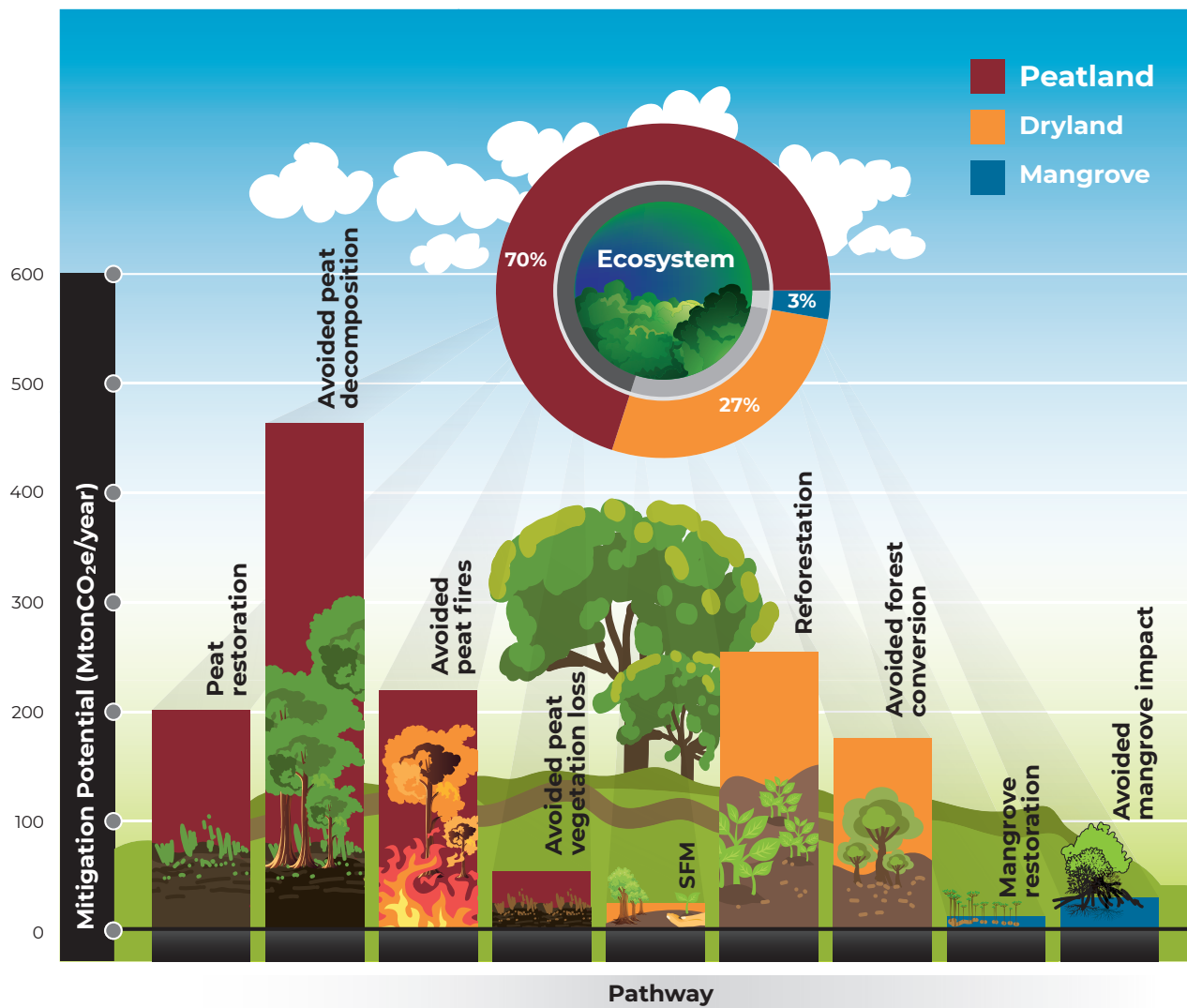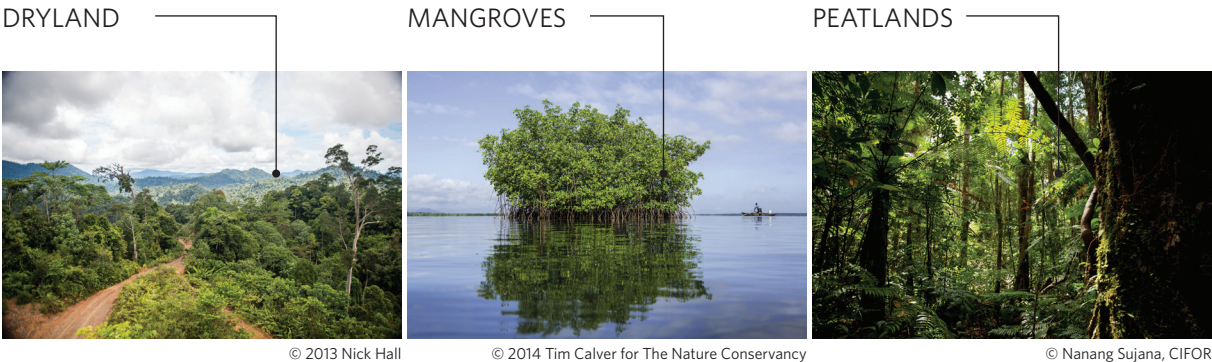
Figure 1. Prioritized Indonesia's NCS pathways

In close collaboration with the Center for Research and Development of Socio, Economic, Policy and Climate Change at the Research, Development and Innovation Agency, the Ministry of Environment and Forestry (MoEF), Yayasan Konservasi Alam Nusantara conducted a scientific study of several NCS pathways with significant potentials, as identified from a global-level NCS study led by Griscom (2017). Given its significance, a better understanding of emission reduction opportunities from prioritized NCS pathways are important to prioritize climate mitigation efforts. The study then aims to refine this global scientific study by using country specific data and assumptions.

To narrow the focus of the study for Indonesia, a national workshop was held in Bogor in January 2020, attended by policy makers, influential scientists and research centres, NGOs and private sector. The workshop discussed the highly potential NCS pathways, seen from the perspectives of the currently available scientific evidence, potency and effectiveness of mitigation action, as well as national policy and strategy. This participatory exercise resulted in seven prioritized pathways, and divided further into nine pathways, to be the focus of this scientific study in Indonesia. The nine prioritized NCS pathways include avoided forest conversion, avoided peat deforestation, avoided peat fires, avoided vegetation loss on peat, avoided mangrove impacts, reforestation, peat restoration, mangrove restoration and sustainable forest management.

Complement to this scientific analysis on the mitigation potentials, we also conducted an analysis using Marginal Abatement Cost Curves (MACCs) and a policy barrier analysis. MACC is a useful tool for assessing the cost and abatement potential of various mitigation options and for prioritizing which of a list of potential measures might be most actively pursued. We hope that, the NCS study could be used and be significantly helpful in supporting policy makers to unlock climate mitigation actions to achieve a sustainable future. In this info sheet, we share the maximum potential emission reduction from NCS pathways to rank the highest potential emission reduction pathways.

METHODS

The Maximum mitigation potential of NCS in this study is estimated from 9 NCS mitigation pathways by 2030. Our 2030 mitigation potential projection is in line with Indonesia's NDC under Paris Agreement. We estimate mitigation potential based on business-as-usual scenario, based on 2009-2019 historical period. A country level emission factors were developed from systematic review or meta-analysis of literature conducted in Indonesia, particularly for avoided peat fires, mangrove restoration, avoided mangrove conversion, Sustainable Forest Management and reforestation. We classify the pathways into 3 groups based on ecosystem types: dryland, mangroves and peatlands.

DRYLAND

MANGROVES

PEATLANDS

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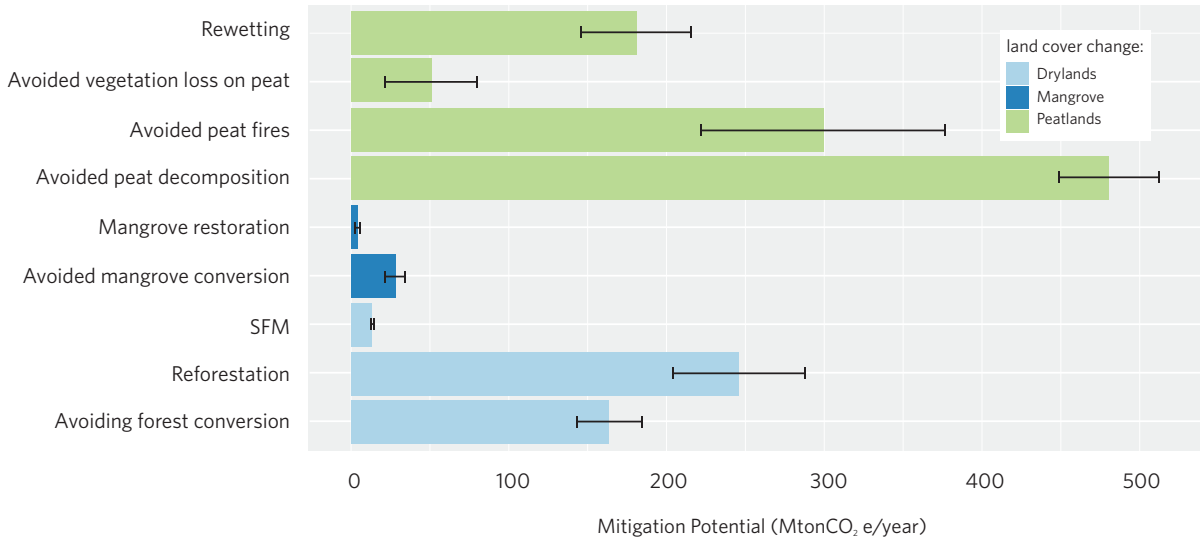
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RESULTS

Figure 2. Maximum mitigation potential from each NCS pathways in Indonesia study.

We estimate that the maximum NCS mitigation potential in Indonesia is 1,471 MtCO2e/year based on 10-year historical emission dataset (2009-2019). This result is higher than a previous pantropical NCS study of 1,390 MtCO2e/year (Griscom et al., 2020). This study has applied Tier-2 emission factors and data activity to improve mitigation potential from nine NCS prioritized pathways. This maximum mitigation potential will translate to 177% of Indonesia's NDC target from all sectors by 2030, under the Counter Measure (CM) 1 scenario (137% if compared to Counter Measure 2 scenario).

If we compare this number to the total national GHG emissions, we find that the total mitigation potential from NCS pathways could contribute to the reduction of 90% of Indonesia's emission from all sectors in 2018, which was 1,637 MtCO2e (MoEF, 2020).

The highest potential comes from mitigation strategies from peatlands (69%), followed by dryland (29%) and mangrove (2%). Mitigation potential from peatland ecosystem is very significant that if it is effectively implemented, this alone would be able to surpass Indonesia's current emission reduction target in the NDC from all sectors under CM1 scenario.

Even though several carbon emission sources used in this study have not sufficiently been included in the NDC and the first Indonesia's Forest reference Emission Level (FREL), such as reforestation, SFM and mangrove soil, this results indicate that using NCS pathways as climate mitigation strategies would significantly reduce national GHG emissions.

Natural Climate Solutions are substantial contributors for this country to achieve emission reduction targets only if all prioritized pathways are effectively implemented by combining biophysical potentials with economic and policy considerations. Yet, this the implementation of NCS pathways cannot replace the implementation of low-carbon energy technologies and reduction of coal-fired power from the energy sector.
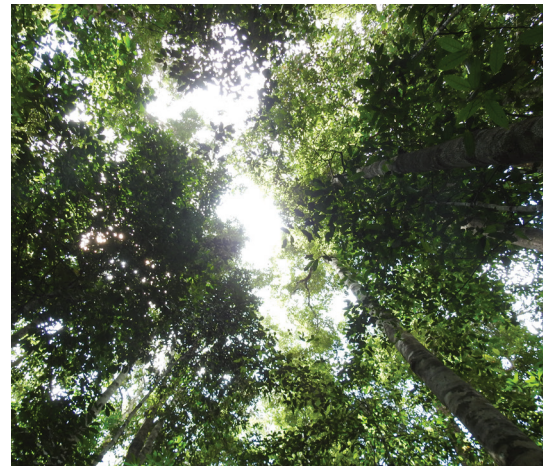
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CONCLUSION AND RECOMMENDATION

- If nine NCS pathways in Indonesia are maximized implemented, mitigation potential from NCS can significantly contribute to achieve emission reduction target in Indonesia

- Peatlands are the key ecosystem of NCS in Indonesia to meet Indonesia's NDC target by 2030

- While restoration is important for degraded ecosystem, ecosystem protection is more would bring higher mitigation outcomes for Indonesia.

- In order to fully utilize the mitigation potentials from these pathways, not only we need to implement effectively, we also need to sufficiently include emission from these pathways in the NDC and national emission monitoring system.

Contact: **Nisa Novita, PhD** ✉ **nisa.novita@ykan.or.id**