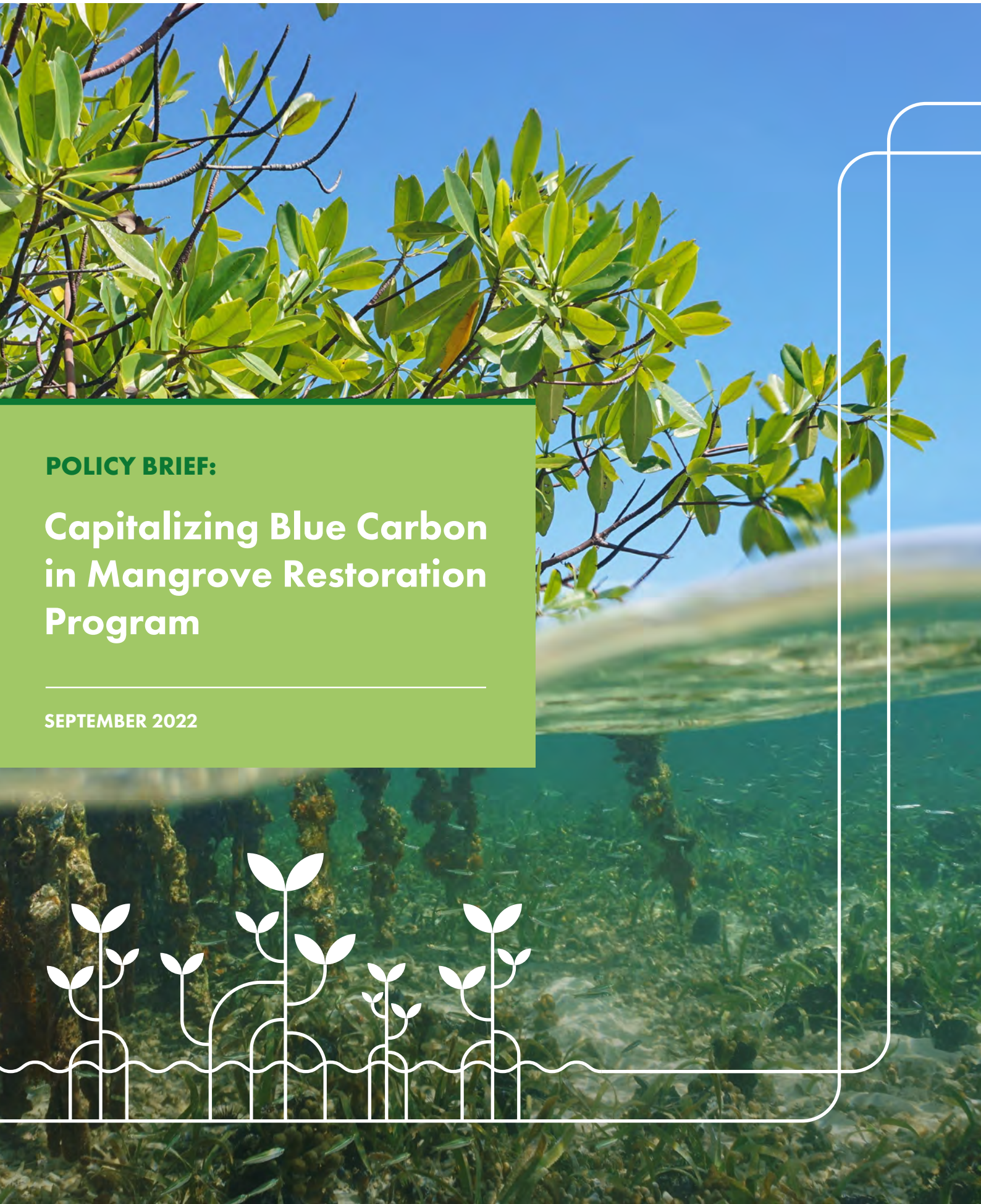

POLICY BRIEF:

Capitalizing Blue Carbon in Mangrove Restoration Program

SEPTEMBER 2022

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Summary and Key Messages

Mangrove restoration has significant natural climate solution, as mangroves and other terrestrial and coastal ecosystems are an important sink and natural tool for climate mitigation. Adaptation is another contribution to the climate solution that mangrove ecosystems play in their communities. Mangrove restoration is considered a win-win investment, providing mitigation and adaptation solutions to climate change while also supporting the implementation of other international pledges and agreements for the SDG Agenda 2030.

Blue carbon of mangroves opens up opportunities in capitalizing the carbon capture and storage to gain economic incentives as well as expediting countries with mangroves to achieve NDC targets for mitigation commitment to the Paris Agreement. Capitalizing on blue carbon will generate the required revenues to enable business endeavours in mangrove conservation and restoration as well as the revenues from the non-carbon benefits of the improved mangrove habitats.

The design of blue carbon pricing systems is important to ensure they provide strong and long-lived investment incentives and are effective at driving emissions reductions and mangroves protection and sustainable management. Effective blue carbon pricing requires well-designed systems that drive deep economic and business transformation. Complementary policy measures are necessary, for example to incentivise innovation, build up social-economy safety net and overcome behavioural barriers.

Transformation of business process from traditional, grant-funded project to income generating business type of restoration by capitalizing blue carbon is crucial to remove the barriers and time-limitations of traditional funding, and allows the business to become self-sustainable, providing more stability and the opportunity to make a bigger impact for mangrove conservation and restoration.

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Forewords

The Important Investing in Mangrove Restoration

The Peat and Mangrove Restoration Agency (BRGM) and Ministry of Environment and Forestry (KLHK) have the responsibility for the rehabilitation of rare mangrove areas within the forest area of 27,160 Ha and 8,487 Ha, respectively, while the Marine and Fisheries Ministry (KKP) has the responsibility for the rehabilitation of rare mangrove areas outside the forest area of 18,837 Ha which will be assisted by other Ministries/ Institutions together with CSR and NGOs.

Following Presidential Regulation Number 120 of 2020 concerning the Peat and Mangrove Restoration Agency, BRGM has 9 (nine) priority areas in carrying out rehabilitation of mangrove areas, including North Sumatra, Riau, Riau Islands, Bangka Belitung Islands, West Kalimantan, East Kalimantan, Kalimantan North, West Papua, and Papua.

Mangrove ecosystems are closely related to climate change. The existence of healthy mangroves in coastal areas can increase the resilience of coastal communities to climate change and minimize the impact of natural disasters, such as tsunamis, storms, and high waves. Mangroves participate in controlling climate change by acting as the lungs of the world through the absorption and storage of blue carbon. In addition to functioning as coastal protection and blue carbon, mangroves are a habitat for marine biota that have economic value such as fish, crabs, and shrimp. However, climate change and global development have had an impact on the preservation of mangroves.

As a country with the largest mangrove forest in the world, mangrove conservation efforts in Indonesia are the main focus of the world's climate program. Mangrove protection and management require good institutional design and adequate legal instruments. Community empowerment is also carried out offline and online socialization is carried out continuously. It is hoped that the mangrove rehabilitation carried out can occur sustainably so that it can provide benefits for many parties.

Mangroves can store 905 megatons per hectare. Mangrove ecosystems must be maintained to keep promises to reduce emissions. Mangrove ecosystem services that are relevant to climate change adaptation include the ability to capture sediment, and soil formation, cope with sea level rise, and protect humans from strong tropical storms. Lowland coastal areas and small islands are very vulnerable to sea level rise. Mangrove management must be landscape-based by balancing the interests of competing land uses so that mangrove protection for protection and conservation functions and the use of mangroves for production functions, tourism, and water transportation and infrastructure can take place in harmony, it must be realized that the characteristics of the mangrove ecosystem in APL should have a protective function. The challenge of landscape-based management is the need to determine the function of the mangrove ecosystem which is divided into protection functions and cultivation functions.

The role of the business sector in climate change adaptation and mitigation:

1. Investment protection against pressure from natural factors such as coastal abrasion, storms, tidal waves, etc.
   a) Support for coastal housing infrastructure and ecotourism.
   b) Demand for the production of "sustainable/ green" certified commodity products and services.
2. Climate resilient community development beyond CSR.
3. Improving the value proposition/ESG score (Environment, Social, and Governance aspects):
   a) Investment oriented towards ESG approach in sustainable management of natural resources.
   b) A high ESG platform can protect a company's long-term success.

The result of the study of the role of investment in mangrove rehabilitation and restoration is very appropriate to support mangrove rehabilitation and restoration efforts. I thank the author of this research and studies, also in the general, I have recommended reading the results of this study, especially the private sector, to understand how important, it is to collaborate inclusively to carry out mangrove rehabilitation and restoration efforts in Indonesia.

Jakarta, November 2022

Silverius Oscar Unggul
Deputy Chairperson for Environment and Forestry,
Indonesian Chambers of Commerce and Industry

Image: Sri Mariati

Forewords

Mangroves are an important coastal ecosystem and play a significant role in coastal protection, and Indonesia is home to the largest extent of mangroves in the world. They can dissipate wave energy, which can lower flood risk and minimize erosion. However, mangrove forests are threatened by various man-made impacts, such as the growth of shrimp aquaculture, coastal development, timber harvesting, and pollution runoff have all been linked to mangrove forest degradation or destruction.

This publication is part of a series publication between Indonesia Chamber of Commerce and Industry (KADIN) and Indonesia Philanthropy Association (PFI), where in the first publication Promoting a Viable and Sustainable Mangrove Restoration Program aim to demonstrate the opportunities of mangrove restoration in providing coastal protection, improved community livelihood, and contribute to the climate agenda. The second publication, Investing Opportunity in Mangrove Restoration Program aim to demonstrate investment opportunities through a science-based approached that would catalyse co-creation, collaboration, and ultimately collective action. The third and final publication is about Capitalizing Blue Carbon in Mangrove Restoration Program which aim to promote, develop and implement mangrove restoration and community-based business models that are locally accepted, ecologically feasible, deliver benefits for local communities, and financially sustainable while contributing to initiatives for sustainable mangroves in Indonesia and beyond.

Filantropi Indonesia believes philanthropy plays a crucial role in galvanizing non-state actors to combat climate change's impact. It is our hope that business and philanthropy pursue a science-based approach and work collaboratively to scale-up actions to accelerate the sustainable development goals agenda.

Rizal Algamar
Chair of the Board of Executives
Indonesia Philanthropy Association
(*Perhimpunan Filantropi Indonesia*)

Image: Sri Mariati

Image: Pexels.com

Introduction and Context

Image: Sri Mariati

Mangroves protection and restoration as mitigation and adaptation measures for climate change

Mangrove forests provide critical ecosystem services, such as coastal protection and food security. Mangroves also provide huge carbon dioxide (CO_2) mitigation capacity from their rapid biomass growth to fixing carbon through their roots underwater.

However, their value goes far beyond carbon; they can be up to 50 times more cost-effective than cement seawalls in protecting coastlines against extreme weather and they are a safe breeding ground for thousands of marine species that support local economies and provide critical habitat to a wealth of coastal and marine species. Located where the sea meets land, mangroves serve as nature's insurance policy against climate change by providing a natural barrier for coastal communities and whole ecosystems from storm surges, flooding and erosion. (See Case Study 1)

Natural climate solutions can play a key role in achieving the goals of the Paris Agreement, and is a largely untapped area of mitigation potential in current NDCs thus providing an opportunity for enhanced commitment and action. Mangroves are incredibly efficient carbon stores, as they can sequester up to 3-5 more carbon on an area basis than their terrestrial counterparts, and remain stable for long geologic timescales if undisturbed.[i] Mangrove loss can equally lead to carbon being emitted back to the atmosphere.

Between 2000 and 2012, 2% of global mangrove carbon was lost, with the consequence of releasing greenhouse gasses (GHGs) equivalent to 317 million tonnes of CO_2 into the atmosphere. If this mangrove degradation and loss trend continues, would certainly lead to more emission.[ii] The degradation and destruction of these wetlands also increases CO_2 dissolved carbon exchange with adjacent coastal waters. Alongi et al., 2016, estimated that roughly 29,040 Gg CO_2 (equivalent) is returned annually to the atmosphere-ocean pool.[iii] This amount is equal to about 3.2 % of Indonesia's annual emissions associated with forest and peatland conversion; highlights the urgent need for blue carbon conservation and restoration projects to halt the degradation and loss of wetland area and to mitigate the release of a significant portion of the world's coastal carbon stores.

Protecting mangroves from deforestation and restoring hydrological connectivity, can reduce CO_2 emissions from mangrove loss and enhance the sequestration potential of disturbed forests (Friess et al., 2020[iv]; O'Connor et al., 2020[v]).

Management effectiveness relies on understanding the level of emissions that can be avoided by specific actions, for instance, by reducing land conversion or increasing restoration efforts.[vi] These actions include improving mangrove representation in the Nationally Determined Contributions (NDCs) committed in the Paris Climate Agreement, strengthening their role as natural-based solutions, and improving their valuation in carbon markets (Adame et al., 2018; Seddon et al., 2019).[vii]

To enable long-term mangrove protection and sustainable management, it is crucial for the transformation of management practices from traditional, grant-funded projects to income generating business types of sustainable management. There are at least three types of income-generating sources, i) non-carbon related payment for performance or payment for ecosystem services, ii) payments from blue carbon, iii) the revenues from timber and non-timber products from sustainable mangrove forest management and/or the possible combinations thereof. Adaptation actions utilizing blue carbon ecosystems also have mitigation co-benefits and can be reflected in a country's mitigation goals, as appropriate. Nonetheless, the valuation of mangrove restoration is only a fraction of the overall blue carbon economy of the sustainable management of coastal ecosystems.

Image: Sri Mariati

Image: Unsplash.com

The purpose of the Policy Brief

This policy brief is the third of a series of mangroves restoration Policy Briefs, as part of the Regenerative Forest Business Sub HUB of KADIN in collaboration with Filantropi Indonesia.

This series of policy briefs are intended to provide a concise synopsis of mangrove's restoration issues, the policy options and recommendations to improve the long-term environmental, social and economic returns from mangrove restoration. This policy brief compels governments, civil society, and the private sector to effectively establish policy and feasible financial mechanisms to halt and reverse this loss.

This policy brief objectives are:

1. To explore carbon economy, how it works, its development and the potential for mangrove restoration;
2. To explore the potential of mangrove restoration projects in creating carbon credit (offsets or emission reduction) which appeal to philanthropic, donor and for-profit investors to finance mangroves;
3. To assess future market-based instruments in Indonesia for mangrove protection and management, i.e., the Regulation on Economic valuation of carbon and its market-based instrument;
4. To support the government in developing required policies for robust but flexible regulation to offset greenhouse gasses (GHGs) from mangrove restoration in a cost-effective manner; including by expediting the development of Carbon Trading infrastructure, carbon transaction administration and mechanism to resolving uncertainties.

Image: Shutterstock.com

Mangrove Restoration as Natural Climate Solutions

Image: Sri Mariati

Coastal ecosystems, including mangroves, are among the world's most productive ecosystems, maintaining high levels of biodiversity (Thompson and Rog, 2019)[viii] and delivering substantial ecosystem services to support local-to-global-scale human well-being relative to their spatial coverage (Donato et al., 2011; McLeod et al., 2011; Curnick et al., 2019)[ix].

Mangroves sequester CO_2 from the atmosphere and store it in their biomass and in rich organic soils, where it remains stable, even for thousands of years. Mangrove restoration can be strategic, fundable and achievable. Restoration methods have been greatly refined over recent years and when properly applied they rarely fail. Successful restoration as significant strategy for climate change mitigation and adaptation (CCMA) can support countries to achieve targets for emission reductions and protecting coastal communities and infrastructure from increasingly frequent storm conditions (Donato et al., 2011; Lee et al., 2014; Duncan et al., 2016; Hochard et al., 2019)[x]. (See Case Study 1)[xi]

Image: Unsplash.com

CASE STUDY 1

Belize: Opportunities for Climate Compatible Coastal Tourism

In Belize, coral reefs, mangroves and beaches are the cornerstone of the tourism industry and coastal communities rely on mangrove and reef-based fisheries for food security and income. The growth of the tourism industry is viewed as inherent to economic development in Belize but is often accompanied by habitat degradation that directly threatens the resources upon which the industry depends.

Responding to climate vulnerability and to deliberate solutions collectively. This included embracing 'grey-green' infrastructure to guard against coastal erosion and flooding. Including mangrove restoration as part of the suite of climate change adaptation measures brings two major benefits and revenue streams. First, mangroves can contribute greatly to cost avoidance and minimization of damage from for instance coastal erosion or storm surges; which is of great interest to NGOs, governments and the insurance industry. Second, mangroves can generate cash flow opportunities and revenue streams, which is of greater interest to impact investors. In Belize, for example, tourism associated with coastal ecosystems is said to contribute an estimated US$ 409.2 – 581.4 million (2017), which is about 22% of Belize's economy.

Sources:

a. UNTACD (2018) Maritime and Coastal Tourism in Belize
b. CDKN Global (2017) Analyzing Vulnerability of the Belize Coastal Tourism Sector. https://cdkn.org/resource/report-analyzing-vulnerability-belize-coastal-tourism-sector

The corporate sector also has a significant role to play. There is a growing trend that businesses and corporates are required to report on the Environment, Social and Governance (ESG) aspects of their value chains, and this has implications for mangroves. Industries that damage or destroy mangroves[1] may increasingly be required to report on such impacts, since this may affect their bottom line. On the other hand, restoration projects may be used by industry as a means of offsetting their carbon emissions or as a means of supporting local sustainability and development.

Carbon-based programs for payment for ecosystem services (PES) could help protect mangroves from degradation. Creating financial incentives can be crucial for protecting and restoring threatened marine ecosystems such as mangroves (Warren-Rhodes et al., 2011)[xii]. Given the importance of blue carbon and the already established carbon-based PES, it is important to evaluate, what would be the necessary carbon price to compete with alternative land use systems and support mangrove conservation under future REDD+ arrangements. Costs of REDD+ programs are mainly related to land opportunity costs of alternative land uses potentially replacing mangroves.

There are 151 countries harbouring to at least one blue carbon ecosystem (i.e., seagrass, saltmarshes or mangroves) and 71 countries have all three;[xiii] and only 25 countries, including Indonesia, have most of the remaining mangroves which still have huge potential for restoration. Indonesia, which has the largest area of mangroves and potential area for restoration (Figure 1)[2] can leverage the value of its mangroves to meet its mitigation targets or use it to generate income through carbon trading — especially as emerging bilateral carbon trading agreements are expected to play a larger role in global decarbonization.[xiv]

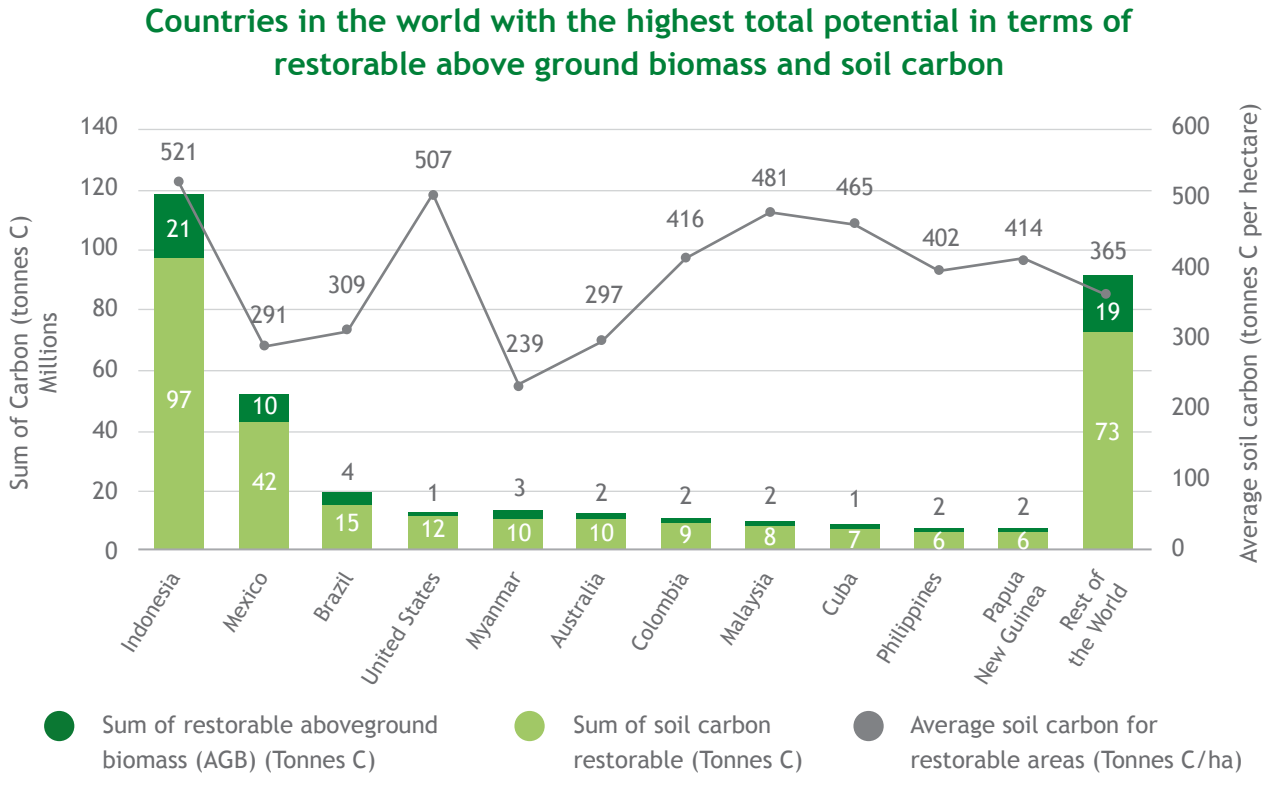

Figure 1. Indonesia has the highest total potential of restorable mangrove in the world

[1] From the building of coastal infrastructure as power plant, ports, warehouse, and roads, to residences and hotels to clearance for aquaculture

[2] Mangrove Restoration Potential: A global map highlighting a critical opportunity

Investments in mangroves are projected to increase as signatory countries to the Paris Agreement should take action to conserve and enhance, sinks and reservoirs of greenhouse gases (forests, peatlands and mangroves) and to invest in adaptation to protect people and ecosystems. By counties putting mangroves restoration in their NDC strategies, they are likely to develop and implement related policies, legal frameworks, and/or economic measures for its restoration and conservation (e.g., public budget lines, subsidies, tax reductions, carbon taxes, national emission reduction markets, or market-based measures under the Paris Agreement).[xv]

Shortly, mangrove restoration could be built into novel investment products. For these sorts of investments, both the scale of a project and the security and legal frameworks are of great importance. Having a better overview of opportunities, equipped with model-driven and globally-consistent assessments of value, provides a new opportunity to engage with private finance to invest in mangrove restoration projects for mitigation and adaptation purposes or other ecosystem services benefits.

Image: Pexels.com

Mangroves "blue carbon"

Total organic carbon stored in Indonesia's mangroves is estimated at 5,939.56 Mt CO_2e with 931.10 Mt CO_2e stored in above-ground biomass and 5,008.47 Mt CO_2e stored in the upper 1 meter of soil.[3] The global significance of carbon storage in Indonesia's coastal wetlands was assessed based on measurements of the organic carbon content of living seagrass and mangrove biomass and soil pools. Indonesia's seagrasses and mangroves conservatively account for 3.4 Pg C, roughly 17 % of the world's blue carbon reservoir.[xvi]

Indonesia Mangrove blue carbon

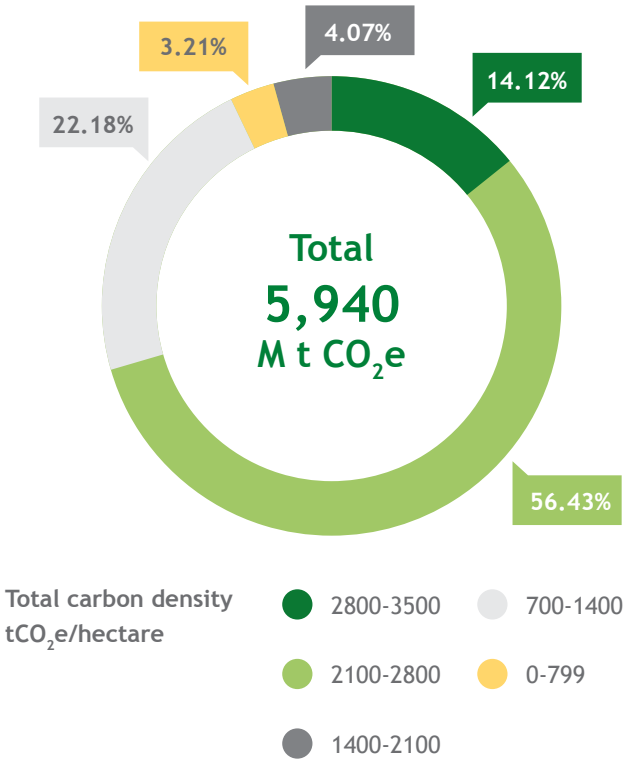

Figure 2. Indonesia mangrove "blue carbon"

[3] https://www.globalmangrovewatch.org/

The target of mangrove restoration in Indonesia according to the FOLU Net Sink target 2030 Operational Plan comprises the existing mangrove and the potential reclaimed or mangrove extension. Restoring 1.6 million hectares of disturbed and degraded mangrove in Indonesia to a healthy state would reduce emission up to 59.4 million tons of CO_2 emissions over the next 10 years, and open the door to new economic opportunities such as carbon economy, eco-tourism, and sustainable fisheries.

Mangrove protection and rehabilitation create high quality carbon credit. Sasmito et al., 2020 argue the high growth rate of mangroves of 3.6 ± 1.1 ton/ha/year means that they can sequester 13.2-ton CO_2 per hectare annually.[xvii] Moreover, the anaerobic conditions from waterlogged conditions will have an impact on the slow decay process, resulting in long-term C storage. This means blue carbon offsets can remove enormous amounts of greenhouse gases.

A blue carbon offset project therefore, should have its carbon credits trade at a premium. This is because of the large positive co-benefit effects such as the positive effects on corals, algae, and marine biodiversity. Other positive co-benefit effects of mangrove forests include their importance as a pollution filter, reducing coastal wave energy and reducing the impacts from coastal storms and extreme events. The accumulation of sediment by mangroves root systems over time can enable coastal habitats to keep pace with rising sea levels. Many investors believe that the significant positive second-order effects attributed to each unit of blue carbon credit will be traded at a premium compared to the other.

Producing high-quality blue carbon offset and credit[4] supply

To promote incentives for mangrove conservation focus is now placed on identifying investible mangrove ecosystem service benefits, in particular for blue carbon projects (e.g., The Blue Natural Capital Financing Facility, 2021; Zeng et al., 2021)[xviii].

Such opportunities could unlock sustainable conservation financing, particularly in low- and middle-income nations where international carbon markets could offer comparatively attractive payments for environmental stewardship (Thompson et al., 2014)[xix].

In many cases, carbon offset projects produce social and environmental benefits beyond just GHG reductions. Depending on the project type, these “co-benefits” can include improvements to community employment opportunities; enhanced air or water quality; biodiversity and habitat conservation; improved energy access; and better access to community health and education services. Many offset credit buyers seek projects that yield a broad range of benefits. Carbon offsets can thus be part of a comprehensive strategy for corporate social responsibility, combining efforts to address climate change with contributions to other public goods. (See Case Study 2[xx] and Figure 3[xxi])

[4] Each credit – which corresponds to one metric ton of CO2 reduced, avoided or removed or equivalent GHG – can be used by a company or an individual to compensate for the emission of one ton of CO2 or equivalent gases.

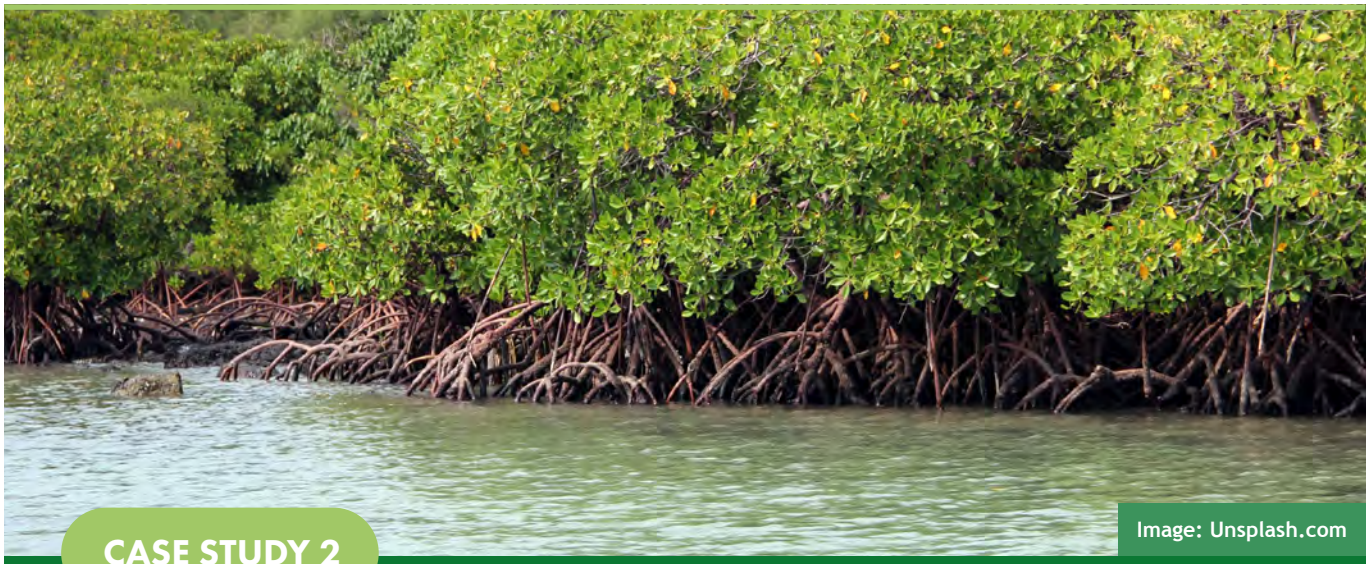

Image: Unsplash.com

CASE STUDY 2

The Mikoko Pamoja Community-led Mangrove Restoration and Conservation in Gazi Bay, Kenya - Lessons from Early Blue Carbon Projects (on-going)

In 2010, after losing about 20 per cent of their mangrove forests to logging, residents of Gazi Bay, Kenya partnered with the UK charity Plan Vivo and the Scotland-based Association for Coastal Ecosystem Services (ACES) to launch a mangrove conservation and restoration project, which involves both the prevention of further mangrove deforestation and new reforestation efforts. As a result of the project, mangroves covering 117 ha of land in Gazi Bay are now protected from illegal deforestation by full-time guards. In addition, nearly 500 members of the community participate in the regular planting of new mangroves.

The Mikoko Pamoja project also generates income for the Gazi and Makongeni communities through the sale of carbon credits, which are created from the CO_2 emissions avoided by the project. These credits are generated through a Payment for Ecosystem Services (PES) agreement between Plan Vivo and the community. From 2014 to 2018, the project generated 9,880 credits, representing 9,880 tons of CO_2 avoided. Payments to the community resulting from the sale of these credits to date have totalled $58,591 (Mwamba et al., 2018).

This money has been used to maintain the project activities, hire a full-time project manager and two full-time guards to prevent illegal deforestation and fund two community development projects related to health and sanitation. Additional income has funded community projects, such as the purchase of books and the installation of clean water pumps at local schools.

Sources:

Mwamba et al. (2018). 2017-2018 Plan Vivo Annual Report: Mikoko Pamoja, Plan Vivo Foundation, Edinburgh, https://www.planvivo.org/Handlers/Download.ashx?IDMF=2165e578-c946-4ae9-87a8-69cccd0ba2ab

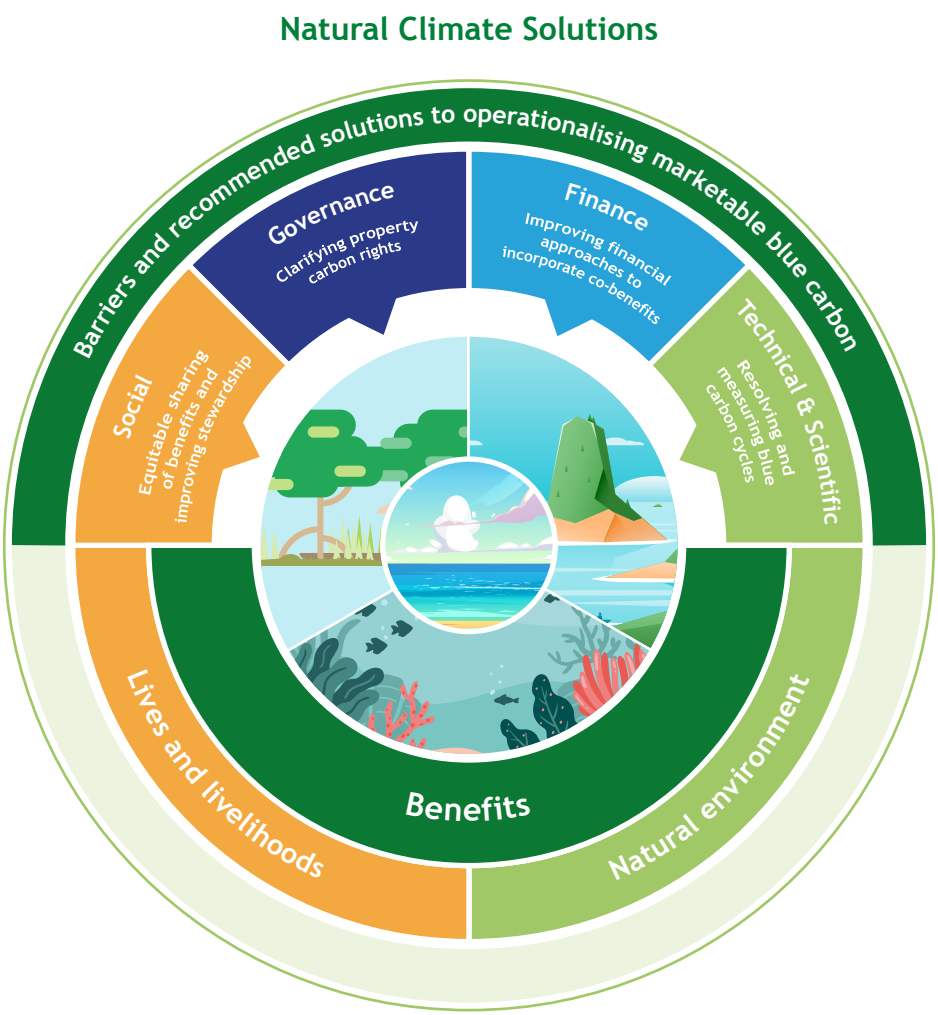

Figure 3. Operationalizing marketable blue carbon. (Source: Macreadie, et al. 2022).

In 2020, a major milestone was reached with the first blue carbon emissions reduction/sequestration quantification methodology approved under the Verified Carbon Standard that now enables the inclusion of disproportionately large carbon sequestration in the soil compartment of blue carbon ecosystems (Verra, 2020a).[xxii] This opens door to a wealth of emerging blue carbon projects globally. To capitalize on this opportunity, the developers need to assess potential return-on-investment (ROI), and hence their viability, prior embarking on extensive and costly project registration and verification processes. The developer teams should have the ability to design and implement blue carbon projects, including the registration of carbon output, MRVs and obtaining emission reduction certificates.

While a major driver of potential blue carbon project costs is likely to be spatial scale, variation in initiation and on-going budget requirements will also depend on project implementation design. This is particularly true for rehabilitation-oriented mangrove management, where multiple intervention options exist with diverse associated costs and probability of long-term success (Bayraktarov et al., 2016; Lee et al., 2019; Wodehouse and Rayment, 2019; Su et al., 2021).[xxiii]

Understanding why mangrove conservation projects fail or succeed will address the needs of the target audience by helping to:

Image: Pexels.com

- Increase technically relevant project knowledge and support capacity-building efforts;
- Inform public and philanthropic grant making to be spent in a more targeted and effective way;
- Develop projects meeting the needs of the impact investors, including having an attractive risk-return profile for private sector engagement in mangrove conservation projects;

A better understanding of the possible returns on investments and cost-savings associated with investments available to flow into mangrove conservation projects will help:

Image: Pexels.com

- Develop innovative business models, which include, or have positive impacts on mangrove conservation
- Ensure long-term, sustainable mangrove management beyond the mostly short-term funding

Image: Sri Mariati

Carbon Pricing for Blue Carbon Offset

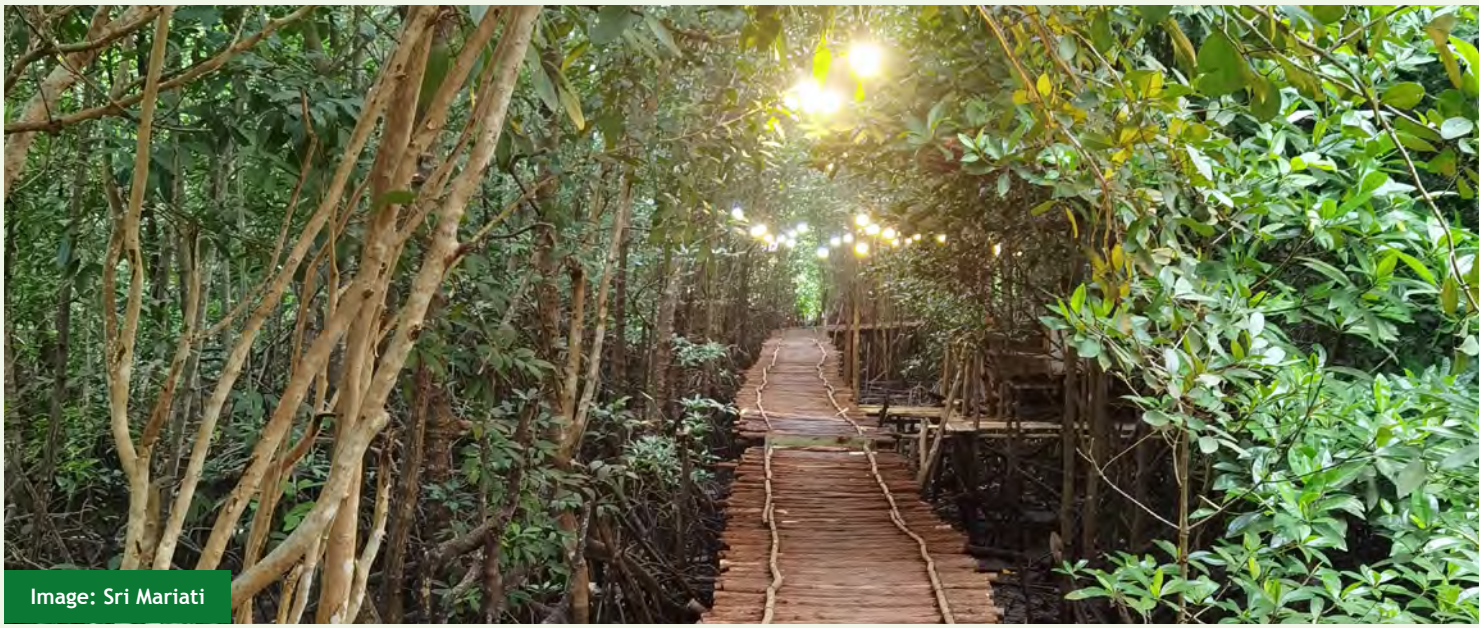

Image: Sri Mariati

Carbon pricing is the essential foundation for the needed transformation, as it provides an efficient means to internalize climate change costs into consumption and investment decisions across the economy, leading to low-cost abatement.

The cost-effectiveness of carbon pricing means that it can be a facilitator of greater ambition for climate action domestically, and by extension for achieving the Paris Agreement goals. Carbon pricing can also be a direct means of co-operation between countries within the Paris Agreement, via the mechanisms described in Article 6 of the agreement. A carbon pricing instrument is a policy vehicle, implemented through a legal and institutional infrastructure, that can deliver a price on carbon emissions on specific sectors or entities.

There has been a recent trend towards increased carbon pricing around the world, whether through tradable permits or taxes. However, coverage remains patchy and prices have generally been too low to provide strong investment incentives. There is a need to assess a range of political and technical barriers, as well as strategies to help overcome them. Barriers to carbon pricing relate both to the specific design of the pricing system and to broader misalignments with other policies that may run counter to the goals of carbon pricing and render it less effective.

The blue carbon credit is produced either by reducing emissions from business activities or capturing CO_2 from the atmosphere (e.g., mangrove protection and restoration). The credit could generate economic value once it was traded in a direct purchasing or through market-based emission trading, carbon exchange, or when a unit of emission reduction unit is verified under result-based payment and payment for the result in the predefined quantity and co-benefit performance result.

The Methods of Carbon Pricing

Different carbon pricing instruments estimate the cost of carbon in slightly different ways. Most of the major carbon pricing tools also handle carbon revenues differently. The goal of pricing carbon is to force entities to produce less CO_2 and other GHGs.

Carbon pricing can be readily implemented through mechanisms as a carbon levy, (a tax on the carbon content of fossil fuels or on their CO_2e emissions),[5] carbon crediting and traded through emissions trading systems—businesses must acquire allowances for greenhouse gases they emit (a cap or a credit), with the supply of such permits regulated by government.

Businesses can buy and sell allowances, thus establishing a price for emissions. Emissions trading programs can be designed to mimic the advantages of taxes through price-stabilizing mechanisms like price floors and revenue-raising measures such as permit auctions.

Image: Unsplash.com

Primary Carbon Pricing Mechanisms

There are two primary carbon pricing instruments, along with several other secondary ones.

CARBON TAX

The carbon tax brings in revenue to finance public interest in controlling the environmental damage caused by activities of the polluting sector/industry. Tax is relatively easy to administer and also a great control mechanism. By taxing the entities that emit CO_2, governments can reduce negative impacts while also providing a revenue stream. A carbon tax isn't perfect. As a pricing mechanism, it's fixed; adjusting a tax rate is a laborious and time-consuming process. And there's no real way to respond to market demand.

EMISSION TRADING SYSTEM

Building a system for trading CO_2 emissions establishes a fundamental carbon market. The market can set the price, at least within certain constraints. At the same time, an ETS allows regulatory bodies to create a baseline price that increases over time – incentivizing decarbonization. There are at least two basic approaches to an ETS:

- A cap-and-trade system: government sets an upper emissions limit and assigns carbon credits for emissions within those limits. Companies that don't use up all their emissions credits can trade their excess credits to other companies that would otherwise exceed the limit, and
- The baseline credit systems: carbon credits are dispersed only to companies that keep their emissions below a set baseline. Those credits can then be traded with companies that are above the baseline.

[5] Law Number 7 Year 2021 on the Harmonization of Tax Regulations Tax (*Undang Undang No. 7 Tahun 2021 tentang Harmonisasi Peraturan Perpajakan*).

Other Carbon Pricing Mechanisms

In addition to a carbon tax and an emissions trading system, there are a number of carbon pricing mechanisms that tend to gather a bit less attention.

INTERNAL CARBON PRICING

When companies calculate their own price for carbon emissions and build that into their planning, that's an internal pricing mechanism. Internal carbon pricing provides the greatest flexibility for companies, but can also be the hardest to clarify or define. Some recent initiatives, such as the Science-Based Targets initiative (SBTi) seek to provide some third-party guidance on this process.[6] In setting an internal carbon price, there's a range of points to consider. It includes reviewing external risks and looking into the carbon tax risks in operating countries, where there can be variations.

RESULTS-BASED CLIMATE FUNDING (RBCF): PAYMENT FOR PERFORMANCE (PFP) OR RESULT-BASED PAYMENTS (RBP)

Typically funded by various regulatory agencies or even non-governmental organizations, RCBF offers payments when certain emissions reductions have been reached. By focusing on results that create incentives to take action – from planting trees to improving access to clean energy, RCBF can help cut emissions. But for all its utility, this mechanism has been a complicated tool to use, putting off many would-be users.

The REDD+ potentials for mangrove conservation require identifying the remaining and converted mangroves in the evaluation periods (to set up baselines emission) and then estimating the potential carbon emission avoided by mangrove conservation. With this approach, the available averages and associated variations of carbon stocks and carbon break-even prices for jurisdictional areas or national level could be assessed. Next, to possible payments for performance from international REDD+ financiers, it requires global analyses backed by local case studies for having a realistic picture of the feasibility of global prices to support conservation and restoration programs at the regional scale.

Determining Carbon Price

Setting carbon prices that work requires a few key ingredients. Carbon pricing policies need to achieve the primary goal of reducing emissions. And to do that, they generally require the following elements:

- Fairness – This is the "polluter pays" principle. The GHGs emitter party bears a monetary cost for the negative social cost of their practices.
- Transparency – Any attempt to price carbon fairly needs to be open and transparent, making clear how the carbon price is calculated.
- Alignment – Carbon pricing works best as part of a broader approach to the climate challenge. Enacting an internal price on carbon, then doing little or nothing to prevent water pollution, for example, casts doubt on the entire process.
- Efficiency – Effective carbon pricing systems include ways to ensure compliance, pushing entities to reduce CO2 emissions over time.

[6] The SBTi is a partnership between CDP, the United Nations Global Compact, World Resources Institute (WRI) and the World-Wide Fund for Nature (WWF) in promoting Science-based targets to show companies and financial institutions how much and how quickly they need to reduce their greenhouse gas (GHG) emissions to prevent the worst effects of climate change. https://sciencebasedtargets.org/about-us

Currently, there are four bases to determine carbon price which dictate the value of each unit of emission reduction.

PRICING BASED ON MARKET DYNAMICS

The voluntary carbon market today is primarily driven by supply and demand, regardless of the implications to the project in terms of long-term viability. Markets can be very effective for driving competition and reducing the cost of accomplishing an objective. However, there still leaves the challenge that the price defined by the market could not fully cover the objective of securing both climate objectives and providing access to food, water, education and good health. Paying for carbon credits at prices below what it costs to maintain a project means that these projects may stop operating in the vulnerable communities they support. Further, neglecting to fully account for the real value they deliver in beyond-carbon development benefits can accelerate a race to the bottom, meaning that the highest quality projects might be the first to fail.

PRICING BASED ON PROJECT COST

A cost-based model takes into account the implementation costs of a project and is used to help ensure the on-going viability of projects. The Fairtrade minimum pricing model is an example of how this works in practice.[7] It calculates a minimum price that ensures the average costs of the projects will be covered, plus an additional "Fairtrade Premium" on top that goes directly to the local community to fund activities that help them adapt and become more resilient to an already changing climate. A cost-based model is a step toward ensuring project sustainability, yet it does not specifically account for the additional value these projects deliver in sustainable development.

PRICING BASED ON VALUE DELIVERED

Assessment of pricing based on value delivered should include valuing transition to a low-carbon economy far beyond carbon mitigation. Using a value-driven model to set a price for carbon credits can truly account for the full environmental, social and economic impacts of a specific project—that is, both in emissions reductions and the additional development benefits that can transform lives. Blue carbon valuation as an ESG proposition should apply this pricing mechanism. To take this a step further and highlight the value above and beyond carbon mitigation, the mangrove restoration project developers should employ economists to conduct a comprehensive valuation of the socio-economic benefits delivered by the projects. The projects that follow safeguards, engage local stakeholders and provide development benefits beyond climate, the high-quality blue carbon, create shared value worth billions of dollars.

CARBON OFFSET AS A PRICING MECHANISM

Carbon pricing from carbon offset (capturing GHGs from the atmosphere) rapidly becomes a multi-million-dollar market globally. Carbon offset can be produced by a variety of activities that reduce GHG emissions or increase carbon sequestration. Carbon offsets are also produced by large-scale "programs of activities,"[8] which aggregate together many similar small projects or coordinated efforts across entire jurisdictions (such as in the case of avoided deforestation and/or forest degradation at a jurisdictional scale).[9]

Carbon offset embraces a free-market approach to the carbon pricing issues. For example, restoring mangroves absorb CO_2 into the vegetation growth and store biomass within the root and soil (substrate)

[7] The Fairtrade Minimum Price/FMP (where it exists) is the minimum price that must be paid by buyers to producers for a product to become certified against the Fairtrade Standards. The FMP is a floor price which covers producers' average costs of production and allows them access to their product markets. https://www.goldstandard.org/blog-item/carbon-pricing-what-carbon-credit-worth

[8] Such "programs" were pioneered under the Kyoto Protocol's Clean Development Mechanism

[9] See, for example, The MOEF Regulation Number P.70 of 2017 regarding Procedures for the implementation of Reducing Emissions from Deforestation and Forest Degradation (REDD+), Verra's framework for Jurisdictional and Nested REDD+ programs.

system; similar to building a Carbon Capture and Storage (CCS) facility that can pull CO_2 from the atmosphere and lock it away from re-entering into the atmosphere. The International Energy Agency (IEA) assessment shows that levelized cost of CO_2 capture in 2019 is at the range of US$134 – 342/ton CO_2.[10] Projects calculate the value of these offsets and then sell them on the open market to other companies who want to cover some of their emissions. If every tonne of CO_2 produced by an entity is covered by an offset, then in theory the net result would be zero emissions – what is commonly referred to as a "net zero" position.

Image: Shutterstock.com

Challenges for Carbon Pricing Systems

Pricing carbon is one of the most powerful and efficient strategies that governments and businesses are using to respond to climate change.

The principle is to put a price on carbon effluence to account for the impacts of GHG emissions that stem from the economic choices made by both producers and consumers. An accurate price signal for carbon will spur businesses, investors and individual consumers to switch their preferences from emissions-intensive industries, processes and practices to low-carbon, climate resilient alternatives.

For blue carbon however, there are still some challenges to effectively capitalize on the potential for carbon pricing (operationalize blue carbon projects). The perceived risk in blue carbon permanence, uncertainty in creditable emissions forecasting in the absence of blue carbon-specific quantification methodologies, large project costs and political risk have meant that mangroves' CCMA potential has historically been largely unrealized (Locatelli et al., 2014; Wylie et al., 2016; Herr et al., 2017).xxiv

The other challenge is that carbon offsetting lacks regulatory oversight and control compared to some of the other approaches to carbon pricing, such as government-run carbon policies (i.e., carbon credit and tax). But in exchange, it provides a wide range of flexibility. Carbon offset projects can be highly technical and costly programs such as CCS or less costly and efficient natural approaches such as protecting and restoring natural carbon sinks like forests, mangroves and peatlands.

[10] https://www.iea.org/commentaries/is-carbon-capture-too-expensive

Image: Sri Mariati

The adoption of carbon pricing can spur investment in innovation and modernization that can lead to competitive advantages and economic gain. However, a common concern is that carbon pricing may threaten business competitiveness. Further, because the adoption of carbon pricing has yet to occur at a global level, there is the chance that firms operating in countries with a carbon price may lose business, profits, or market share to competitors that do not have to account for a carbon price.

This unintended consequence of carbon pricing policies could result in "carbon leakage," whereby carbon-intensive industrial investments, operations, and related GHG emissions are shifted from carbon limited markets to less stringent ones. Concerns about competitiveness and carbon leakage are very important to address as they have the potential to undermine the efficiency and environmental aims of carbon pricing. Each of the carbon price mechanisms mentioned above brings its own unique problems, but there are at least three broader issues to consider.

- **Leakage** – Imposing a high price on carbon helps reduce CO_2 emissions, but a poorly-designed program can lead to leakage when industries move production to other, less-regulated locations and end up producing more CO_2 down the line. To avoid leakage, planners need to consider CO_2 emissions at the meta-level, looking beyond a particular company or region. A jurisdictional approach can minimize the risks of leakage to a region/sub-national boundary.

- **Inefficiency** – The implementation of a carbon price makes all the difference to long-term success. Great but poorly executed plans result in leakage, missed reductions, and a host of related issues regardless of the types of carbon pricing used.

- **Mismanagement** – A good carbon pricing scheme generates revenue – but if that revenue isn't used to reduce future emissions, then the entire program has missed the point.

Carbon Pricing in Indonesia

On 29 October 2021, The GOI enacted a Presidential Regulation Number 98 of 2021 regarding The Economic Value of Carbon to Reach Nationally Determined Contribution's Target and Control GHG Emission in National Development.

The Carbon Economic Value, also known as a Carbon Price, is the value of each unit of greenhouse gas emissions resulting from human activities and economic activities (Article 1 General Provisions). The Regulation identifies a few trading mechanisms, including a 'cap and trade' scheme between two business entities, a carbon offset scheme, and result-based payments.

The carbon pricing through emission trading will be conducted via an Indonesian bourse (exchange), and levies will be charged on transactions. The issuance of this regulation provides the opportunity to value the carbon unit of GHGs emission reduction and/or offset, thus opening up the potential of using carbon pricing to attract investment in mangrove protection and rehabilitation that produce economic returns from the emission trading, result-based payment from mitigation activities and other mechanisms as their development progressing and the regulation allows. (See Figure 4)

Mangrove restoration projects combining adaptation-mitigation with relevant economic activities could support long-term sustainable mangrove management based on ecosystem services (coastal tourism, fisheries, non-timber product, etc.). The long-term maintenance of carbon offset could generate trade and non-trade economic benefits. The Presidential Regulation on Economic Value of Carbon provides opportunity for cost effective mitigation and adaptation measures. The instruments in which mangrove restoration could participate include the emission offset, result-based payment and other mechanisms (in development progress). The mangrove restoration emission offset could be traded in the voluntary market.

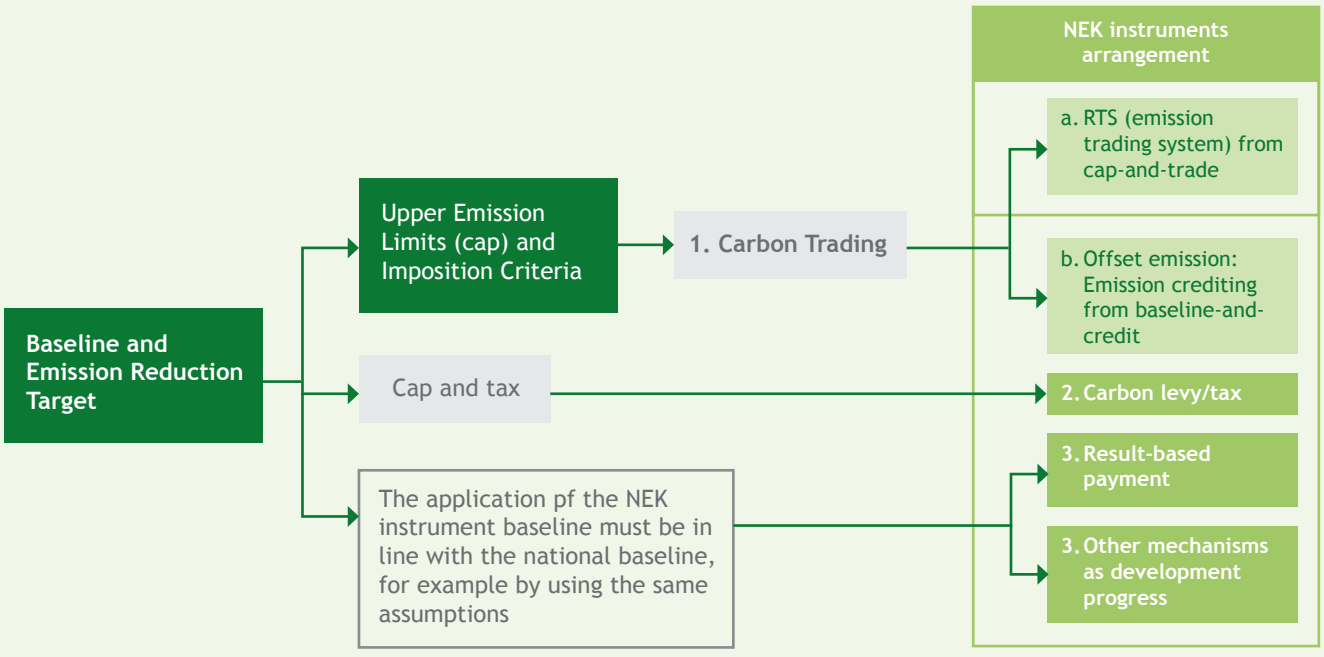

Figure 4. Carbon pricing Operation Scheme

Carbon Price Implementation Mechanisms

A carbon crediting mechanism refers to a system where tradable credits (typically representing a metric ton of carbon dioxide equivalent) are generated through voluntarily implemented emission reduction or removal activities (e.g., mangrove restoration).

Carbon crediting mechanisms operate differently from carbon taxes and ETSs, in which businesses and other organizations (as mangrove restoration project developers) can generate carbon credits (and hence revenue) by demonstrating that emissions have been reduced or sequestered relative to a counterfactual baseline. The crediting mechanism and trade could benefit from the market mechanism which encourage efficiency and innovation.

Image: Shutterstock.com

There are two crediting mechanisms for emission reduction, through cap and trade and trough baseline and credit. The emission cap could be obtained from emission allowance auction conducted by the government, in which the credit is then registered as SIE (sertifikat izin emisi/emission permit certificate) in the National Registry System. This crediting mechanism is: emission allowance; and GHG Emission Offset.

The emission trading could be conducted between different sector of NDC and applicable to businesses and/or activities that have a GHG Emission cap (Upper Limit) having been determined through technical approval by the relevant minister. The emission trading is carried out by transferring the Carbon Unit between Business Actors. The transfer of the Carbon Unit between business actors within NDC Sectors does not affect the achievement of the NDC target.

The GHG Emission Offset Mechanism is applicable for a business and/or activity that does not have a GHG Emission Upper Limit or not within the coverage of NDC sectors emission reduction target. The statement of emission reductions is then based on the results of Mitigation Actions from other businesses and/or activities providing that the baselines and mitigation result has been reported and registered in the SRN PPI. The emission reduction achievement (results) is the amount of emission reduction below the targets and baselines set. This emission reduction should be verified before it can obtain the emission reduction unit.

For mangrove restoration project, currently the applicable mechanisms are through the GHG emission offset which then could enter into carbon market or valued through performance-based mechanism. Restoration performance that could be measured among other by the amount of GHGs sequestered and stored in the project area. (See Figure 5)

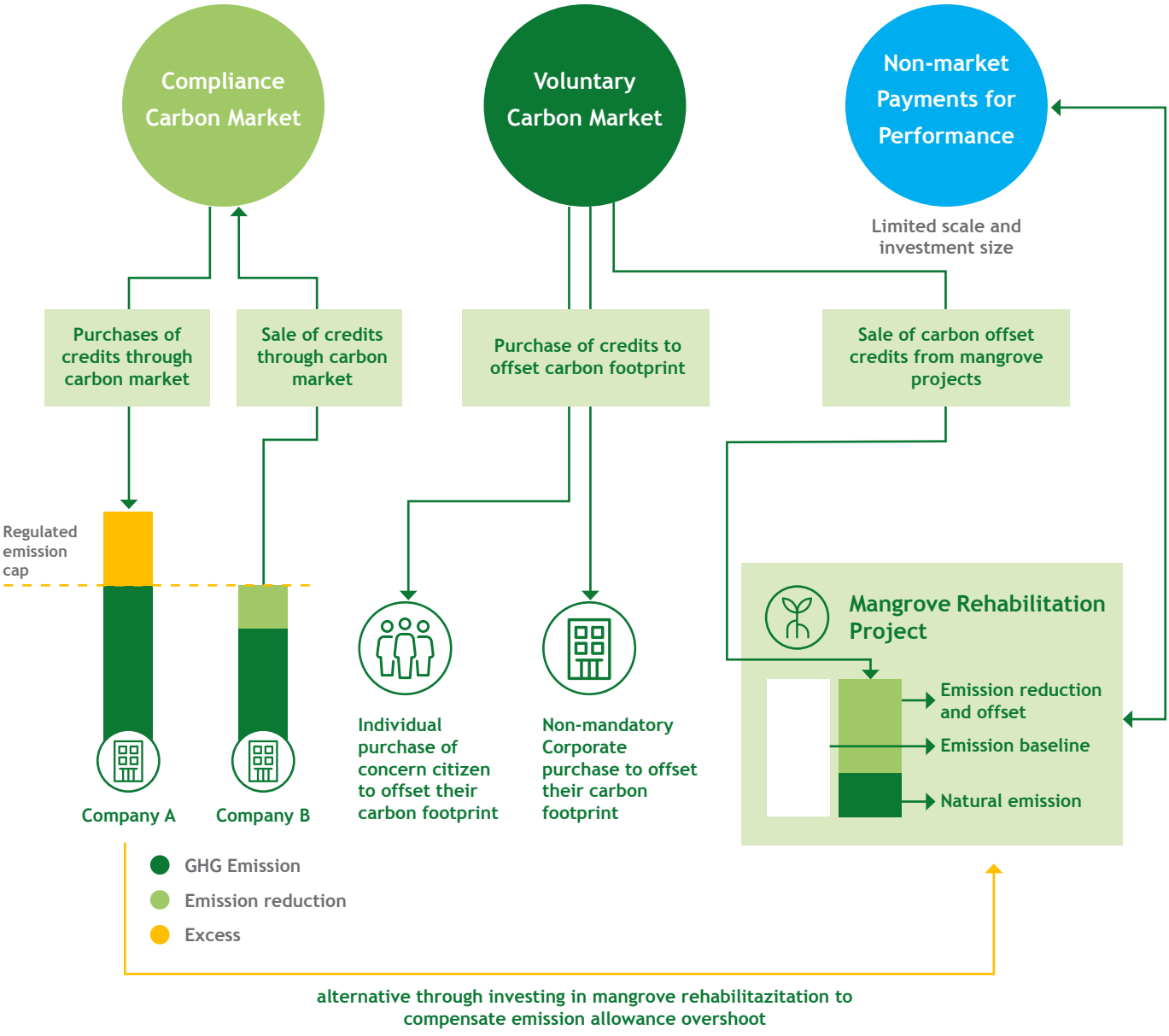

Figure 5. Carbon emission reduction from mangrove rehabilitation project

Carbon pricing instruments can take many forms. A wide range of approaches and paths allows governments, businesses, and institutions to select the method best suited to the broader policy environment. The carbon pricing policy in Indonesia comprise the following instruments:

a. **Direct carbon pricing in the form of carbon tax** puts a direct price on GHG emissions and requires economic actors to pay for every ton of carbon pollution emitted. It thus creates a financial incentive to lower emissions by switching to more efficient processes or cleaner fuels (i.e., less pollution means lower taxes). This approach provides a lot of certainty about price because the price per ton of pollution is fixed; but it offers less certainty about the extent of emissions reduction. The carbon tax is currently applied to power generating sector, i.e., coal fire electric generation, and regulated under the Law Number 7 of 2021 regarding the Harmonization of Tax Regulations.

b. **An emission trading system (ETS)**—also known as a cap-and-trade system—sets a limit ("cap") on total direct GHG emissions from specific sectors in the NDC and sets up a market where the rights to emit (in the form of carbon permits or allowances) are traded. This approach allows polluters to meet emissions reductions targets flexibly and at the lowest cost. It provides certainty about emissions reductions, but not the price for emitting, which fluctuates with the market.

c. **Emission reduction and/or offset under a crediting mechanism**, emissions reductions that occur as a result of a project or policy are assigned certificates of emission reduction or offset (similar to credits), which can then be bought or sold. Entities seeking to lower their emissions can buy the credits as a way to offset their actual emissions. This approach requires a formally recognized third-party verifier to sign off on the emission reduction before it is credited.

d. **Under a results-based climate finance (RBCF) framework**, entities receive funds when they meet pre-defined climate-related goals, such as emissions reductions. Like crediting mechanisms, this approach requires the involvement of independent verifiers (in this case, to confirm that a goal has been met). By linking financing to specific results, RBCF facilitates carbon pricing and the creation of carbon markets, helps polluters meet climate goals, and stimulates private sector investment.

Image: Sri Mariati

Carbon Credit and Offset Issuance Mechanisms and Certificate

The Indonesian Certificate for Emission Reduction (ICER) issuance process begins with registering project planning (DRAM)[11] to the SRN (National Registry System). DRAM is prepared and composed according to a predetermined format. The action plan is then validated by the authorized entity and becomes the basis for determining its eligibility to be registered as a mitigation action in the ICER Mechanism. The registered actions then implemented, monitored and the amount of GHG emission reductions is verified then ICERs would be issued corresponding to the mitigation actions. (See Figure 6)

Measurement, Reporting, and Verification (MRV) refers to the multi-step process to measure the amount of greenhouse gas (GHG) emissions reduced by a specific mitigation activity, such as reducing emissions from mangrove degradation and clearing, over a period of time and report these findings to an accredited third party. The third party then verifies the report so that the results can be certified and carbon credits can be issued. MRV seeks to prove that an activity has actually avoided or removed harmful GHG emissions so that actions can be converted into credits with monetary value. These credits are the units that the market or donor pays for through specific results-based climate finance arrangements. They are also the basic units traded in international carbon markets and used to fulfill countries' Nationally Determined Contributions (NDCs) under the Paris Agreement. MRV is the key to unlocking climate finance and showing progress on climate goals.

Validation and verification of reporting the results of measurement and monitoring of the implementation of Climate Change Mitigation Actions, Climate Change Adaptation Actions, and NEK are reported and recorded in the PPI SRN. For businesses and/or activities that implement NEK related to Carbon Trading and Performance-Based Payments, they must include the results of validation and verification carried out by validators and independent verifiers.

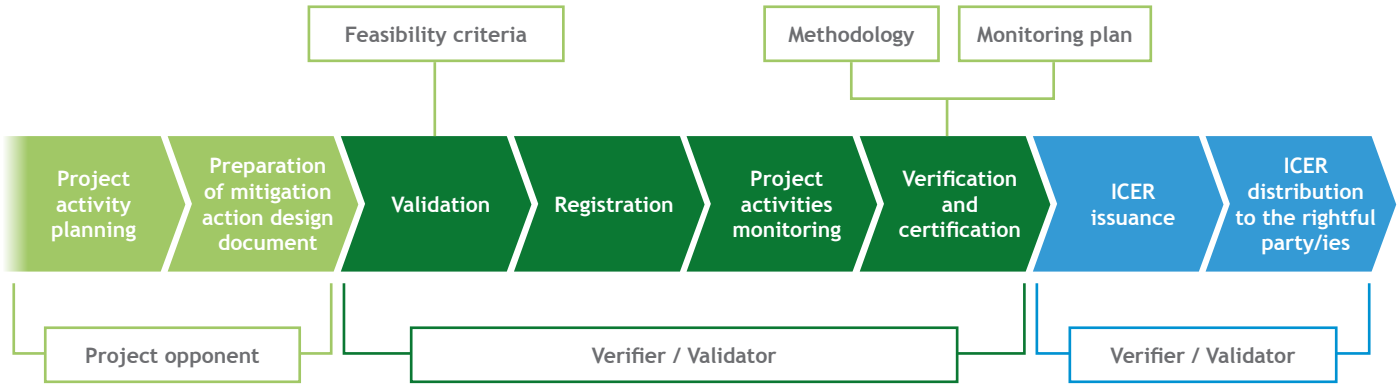

Figure 6. ICER Mechanism and Procedure

[11] DRAM = Dokumen Rancangan Aksi Mitigasi (Mitigation Action Design Document)

Image: Shutterstock.com

Operationalization of the Carbon Pricing Regulation of Presidential Regulation Number 98 of 2021

Prior to the issuance of the Presidential Regulation Number 98 of 2021, there are already a number of projects that have been carried out by government agencies, business and finance actors, NGOs and community groups. Those projects are implemented under the compliance and voluntary basis as well as with tradable and non-tradable carbon result, including bilateral RBP type of arrangement. The total is 98 projects, with total emission reduction target is 134.9-million-ton CO2e. The CDM is the largest type of project in numbers with 49 projects, and an accumulative emission reduction target of 34.4-million-ton CO2e. Those CDM projects have ended in 2020, and will transform to the mechanism of Article 6.4 of the Paris Agreement.[12] The VCS however, has the largest accumulative emission reduction target of 68-million-ton CO2e, with 15 ongoing projects.[13]

In 2016, the Ministry of Environment and forestry establish a National Registry System for Climate Change Control (SRN-PPI) to manage data and information on climate change adaptation and mitigation actions as well as information on resources and contributions of various parties to climate change control efforts (which consist of adaptation, mitigation, funding, technology, and capacity building). This web-based information management system serves as a means for integrating actions and resources related to climate change to avoid double counting actions and resources as well as a coordination tool and at the same time as a tool for assessing the extent to which climate change mitigation and adaptation activities are carried out with the support of various sources.[14] In the Presidential Regulation Number 98 of 2021, SRN PPI is also given the task of registering an Emission Reduction Certificate, recording the results of validation and verification of climate action, NEK and PI resources and a place to record the transfer of carbon rights. (See Figure 7)

[12] Article 6.4 creates a global carbon market overseen by a United Nations entity “Supervisory Body”. Project developers will request to register their projects with the Supervisory Body. A project must be approved by both the country where it is implemented, and the Supervisory Body, before it can start issuing UN-recognised credits. These credits, known as A6.4ERs, can be bought by countries, companies, or even individuals.

[13] Direktorat Inventarisasi GRK dan MPV, Direktorat Jenderal Pengendalian Perubahan Iklim (2021) Kerangka Kerja Transparansi dalam Peraturan Presiden Nomor 98 Tahun 2021 Tentang Penyelenggaraan Nilai Ekonomi Karbon. Webinar Penyelenggaraan Nilai Ekonomi Karbon di Subsektor Ketenagalistrikan. Jakarta, 2 Desember 2021.

[14] managing clarity, transparency and understanding (CTU) principles.

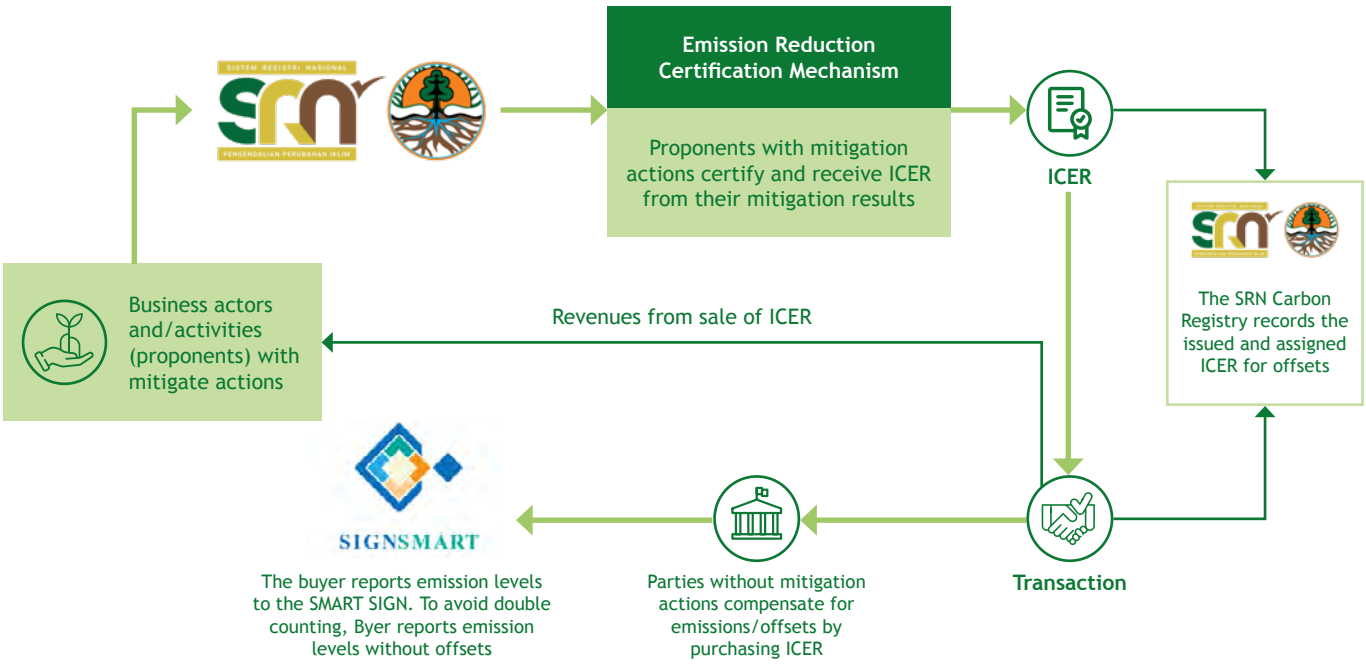

Figure 7. Integration of Mechanism Flow NRS - ICER (SRN - SPEI)

Considering the above circumstances, the operationalization of the Presidential Regulation 98 of 2021, Article 85 to 86 provide the transitional terms as follows:

a. The implementation of the National and Regional Action Plans related to the reduction of GHG Emissions that are still in effect shall be adjusted to this Presidential Regulation no later than 1 (one) year after the promulgation of this Presidential Regulation.
b. Entities who have implemented Carbon Trading or Performance-Based Payments before this Presidential Regulation comes into force, are required to register and report the implementation of Climate Change Mitigation Actions and Carbon Units owned through SRN PPI no later than 1 (one) year since this Presidential Regulation is promulgated. Therefore, the entities who do not carry out the obligation to record and report on Climate Change Mitigation Actions and Carbon Units owned through SRN PPI, cannot sell the remaining Carbon Units owned.
c. The Carbon Units that are still owned by the project owners and have been registered and reported through the SRN PPI may be sold only for domestic Carbon Trading.
d. The entities who have implemented Carbon Trading or Performance-Based Payments before this Presidential Regulation comes into effect, must comply with the provisions regarding the management of NEK as regulated in this Presidential Regulation no later than 2023.
e. The entities who carry out new transactions since this Presidential Regulation comes into force but have not made the required adjustments are subject to additional obligations in the form of payment of benefit sharing on the value of the transacted carbon.
f. The entities who already have a Carbon Unit and have not entered into Carbon Trading or Performance-Based Payment transactions are required to comply with the provisions regarding the administration of NEK no later than 1 (one) year after the promulgation of this Presidential Regulation.

Carbon Market

Just like what we know of a market, carbon market is a place where two parties, usually buyers and sellers of carbon credit or emission offset, can gather to facilitate the exchange carbon credit or emission offset.

The World Bank's latest State and Trends of Carbon Pricing report reveals that global average carbon credit prices on the voluntary market moved from US$2.49/tCO2e in 2020 to US$3.82/tCO_2e in 2021, and the volume of credits transacted in the voluntary market exceeded 362 million credits last year, 92% more than in 2020.[15] However, the current price of carbon on the voluntary market is not high enough to provide the necessary financing for conservation and regeneration on a large scale. The price of carbon should be at least seven times to USD 29/tCO_2.

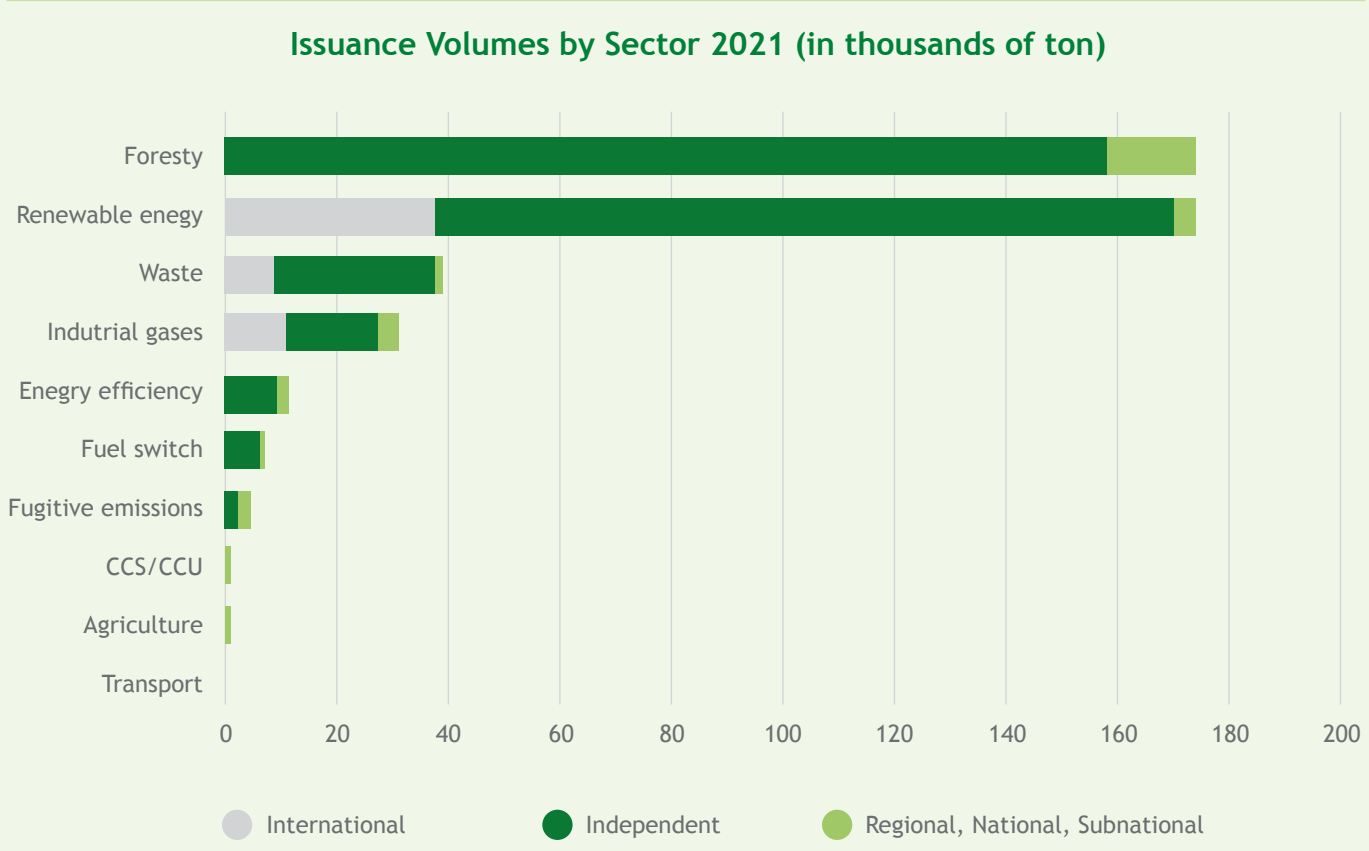

Figure 8. Volumes of credit issued by sector and mechanisms

[15] https://carbonpricingdashboard.worldbank.org/carbon_crediting

There are two type of carbon market, the regulatory compliance and the voluntary markets. The blue carbon emission reduction unit generated by mangrove restoration basically is traded in the voluntary market. Blue carbon projects aim to demonstrate emissions removals or avoidance through restoration activities to generate carbon credits; these credits can then be sold on either the compliance or the voluntary markets to generate revenue.[16] These include mechanisms such as the clean development mechanism (CDM) under the Kyoto protocol and the Reducing Emissions from Deforestation and Forest Degradation (REDD+) initiative under the United Framework Convention for Climate Change. Although it seems that compliance market has rigorous procedure, less flexible and expensive transaction costs compare to the voluntary market, the size of the two markets differs considerably. While carbon credit market (CCM) valuation last year (2021) expanded by 164% to $850 billion, the voluntary market was a fraction of the whole to reach at $1 billion.[17]

REDD+ is a mechanism that works similarly to CDM, but expands upon the land use sector in an effort to more effectively implement projects focused on reducing emissions from land use change. Alternatively, a blue carbon project could be financed by carbon credits sold on the several different voluntary market standards, using methodologies such as Plan Vivo[18] or the Verified Carbon Standard (VCS)[19]. These methodologies have proven significantly easier to implement due to the diversity and flexibility of different voluntary standards as well as lower costs of the required carbon accounting, verification, and certification, associated with submitting a voluntary carbon project. Several blue carbon projects have already been certified either under VCS or Plan Vivo standards, but no projects have as yet been certified under the compliance standards (Wylie, Sutton-Grier and Moore, 2016)[xxv]. Thus, the discussion in the policy brief focuses more on voluntary markets.

The Compliance Markets

Compliance markets have more rigorous standards of monitoring, reporting and verification that are challenging for smaller projects to meet in a cost-effective way. Under the CDM, for example, a project needs to sell at least 5,000 tCO_2 to justify the transaction costs, which puts this mechanism out of reach for many small-scale coastal projects (Kollmuss et al., 2008)[xxvi]. The compliance market is used by companies and governments that by law have to account for their GHG emissions. It is regulated by mandatory national, regional or international carbon reduction regimes. A cap-and-trade mechanism is usually applied under this scheme, where the cap is based on the allowance to emit and the company that emits above the cap has to purchase the difference either to the other company that emits below its cap.

In cap-and-trade programmes, high emitters purchase carbon credits from low emitters in markets where the total amount of emissions is fixed per sector. Companies reduce their emissions as much as possible, and then 'buy' or 'sell' units of carbon emissions depending on how successful they are at reducing emissions. Projects can range from switching to renewable energy and capturing greenhouse gases to protecting habitats that sequester CO_2 and its equivalents.

Image: Pexels.com

[17] https://www.reuters.com/business/energy/global-carbon-markets-value-surged-record-851-bln-last-year-refinitiv-2022-01-31/

[18] http://www.planvivo.org/foradditionalinformation

[19] http://www.v-c-s.org/foradditionalinformation

The Voluntary Market: Carbon Offset Markets

The experience of the past decade shows that carbon offset markets can play an important role in catalysing low-carbon investment in developing countries, complementing and leveraging other financial resources. In principle carbon offset revenues provide an additional revenue stream that enhances the overall financial viability of low-emission projects. More particularly, they can help incentivize the often-large upfront capital investments needed for low carbon projects, as well as providing incentives to overcome social inertia, lack of awareness and various transaction costs that tend to hinder climate-friendly investment. The pay-upon-performance nature of the asset also creates positive incentives for good management and operational practices to sustain emission reductions over time.

The voluntary market has become very important for agriculture and forestry projects. The private sector can either purchase carbon credits directly from projects, companies (e.g., Ecosecurities) or from carbon funds (e.g., The World Bank BioCarbon Fund). Voluntary carbon credits (VER) are mainly purchased by the private sector. Corporate social responsibility (CSR) and public relations are the most common motivations for buying carbon credits. Other reasons are considerations such as certification, reputation and environmental and social benefits. Some industries offer clients to neutralise their carbon emissions (e.g., ICAO offers carbon neutral flights and Morgan Stanley provides the equivalent amount of carbon credits). In voluntary carbon markets companies set voluntary mitigation goals or purchase carbon offsets (Forest Trends n.d.)[20]. They have been experiencing a significant spike in demand, growing by 53% in volume and 49.5% in value from 2016 to 2018 (Donofrio et al. 2019).[xxvii]

The greater flexibility makes voluntary standards more attractive to emerging offsets approaches like blue carbon, and the lower transaction costs mean small-scale projects can be certified. Among the countries for which Sustainable Ocean Economy Country Diagnostics were conducted, projects in Kenya and Indonesia have been certified successful under the Plan Vivo and VCS standards, respectively. The impacts of these projects have been significant: the Yagasu project in Aceh and North Sumatra provinces of Indonesia protects 25,000 ha of forest and restores a further 5,278 ha, resulting in annual emissions reductions of 120,706 tCO_2e (VCS, 2019)[xxviii]. Like the Mikoko Pamoja blue carbon project (Case Study 2), Yagasu has had significant positive social impacts by improving the livelihoods of over 9,000 people through employment, increased income and capacity building.

Voluntary carbon credits direct private financing to climate-action projects that would not otherwise get off the ground. These projects can have additional benefits such as biodiversity protection, pollution prevention, public-health improvements, and job creation. Carbon credits also support investment into the innovation required to lower the cost of emerging climate technologies. And scaled-up voluntary carbon markets would facilitate the mobilization of capital to the Global South, where there is the most potential for economical nature-based emissions-reduction projects. This policy brief focuses more on the voluntary market, since the current option for carbon offset mostly traded in the non-capped market, i.e., the voluntary market.

[20] https://www.forest-trends.org/topics/finance/

Image: Shutterstock.com

CASE STUDY 3

Indonesia: mangroves revitalizing coastal villages with fishery & new businesses

Livelihoods-mangrove restoration project is located in the province of North Sumatra in Indonesia, which has steadily lost its mangrove forests over the past decades. In 1987, it had 200,000 hectares of mangroves. Today, less than half of that amount remains, with only 83,000 hectares standing. The mangrove forests were destroyed due to the island's rapid industrialization: mainly to ponds for shrimp production but were also converted into rice fields, and plantations for palm oil.

Launched in 2011, Livelihoods-Yagasu project restored mangrove forests, and as a result, increasing the resilience of the local population from erratic climatic events. Replanting coastal mangroves significantly buffers coastal communities from tidal flooding and storm surge. Mangrove forests also contribute to restore vital agricultural land. Local villagers can now increase their revenues by selling the by-products of the mangroves such as fish, crabs, molluscs, and natural dyes that could be made from the parts of the mangrove tree.

Between 2011 and 2014, Livelihoods-Yagasu project helped plant 18 million mangrove seedlings on 5,000 hectares to rebuild a natural mangrove barrier, that is essential to maintain life in these fragile areas. The 18 million trees planted will sequester more than 2-million-ton CO2e over 20 years. In 2018, a new carbon project financed by Livelihoods Carbon Fund's 2 investors is helping restore 5,000 additional hectares of mangroves, develop key economic opportunities for the local communities and sequester 2.5 million tons of carbon over 20 years.

Sources:
http://livelihoods.eu/portfolio/yagasu-indonesia/

Conclusion and Recommendation

Conclusion

Carbon economy of mangrove restoration could be built into novel investment products. For these sorts of investment, both the scale of a project and the security and legal frameworks are of great importance. Having a better overview of opportunities, equipped with model-driven and globally-consistent assessments of value, provide a new opportunity to engage with private finance to invest in mangrove restoration projects for mitigation and adaptation purposes or other ecosystem services benefits.

Effective mangrove restoration and sustainable management can spearhead climate change mitigation. Mangrove blue carbon financing requires effective allocation of capital and market (emissions trading) provide the most viable path for bankable blue carbon projects.

A blue carbon project could be financed by carbon credits sold on the voluntary carbon market, using methodologies that have proven significantly easier to implement; due to the diversity and flexibility of different voluntary standards as well as lower costs of the required carbon accounting, verification, and certification, which appeal to philanthropic, donor and for-profit investors to finance mangroves.

Payment for these co-benefits could occur through premium prices for “carbon+” (carbon and co-benefits) credits, through the layering of government and philanthropic funds, or through direct payments from those who benefit from blue carbon projects such as insurers and tourism and aquaculture operators.

There are at least three types income generating sources, i) payments from blue carbon credit, ii) non-carbon related payment for performance or payment for ecosystem services, iii) the revenues from timber and non-timber products of sustainable mangrove forest management and/or the possible combinations thereof.

The Presidential Regulation Number 98 of 2021 opens up potentials of using carbon pricing to attract businesses and financial sectors investment in mangrove protection and rehabilitation that produce economic returns, therefore, the government should develop required policies for robust but flexible regulation to offset GHGs) in a cost-effective manner, including by expediting the development of Carbon Trading infrastructure, carbon transaction administration and mechanism to resolving uncertainties.

Recommendation

a. **A Proponent should have better understanding of the possible returns on investments and cost-savings** associated with investments available to flow into mangrove projects to be able to develop innovative business models, which include, or have positive impacts on mangrove conservation, and to ensure long-term, sustainable mangrove management beyond the mostly short-term funding.

b. **For a meaningful blue carbon economy of mangrove restoration and sustainable management, the three components economy should be enhanced**; i) demand establishment either by regulatory drivers, result-based commitments, or stakeholders-oriented demand drivers (ESG proposition), ii) sustained high-quality of supplies through diversify and increase investments, lowering barriers of project initiation, and balanced competitions, and iii) improving market infrastructure for an efficient and effective interface between demand and supply to enable transaction with the least friction.

c. **To expedite the effective implementation of the President Regulation on the economic value of carbon** to incentives mangrove restoration as scale, the followings should be prepared and operationalized, to include:

- Preparation of implementing regulations (derivatives) of the Presidential Regulation on Economic Value of Carbon;
- System strengthening and/or development of National Registry System and Indonesian Certified Emission Reduction (SRN/SPEI);
- Determination of emission targets and upper limits, for each sector of the NDC or activities potentially emitting GHGs of key stakeholders (government agencies of national/regional, relevant private sectors, NGOs and community groups);
- Socialization on the process and procedures of the President Regulation 98 of 2021, technical assistance and responses to stakeholders' concerns;
- Implementation of transitional provisions (e.g., registration of SRN and transition of RAN/RAD documents);
- Develop and promote institutional and modalities for value exchange on the application of the NEK mechanism, including market infrastructure, Carbon Exchange, Fund Management/BPDLH, Benefit Sharing, Supervision Control, etc.

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