

NATURE-BASED SOLUTIONS (NBS) AS NATURAL FIXES: TRENDSETTING IDEAS IN HARNESSING NATURE TO COMBAT CLIMATE CHANGE IN SABAH

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ABSTRACT

The Sabah Forestry Department emphasises that effective forest protection and conservation go beyond tree planting, advocating for all-encompassing approaches like Nature-Based Solutions (NBS). These revolutionary strategies mitigate climate change by harnessing nature's power, focusing on protecting pristine forests, restoring degraded areas, sequestering carbon, enhancing biodiversity, and increasing resilience to climate impacts. NBS is just one of the many approaches the department uses to ensure forests continue to provide vital environmental and social benefits for future generations. The department values a diversity of perspectives, recognising that no single idea holds a monopoly in the ever-evolving forestry landscape. Collaboration is also key, as the department has established impactful partnerships over the years, which have been essential in addressing complex forestry issues, fostering innovation, and securing the financial support needed for successful conservation outcomes. In Sabah, the two forest-based carbon projects are the INFAPRO Rehabilitation of Logged-over Dipterocarp Forest with Face the Future and the Kuamut Rainforest Conservation Project with Permian Global. These Projects are integral to Sabah's broader conservation and climate mitigation efforts.

Keywords: Nature-based Solutions (NBS), Climate Change, Forest-based Carbon

1. INTRODUCTION

1.1 Forest Resource Base

Sabah's forest resource base is one of the most biologically rich and economically significant in Malaysia. Forests cover a large portion of Sabah's land area and are vital for biodiversity conservation, climate regulation, water catchment, and economic activities like timber production and nature-based recreation.

Sabah's forests to date still stand at about 4.6 million hectares or about 63% of its total land mass. More than 3.8 million hectares of forests were legally gazetted as permanent forest reserves, parks, wildlife sanctuary and wildlife conservation area. These protected areas made up about 52% of the Sabah's total land mass. Sabah took pride in this achievement as

not only fulfilled the national commitment of maintaining 50% under forest cover, but had also surpassed or achieved beyond what was pledged, whereby Sabah have ensured that its forests are protected in various functional classes.

In addition, the Sabah Government had showcased steadfast commitment to increase its forests under Totally Protected Areas (TPAs) to 2.2 million hectares or 30% of the it's land mass by 2025. To date, about 2.0 million hectares (or 27%) have been designated as such. Sabah only needs about 3% or 200,000 hectares of TPAs to achieve the 30% TPAs target by 2025, in line with the Sabah Forest Policy 2018 and the *Sabah Maju Jaya* (SMJ) Plan.

Sabah's forest reserves have shown a significant positive change over the years. The TPAs have increased from 12% in 2007 to 27% to date. Our goal is to achieve 30% of TPAs, leading the nation in achieving the AICHI targets, and in line with the Kunming-Montreal Global Biodiversity Framework.

1.2 Nature-Based Solutions (NBS)

The concept of Nature-Based Solutions (NBS) began gaining prominence in the early 2000s, but its formal development can be traced to the International Union for Conservation of Nature (IUCN) around 2009. The IUCN introduced NBS as an approach to conservation that addresses societal challenges, such as climate change, water security, and biodiversity loss, by harnessing nature's potential to provide sustainable solutions.

However, the broader idea of using nature to solve environmental and societal challenges has roots that stretch back much further, linked to traditional ecological practices and the broader environmental movement in the 20th century. The term gained further momentum in global discussions with its inclusion in key frameworks like the Paris Agreement (2015) and the UN Sustainable Development Goals (2015).

Nature-Based Solutions (NBS) are conservation and sustainable management strategies that use natural processes and ecosystems to address societal challenges like climate change, biodiversity loss, and water security. These solutions harness the power of nature to deliver benefits for both the environment and people, focusing on actions such as protecting, restoring, and managing ecosystems in a sustainable way.

Key goals of NBS include carbon sequestration through absorbing carbon from the atmosphere through reforestation or ecosystem restoration; biodiversity enhancement by protecting and restoring habitats to support a wide range of species, water regulation by managing natural water cycles to prevent floods or droughts; and climate resilience by helping ecosystems and communities better adapt to changing climates. Examples of NBS include reforestation, wetland restoration and sustainable agricultural practices. By working with nature, these approaches offer cost-effective, long-term solutions to environmental challenges.

Hence, Nature-Based Solutions (NBS) are important because they provide a sustainable, cost-effective ways to address some of the most pressing global challenges, while benefiting both nature and people. Several reasons why NBS are vital:

- a. **Climate Change Mitigation:** NBS, such as reforestation and wetland restoration, absorb carbon dioxide from the atmosphere, helping to reduce greenhouse gas emissions (GHG) and combat climate change. Forests and wetlands are crucial carbon sinks.
- b. **Climate Adaptation and Resilience:** NBS enhance the resilience of communities and ecosystems to climate change impacts e.g. mangroves protect coastlines from storm surges, and wetlands can reduce the severity of floods by absorbing excess water.
- c. **Biodiversity Conservation:** By restoring and protecting ecosystems, NBS promotes biodiversity protection; and ensuring that species and natural habitats thrive. Healthy ecosystems support a rich diversity of life, which is essential for overall ecological balance.
- d. **Cost-Effectiveness:** NBS are often more affordable than technology-based solutions, such as restoring wetland to manage flood risks which is less expensive than building concrete flood barriers, while also providing multiple additional benefits.
- e. **Water Security:** Restoring natural water systems such as rivers and wetlands, helps regulate water availability, improve water quality and reduce the risks of floods and droughts.
- f. **Human Well-being:** NBS provide numerous social and economic benefits, including enhanced livelihoods, better food security, and improved mental and physical health through green spaces and ecosystem services.
- g. **Sustainable Development:** By integrating NBS into policies and practices, enable Sabah to meet multiple Sustainable Development Goals (SDGs), from climate action and life on land, to water management and poverty reduction.

1.3 Difference Between Conservation and Nature-Based Solutions

Conservation is the protection and preservation of our planet's biological diversity and natural resources so that they exist into the future. It includes protecting flora and fauna species, habitats, ecosystems, and important ecological services against threats. Conservation can involve setting aside forest reserves, parks and etc, ensuring that species have the habitat they need to survive, or implementing laws to protect endangered flora and fauna.

NBS, on the other hand, encompass a wider range of approaches i.e., from the restoration of habitats to water resource management, disaster risk reduction and green infrastructure to address societal problems. NBS are based on the notion that when ecosystems are healthy and well-managed, they provide essential benefits and services to people, such as reducing greenhouse gas emissions (GHG), securing safe water resources, making air safer to breathe, or providing increased food security.

1.4 Natural Capital And Ecosystem Services

Sabah's natural capital refers to its rich array of natural resources and ecosystems, which provide significant environmental, economic, and social benefits. Sabah is home to one of the most biodiverse regions in the world, with vast forests, unique wildlife, and valuable natural assets, including:

- a. **Biodiversity:** Sabah's rainforests host an extraordinary range of species, many of which are endemic to the region. Sabah's diverse flora and fauna contribute to its standing as a biodiversity hotspot.

- b. **Forests:** Sabah has significant 63% forest cover, which includes tropical rainforests, mangrove forests, and peatlands. These forests are critical for carbon sequestration, regulating climate, and providing habitat for wildlife; hence, Sustainable Forest Management (SFM) is crucial to preserving Sabah's natural capital.
- c. **Ecosystem Services:** The natural ecosystems in Sabah provide a wide range of services that benefit both local communities and the broader global environment. These include water catchment and purification, soil fertility, flood control, carbon storage, pollination and etc. Peatlands, in particular, are vital for carbon storage and climate regulation.
- d. **Marine Resources:** Sabah also has rich marine ecosystems, including coral reefs, seagrass beds, and mangroves. These ecosystems support fisheries, eco-tourism, and protect coastlines from erosion. The Coral Triangle Initiative (CTI), of which Sabah is a part, is renowned for its marine biodiversity. Sabah is now venturing into Blue Economy which seeks to align marine resource use with conservation strategies, offering economic opportunities without compromising ecological health.
- e. **Eco-tourism:** Natural ecstatic beauty makes Sabah a major eco-tourism destination. The preservation of its natural capital is essential for sustaining tourism, which contributes significantly to Sabah's economy.
- f. **Timber and Non-Timber Forest Products (NTFPs):** Sabah's forests are also a source of timber and NTFPs such as rattan, medicinal plants, honey etc., which support the livelihoods of Sabah's rural communities. The sustainable harvesting of these resources is important for maintaining the balance between conservation and economic needs.

Sabah's forestry initiatives, such as Nature-Based Solutions (NBS), REDD+ projects, and carbon projects, aim to protect and restore this natural capital while promoting sustainable development and addressing climate change.

1.5 Forest Ecosystem Services

The forest ecosystem services are benefits receives from forests and are categorized into four (4) types as listed:

- a. **provisioning** – material or energy outputs from an ecosystem, includes food, water catchment etc.
- b. **regulating** - benefits derived from the ecosystem's ability to regulate environmental processes e.g. carbon sequestration, water filtration, and climate regulation.
- c. **supporting** – services maintain the fundamental processes that allow ecosystems to function includes soil formation, nutrient cycling, and habitat provision.
- d. **cultural** - benefits receives from a forest, includes nature-based recreation, environmental education, aesthetic appreciation and spiritual connection.

NBS are essential because they leverage nature's own processes to solve environmental challenges in ways that are sustainable, effective, and beneficial for both the planet and human societies. Some common scenarios where NBS are applied:

- a. **Climate Change:** NBS are used to reduce greenhouse gas (GHG) emissions, adapt to the impacts of climate change, or increase resilience to climate-related disasters like floods,

droughts, and storms. For example, restoring mangroves can protect coastal areas from storm surges.

- b. **Biodiversity Loss:** NBS come into play when there is a need to protect or restore ecosystems that support diverse species. This includes efforts like reforestation to revive biodiversity and ecosystem health.
- c. **Flood and Water Management:** NBS are used when addressing issues like floods, droughts, and water scarcity. Wetland restoration, for example, helps absorb excess rainwater and prevent floods while also replenishing groundwater resources during dry periods.
- d. **Agriculture and Food Security:** NBS are used in sustainable agriculture practices when there is a need to increase food security while minimizing environmental impacts. Agroforestry, for instance, combines agriculture and tree planting to enhance soil fertility and reduce erosion.
- e. **Coastal Protection:** Coastal communities implement NBS when they face threats from sea-level rise and erosion. Solutions like restoring sand dunes or planting mangroves can stabilize shorelines and provide natural barriers against the sea.

In general, NBS are applied when solutions are needed that simultaneously address environmental sustainability, resilience, and human well-being, offering long-term and holistic benefits over technology-based solutions. Nature-Based Solutions (NBS) are increasingly recognized as effective strategies to combat climate change by utilizing natural processes to enhance ecosystems and biodiversity while benefiting human well-being.

In Sabah, NBS are being integrated into its policies and initiatives as a response to the pressing challenges posed by climate change, including severe weather events and environmental degradation.

2.0 TYPES OF NATURE-BASED SOLUTIONS

Think of nature-based solutions as an umbrella concept that covers a whole range of ecosystem-related approaches, all of which address societal challenges. These approaches can be placed into five (5) main categories i.e., ecosystem restoration approaches, issue-specific ecosystem-related approaches, infrastructure-related approaches, ecosystem-based management approaches, and ecosystem protection approaches.

These solutions integrate protection, restoration and/or sustainable management of natural and semi-natural ecosystems (i.e. forests, peatlands and grasslands), aquatic systems and working lands such as crop lands. NBS rely on nature as a life support system and for agriculture, which centre around nature-positive production approaches that reduce greenhouse gas emissions, boost ecosystem health and simultaneously reduce climate impacts such as flooding, soil erosion and dry conditions.

- a. **Restoration of Ecosystems:** Ecosystems such as forests, wetlands, and mangroves are restored or rehabilitated to their natural state; for example, reforestation efforts help absorb carbon dioxide, enhance biodiversity, and restore wildlife habitats. Wetland restoration helps in flood control by acting as a natural sponge for excess water.

- b. **Sustainable Land Management:** NBS uses sustainable farming practices such as agroforestry, to enhance and preserve ecosystems; for example, planting trees alongside crops (agroforestry) helps improve soil health, reduce erosion, and store carbon, all while increasing crop yields.
- c. **Water Management and Flood Control:** By restoring natural water systems such as rivers, lakes, and wetlands, NBS improves water quality, prevents floods, and maintains the water cycle; for example, restoring wetlands absorbs excess rainwater, reduces flood risks, and filters pollutants from water before it reaches rivers and lakes.
- d. **Coastal Protection:** NBS involves using natural coastal systems such as mangroves, sand dunes, and coral reefs to protect shorelines from erosion, sea-level rise, and storms; for examples, mangrove forests protect coastal areas by reducing the impact of waves and storm surges, while also serving as breeding grounds for marine life.
- e. **Biodiversity Conservation:** By protecting and restoring natural habitats, NBS supports the conservation of species, ensuring ecosystems remain balanced and resilient; for examples, protecting areas like rainforests, which are rich in biodiversity, helps safeguard species while providing ecosystem services like clean air and water.
- f. **Payment for Ecosystem Services (PES):** Communities are financially compensated for conserving or restoring natural ecosystems that provide services like clean water, carbon sequestration, or flood control; for examples, farmers may receive payments for maintaining forest cover on their land, which helps protect watersheds and provide ecosystem services to downstream users.
- g. **Climate Change Mitigation and Adaptation:** NBS enhances the capacity of ecosystems to absorb carbon, protect biodiversity, and create buffers against climate change impacts like extreme weather events; for examples, reforestation sequesters carbon, while projects like riparian restoration help prevent floods and adapt to rising temperatures.

In essence, NBS works by aligning human needs with the natural capacity of ecosystems to provide essential services, creating sustainable and resilient solutions to modern challenges which include:

- a. **Collaboration:** NBS often involves partnerships between governments, communities, private sector, and NGOs to implement solutions that benefit both people and nature.
- b. **Local Knowledge:** NBS integrates traditional knowledge with scientific expertise to create locally adapted solutions.
- c. **Sustainability:** NBS are long-term approaches, designed to function continuously with minimal maintenance, compared to technology-based solutions that often require ongoing investment.

3.0 VULNERABILITY TO IMPACTS OF CLIMATE CHANGE

Sabah is a global biodiversity hotspot, with diverse and complex ecosystems ranging from incredible coral reefs and marine fisheries, coastal mangrove systems, montane and lowland tropical rainforests to wetlands.

Sabah's biodiversity is under pressure from the impacts of climate change. Although there is much uncertainty about the likely magnitude of impacts, but it is clear that there will be potentially significant impact on flora and fauna – including the loss of ecosystems and as well

as changes in distribution and movements of species. Therefore, the climate and biodiversity crises must be addressed in unison i.e. climate mitigation and adaptation and biodiversity conservation.

3.1 Climate Change Initiatives

Sabah has implemented a variety of climate change initiatives to address both mitigation and adaptation strategies, given its rich biodiversity and forests that play a critical role in carbon storage.

In 2021, in line with the aspiration of the Sabah State Policy on the Environment and the Sustainable Development Goals, the Sabah Climate Change International Conference (SCCIC) 2021 was held to address climate change impacts both locally and globally and to provide an avenue for all relevant stakeholders to participate in climate change mitigation and adaptation initiatives.

These initiatives are largely focused on sustainable forest management (SFM), carbon sequestration, ecosystem restoration, and community engagement. Here are some key climate change initiatives in Sabah:

- a. **Sabah Tackling Climate Change through Sustainable Forest Management and Community Development Project (2013 – 2021):** An EU-funded REDD+ Project that focuses on forest conservation, sustainable management, and improving livelihoods of local communities in forested areas. REDD+ aims to reduce carbon emissions from forest degradation, increase carbon stocks, and contribute to community development through capacity-building and sustainable livelihoods.
- b. **Sabah Climate Change Action Council (SCAC):** In 2022, the SCAC was established to coordinate and implement policies and actions related to climate change in Sabah. The SCAC brings together government agencies, NGOs, private sector stakeholders, and international partners to address climate change through projects in forestry, agriculture, and energy sectors. SCAC oversees projects like REDD+, Carbon Management Initiatives, and NBS aimed at both mitigation and adaptation.
- c. **Heart of Borneo (HoB) Initiative:** A transboundary conservation effort involving Malaysia, Indonesia, and Brunei to conserve one of the largest remaining rainforests in the world. Sabah is a key participant in this Initiative, which aims to preserve the region's biodiversity, protect watersheds, and combat climate change by maintaining forest cover. The HoB Initiative helps conserve vast tracts of rainforest, supporting carbon storage, and acting as a buffer against climate change while promoting sustainable livelihoods through eco-tourism and community-based projects.
- d. **Sustainable Management of Peatland Ecosystems in Malaysia (SMPEM) Project:** The objective is to restore and sustainably manage peatland ecosystems to reduce carbon emissions and improve biodiversity. The SMPEM Project in Sabah focuses on restoring degraded peatlands, which are vital carbon sinks. Hence, by rehabilitating these ecosystems, the Project prevents the release of stored carbon from peat soils, thus contributing to climate change mitigation while improving water regulation and biodiversity.

- e. **Payment for Ecosystem Services (PES):** The objective is to incentivize communities to conserve and protect forests that provide ecosystem services like carbon sequestration, water regulation, and biodiversity conservation. For example, in the Babagon Watershed, the local communities are compensated for protecting the forested watershed, which secures water supply for Kota Kinabalu and provides carbon storage. The PES schemes help conserve critical ecosystems, enhance livelihoods, and contribute to climate change adaptation and mitigation efforts.
- f. **Conservation of Mangrove Forests:** The objective is to protect and restore Sabah's extensive mangrove forests to enhance resilience to sea-level rise and coastal erosion, while also sequestering carbon. Mangrove ecosystems in Sabah act as significant carbon sinks and provide coastal protection from storm surges and flooding, which are becoming more frequent due to climate change.
- g. **Community-Based Forest Management (CBFM):** The objective is to engage local communities in sustainable forest management, allowing them to benefit from conservation efforts while protecting forest resources. Through co-management agreements, local communities are given a stake in managing forest resources, receiving income from activities like eco-tourism. CBFM Projects promote forest conservation, enhance livelihoods, and contribute to both climate change mitigation and adaptation by preserving forests that act as carbon sinks.
- h. **Forest Certification and Sustainable Timber Production:** The objective is to ensure that timber harvested from Sabah's forests is done sustainably, reducing deforestation and forest degradation, which are major sources of carbon emissions. Sabah's forests are certified under the Forest Stewardship Council (FSC) and the Malaysian Timber Certification Scheme (MTCS), ensuring sustainable management practices. Certified timber production helps mitigate climate change by ensuring that forest resources are managed sustainably, reducing the carbon footprint of logging operations.
- i. **Sabah's Eco-Tourism Initiatives:** The objective is to promote eco-tourism as a sustainable alternative to resource-intensive industries, supporting conservation efforts while reducing carbon emissions. Protected areas like Kinabalu Park, Danum Valley, and the Lower Kinabatangan Wildlife Sanctuary attract eco-tourists, providing income for conservation and local communities. Eco-tourism helps preserve forested areas, supports wildlife conservation, and encourages the protection of Sabah's natural resources, all of which contribute to climate change mitigation.
- j. **Sabah's upcoming Climate Change and Carbon Policy:** The objective is to create a framework for managing carbon emissions in Sabah while balancing development needs with environmental conservation. This Policy, currently spearheaded by the Sabah Climate Action Council, is designed to regulate carbon projects and encourage private sector investment in carbon sequestration initiatives. The proposed policy aims to make Sabah a leader in climate change mitigation through sustainable forest management, carbon credits, and investment in nature-based solutions.

These initiatives reflect Sabah's commitment to tackling climate change through innovative and sustainable strategies, with a strong emphasis on forest conservation, ecosystem restoration, and community involvement. The integration of Nature-Based Solutions (NBS) in these initiatives ensures that both environmental and social goals are met, making Sabah a key player in regional and global climate action.

3.2 Initiatives of Forest-Based Carbon Project

3.2.1 INFAPRO Rehabilitation of Logged-Over Dipterocarp Forest

The INFAPRO (INFAPRO Rehabilitation of Logged-over Dipterocarp Forest) Project is one of Sabah's pioneering forest restoration and carbon sequestration initiatives. It was launched in 1992 as a collaborative effort between the Sabah Forestry Department and Face the Future, an organization specializing in forest carbon projects.

The primary goal of the INFAPRO Project is to rehabilitate 25,000 ha degraded dipterocarp forests in Sabah that have been heavily logged, focusing on restoring forest biodiversity and improving ecosystem services. The Project also aims to sequester carbon by promoting the growth of trees in these areas, contributing to global efforts to mitigate climate change. INFAPRO Project is the first forestry project in Malaysia to initiate SGS's Carbon Offset Verification (COV) programme in 2002.

Through the restoration of the 25,000-ha logged-over forests, INFAPRO helps increase carbon storage while also supporting wildlife habitat recovery and enhancing local biodiversity. This Project is part of the broader efforts in Sabah to combine sustainable forest management practices with climate change mitigation strategies, showcasing the value of balancing conservation with environmental and community benefits.

In September 2011, the INFAPRO Project was the first Forestry Project (AFOLU) in Asia to be validated and certified under VCS, and the first tranche of approximately 509,540 VCUs were issued in September 2011, covering a vintage period 2007 – 2010. Making it the first of its kind in the world, the first Improved Forest Management (IFM) project with avoidance re-logging methodology approved by VCS Board in 2010.

The INFAPRO Project was presented at COP17, on the 5th November 2011 at Durban, South Africa. Currently, since August 2024, the INFAPRO Project is undergoing the carbon monitoring. INFAPRO is accessible in the Verra's VCS project database www.vcsprojectdatabase.org

3.2.2 Malua Wildlife Habitat Conservation Bank

The Malua BioBank was established as a partnership between the Sabah Forestry Department private investors and conservation organizations. It operates on the principle of selling biodiversity credits to investors, companies, and individuals who wish to support forest conservation. The Malua BioBank operates by generating and selling Biodiversity Conservation Certificates (BCCs). Each Certificate represents the restoration and protection of 100 square meters (0.01 Ha) of rainforest within the Malua Forest Reserve. The funds generated from the sale of these credits are used to finance the restoration and long-term protection of the forest, as well as support local communities and research initiatives.

Malua BioBank focuses on rehabilitating 34,000 hectare of degraded areas of the Malua Forest

Reserve in Sabah. The Malua Forest Reserve (MFR) is a critical habitat for endangered species, including orangutans, pygmy elephants, and clouded leopards, and forms part of the larger Ulu Segama-Malua Forest Reserve, which is key to biodiversity conservation in Sabah. Malua BioBank focuses on rehabilitating forest, protecting wildlife, and preventing illegal logging and encroachment. By providing a financial mechanism to link conservation efforts with the private sector, the Malua BioBank aims to create a sustainable model for forest conservation that balances environmental protection with economic returns.

The Malua BioBank pioneered a novel approach to conservation financing that could serve as a model for other regions. The Project's reliance on Voluntary markets and the absence of regulatory support have highlighted the need for a more predictable demand for biodiversity credits. However, the Malua BioBank remains a valuable example of how conservation can be integrated with commercial interests, but its long-term success will depend on the development of supportive regulatory frameworks and market conditions. Reviving the concept of Malua BioBank is included in the revised Sabah Biodiversity Strategies (2024-2034).

3.2.3 The Kuamut Rainforest Conservation Project (KRCP)

The Kuamut Rainforest Conservation Project (KRCP) is the most recent forest conservation and carbon sequestration carbon project being implemented by Sabah and it is the first Nature-based Solutions (NBS) Project in Malaysia. A joint venture between the Government of Sabah (SFD), Rakyat Berjaya Sdn. Bhd. (RBJ) and the Permian Global (Permian). KRCP focuses on the Northern Kuamut Forest Reserve, a crucial area for wildlife conservation, especially for endangered species such as orangutans, Bornean elephants and other native fauna.

The Project's primary goal is to prevent deforestation and degradation of the Northern Kuamut Forest Reserve, which plays a vital role in carbon storage, biodiversity conservation, and the preservation of ecosystem services. The main objective of KRCP is to carry out forest protection and restoration efforts in order to generate and sell carbon credits. Meanwhile, the expected outcomes include (i) long-term protection and restoration of the Northern Kuamut FR and its biodiversity; (ii) additional revenue for Sabah from the forestry sector through carbon trading; (iii) improved livelihoods and alternative sustainable incomes; (iv) employment opportunities for local communities; and (v) awareness raising.

One of the key aspects of KRCP is the development of a carbon offset program. The Project generates carbon credits, which are sold to companies or individuals looking to offset their carbon emissions. These funds are then reinvested into the conservation efforts, making it a sustainable financial model for long-term forest protection. The Project is part of Sabah's broader commitment to addressing climate change through Nature-Based Solutions (NBS) and sustainable forest management, supporting global efforts to mitigate the effects of climate change while safeguarding critical ecosystems.

The KRCP is assessed against Verra Verified Carbon Standard (VCS) and the Verra Climate, Community and Biodiversity (CCB) standard to both demonstrate the Project's scientific rigour

and to enable it to generate income from Verified Carbon Units (VCUs), or carbon credits. In March 2024, the KRCP achieved its 1st Climate, Community and Biodiversity Verification, and was able to generate its first tranche of Verified Carbon Units (VCUs) of approximately 1.42 million VCUs were issued, covering a vintage period 2016 – 2021. Currently, the Project is undergoing VCS and CCB Standard for the period 2022-2023.

4.0 FUTURE OUTLOOK FOR NBS

The future outlook for Nature-Based Solutions (NBS) in Sabah is promising, given Sabah's strategic focus on conservation, climate action, and sustainable development. Some key aspects of the future potential include: -

a. Integration into Sabah's Climate Policies

Sabah's Climate Change and Carbon Policy is already taking shape, positioning NBS as a core strategy to mitigate and adapt to climate change. This policy framework could further catalyze the implementation of NBS by creating regulatory clarity and attracting investments. The focus will likely expand on balancing economic growth with environmental preservation, ensuring that NBS projects generate financial returns while promoting ecosystem health.

b. Scaling Up of NBS Projects

Forest-based carbon projects, such as the INFAPRO Rehabilitation and the Kuamut Rainforest Conservation Project (KRCP), demonstrate Sabah's capability to develop large-scale NBS initiatives. Future expansion in reforestation, peatland restoration, and sustainable forestry management is anticipated. New NBS initiatives targeting mangrove restoration, watershed management, and agroforestry could be introduced, given their importance in coastal protection, water security, and sustainable agriculture.

c. Public-Private Partnerships and Financing

As public-private partnerships gain traction, more funding for NBS projects is expected. Partnerships between the state government, private companies, NGOs, and international donors will continue to play a pivotal role in scaling up NBS projects. With the establishment of frameworks like the Climate Change and Carbon Policy, Sabah could potentially attract global investments in carbon markets, Payment for Ecosystem Services (PES), and green bonds, making NBS more financially viable and attractive to investors.

d. Technology and Innovation

The integration of technology in NBS monitoring and management will likely increase. Remote sensing, satellite monitoring, and AI tools could offer new ways to monitor forest health, carbon sequestration, and biodiversity conservation. These innovations will enhance transparency, efficiency, and scalability of NBS initiatives in Sabah, allowing for better tracking of climate impacts and environmental outcomes.

e. Community and Indigenous Involvement

Future NBS projects will emphasize community-driven approaches, involving local and Indigenous populations in project planning, execution, and benefit-sharing. Empowering local communities is crucial to ensuring the sustainability of NBS efforts. Indigenous knowledge, particularly on forest and land management, could be further integrated into NBS, enriching project outcomes with culturally appropriate and locally relevant solutions.

f. Biodiversity and Ecosystem Protection

Biodiversity conservation will remain a high priority, with a focus on maintaining the rich ecosystems of Sabah's rainforests, mangroves, and peatlands. NBS will continue to provide a vital framework for protecting endangered species and habitats. Future strategies might also address human-wildlife conflicts and habitat connectivity, ensuring that biodiversity protection is balanced with human development needs.

g. Synergies with Global Initiatives

Sabah's NBS efforts will increasingly align with global climate and conservation goals, such as the Paris Agreement, Convention on Biological Diversity (CBD), and the UN Sustainable Development Goals (SDGs). Participation in global NBS coalitions and research networks could boost knowledge-sharing, attract international funding, and promote innovative solutions tailored to Sabah's unique ecosystem.

h. Research, Capacity Building, and Policy Support

Ongoing research into the effectiveness of NBS in mitigating climate change, preserving biodiversity, and supporting livelihoods will be essential. Research institutions could partner with the state to provide data-driven insights into NBS outcomes. Capacity building efforts for local institutions, government agencies, and communities will ensure that they have the technical and managerial expertise to scale up and sustain NBS initiatives.

The Sabah Government will likely continue refining and expanding the policy framework for NBS, ensuring it supports long-term conservation goals while integrating economic incentives for sustainable land use.

5.0 CHALLENGES

Despite its potential, NBS faces challenges related to land-use conflicts, funding gaps, and the need for strong governance. Balancing timber extraction, agriculture, and conservation will be critical as the demand for land increases. Ensuring that long-term financial sustainability is secured for NBS projects, including building resilient funding models that go beyond initial investments, will be a key focus moving forward.

Climate change poses risks to forest ecosystems, including changing rainfall patterns, rising temperatures, and increased frequency of extreme weather events. As forest areas shrink, wildlife like orangutans and elephants increasingly come into conflict with human activities, especially agriculture.

Sabah's Forest resource base is rich in biodiversity and plays a key role in both the local economy and global environmental efforts. The focus on sustainable management, conservation, and innovative projects like carbon sequestration are vital for ensuring that these forests continue to provide ecological, economic, and social benefits for generations to come.

6.0 FUTURE DIRECTION

NBS are used to adapt to climate change; instead, we should think of managing climate risks similar to investing in stocks i.e., to invest in a diversified portfolio and we should use a range of strategies that complement one another. Nature-based Solutions can be key assets in a diversified portfolio. In other words, addressing the climate crisis means expanding our toolkit. In order to mitigate the impacts of climate change, we must urgently reduce our emissions and it is becoming clearer that nature must be at the heart of these efforts. Nature-based Solutions when incorporated alongside science-based targets could be key to unleashing our potential for protecting Sabah's people and our nature resources. By investing in Nature-based Solutions, we get nature on our side too.

In general, the three things needed to mainstream Nature-based Solutions i.e., (i) the technical assistance to transform forestry and agriculture practices to mainstream sustainable supply of products; (ii) greater transparency and incentives for sustainable demand and conscious choices by people; and (iii) policy subsidies and incentives supporting the transformation of the food, agriculture and forestry sectors into net carbon positive sectors.

7.0 CONCLUSION

The future of NBS in Sabah looks bright, with a growing emphasis on innovative conservation strategies, community involvement, and leveraging global climate finance. As Sabah strengthens its policy frameworks and builds partnerships, it is well-positioned to become a regional leader in nature-based solutions, driving both environmental and socio-economic benefits in the process.

Sabah's Conservation Next agenda is reaching out to the people especially the local communities to educate them on forest conservation and the benefits it brings or contributes to the socio-economic activities including agriculture and plantation that they depend upon for their livelihood. Unlocking these potentials could bring about greater conservation outcomes. It is also hoped that through this approach, Sabahan will be more receptive towards conservation efforts and take the lead in the protection of the forests and contribute towards maintaining and achieving the state conservation targets and commitments.

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