HEART OF BORNEO

INVESTING IN NATURE FOR A GREEN ECONOMY

A Synthesis Report

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A Synthesis Report

Published by WWF HoB Global Initiative

“The perilous future facing nature is our own making, but the solution is also within our grasp”

Edward O. Wilson

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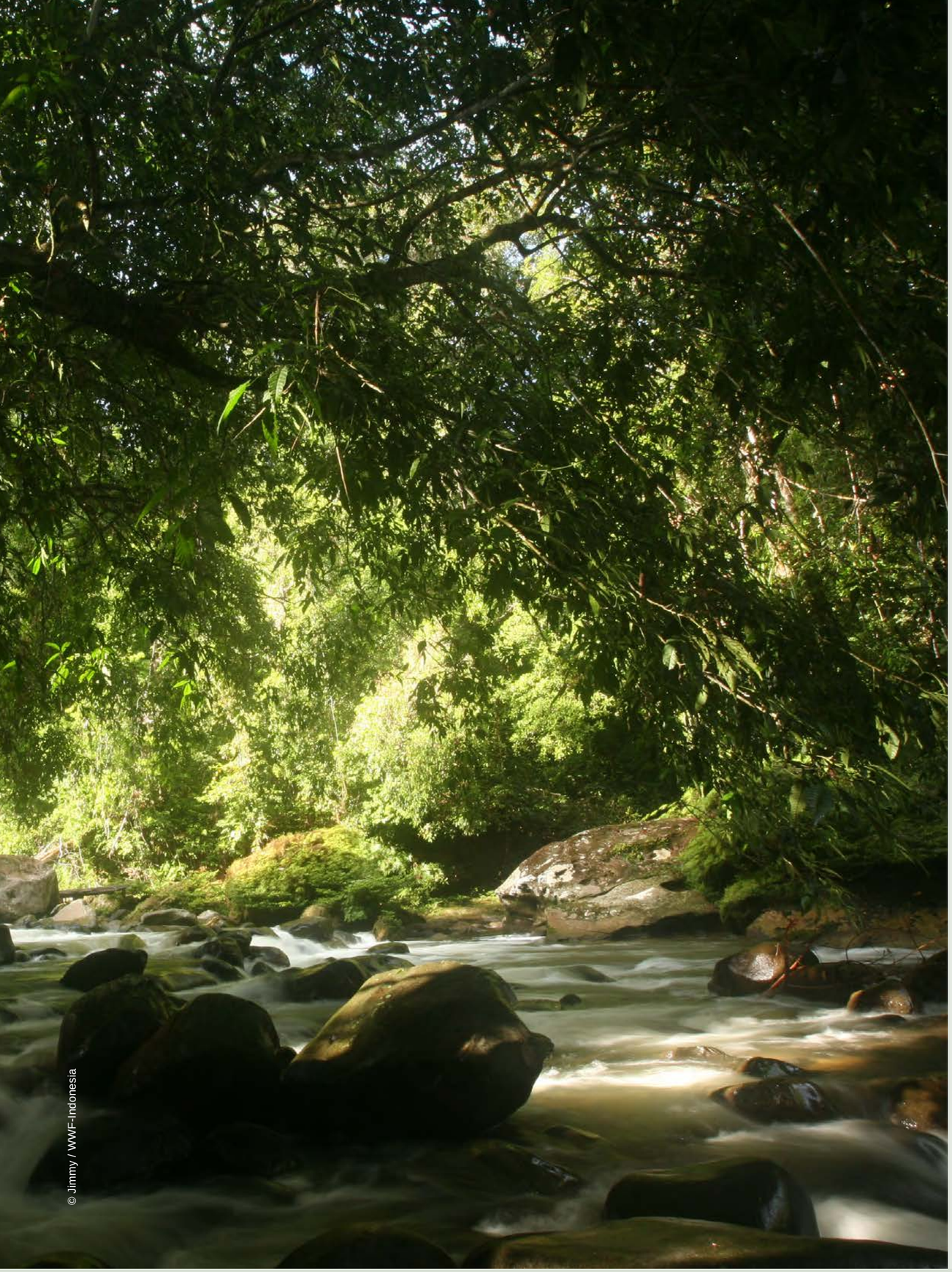

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FOREWORD
BY SIR DAVID ATTENBOROUGH

Life on Earth is not evenly spread around our planet. Borneo – the world's third largest island – is one of its richest treasure houses, full of an immense variety of wild animals and plants, all living in a magnificent tropical forest.

A vast area of this forest still cloaks the mountains, foothills and adjacent lowlands that stretch along the borders of Brunei Darussalam, Indonesia and Malaysia. This is the Heart of Borneo and all of us who value life on this planet should support the efforts of these countries to conserve it. It is truly a world heritage and the world should respond to its needs.

Like almost all such forests, it is threatened by being cleared or degraded, due to the economic and social pressures of life in the 21st century. Unsustainable logging, clearance for agriculture and mining, and the increasing impact of climate change are all taking their toll. Borneo is in danger of losing valuable ecosystems that are important to the survival of local communities and to the national economies of all three Bornean countries, as well as being a vital part of the global effort to combat climate change.

Borneo's forests are huge stores of natural capital. We harvest their timber and non-timber products from a staggering array of plants and animals. We enjoy their amenities and market them for ecotourism. We depend on their water for our homes, farms, industries and transport; and we depend on their ability to store carbon and so mitigate the build-up of greenhouse gases in the atmosphere.

In spite of this, until now we have put almost no effort into calculating their worth. Forests are natural capital that we can ill afford to squander, yet we don't know the true value of what we have in our 'natural bank'. Conventional national accounts give us GDP and other measures, but they fail to measure things that are not paid for in cash, no matter how valuable they are and no matter what the monetary costs would be if we had to replace them.

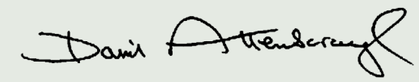
This report addresses this oversight. It takes the first steps towards quantifying the unseen value of nature in the Heart of Borneo and tells us that with concerted action, a green development pathway is indeed possible, with greater benefits for everybody, including indigenous communities and the poor. It presents a beacon of hope, with conservation, development and economic growth going hand in hand.

In order to implement its message, the real value of natural capital must be reflected in both fiscal planning and the prices of goods and services. There must be financial incentives to stimulate the proper husbandry of natural resources, with realistic valuations given to the crucial issue of the growth of low-carbon markets and sustainable, pro-poor economies. Carbon finance through REDD+ can be a key mechanism to safeguard the forests and unlock their true value.

Governments must take the lead and work with civil society, indigenous groups and the private sector to make sustainable forest management financially worthwhile. The Heart of Borneo is an excellent place to begin.
We urgently need a new path towards a sustainable future–one which places a true economic value on nature's gifts and the role they play in providing us with the necessities of life.

This report will help us to get closer to creating the green economies that will ensure food, water and energy security for all.

Managing forests sustainably needs to become a universal political priority. Protecting biodiversity protects all our futures and the Heart of Borneo can be an example to the world of how this can be achieved.



"The Heart of Borneo Initiative offers an important example of how countries can work together across borders to develop and implement a green economy vision. By investing in nature, countries in Borneo and beyond are helping to ensure a sustainable and equitable future for their citizens and for the world as a whole."

Fulai Sheng, Senior Economist, United Nations Environment Progam (UNEP)

"Investing in nature, particularly sustainable forest management, is a critical element in ensuring sustainable development. Recognizing the value of natural capital is a necessary first step in encouraging such investment."

Javed Hussain Mir, Director, Environment, Natural Resources and Agriculture, South East Asia Department, Asian Development Bank (ADB)

"The HoB is Indonesia's first National Strategic Area designation based on natural capital values. This unique landuse policy and planning framework provides the foundation for a forward looking vision to achieve conservation and sustainable development for nature and people's well-being. This report is a valuable resource that can support a green economy approach in Kalimantan."

Andi Novianto, Chairperson, Indonesia HoB National Working Group

KEY MESSAGES

- Home to approximately 6% of the world's biodiversity, the Heart of Borneo (HoB) is one of earth's richest biological treasure troves. HoB's forests cover upstream and midstream portions of 29 river basins and provides important ecosystem services across an area of 54 million ha, more than 70% of Borneo, benefiting over 11 million people.

- HoB's natural capital has tremendous social and economic value at local, national and global levels. This includes social values related to traditional knowledge and sacred sites, the value of biodiversity and ecosystems in creating resilience to a changing climate and the value of ecosystem goods and services used as inputs within multiple sectors of Borneo's economy but the many values of HoB's natural capital remains poorly recognized.

- While still of great importance, HoB's natural capital has been sharply eroded in recent years. As natural capital is lost, ecosystem goods and services decline. Climate change, coupled with deteriorating ecosystems and biodiversity from land use change, is having further impacts, including sea level rise, risk of floods and fires and changes in the duration and intensity of wet and dry seasons.

- Borneo's economy is currently neither supporting readiness for climate change nor adequately serving the needs of its people. The unsustainable practices of one economic sector are having impacts on other sectors and on local people. Few industries are taking into account the high costs of reduced or lost ecosystem services, which are eroding their long-term economic prospects and viability. According to a Business-as-Usual (BAU) scenario, by 2020 the environmental costs of economic growth are estimated to outweigh revenues from natural capital.

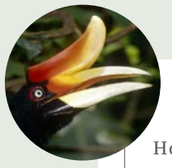
- The many values of HoB's natural capital—including its critical role in the economy, in supporting broader human welfare and in creating resilience to climate change—remain poorly recognized. Traditional economic measures such as GDP measures fail to account for natural capital's role in determining productivity, while most ecosystem goods and service lack markets and prices.

- Shifting to a green economy that values and invests in natural capital would help to sharply reduce many of these negative trends, while supporting climate change mitigation and adaptation. Its creation depends on the incorporation of natural capital values into economic policies and private sector decision making.

- A modeling approach indicates that shifting to an alternative, green economy which recognizes the value of natural capital is feasible. The potential benefits of such a shift include reduced poverty, more rapid growth, stronger local economies and enhanced resilience to climate change. In the long term, growth will increase more rapidly under a Green Economy (GE) scenario where natural capital is sustained. A green economy is essential to ensuring long-term, sustainable economic growth and development.

- HoB is a prime example of a coordinated transboundary approach in which a green economy vision—as outlined in the HoB Declaration—is being transformed into reality. However, urgent action is still required by governments and other stakeholders, working in partnership. The cost of action is far less than the cost of inaction.

PEOPLE, NATURE AND ECONOMY IN TODAY'S HEART OF BORNEO



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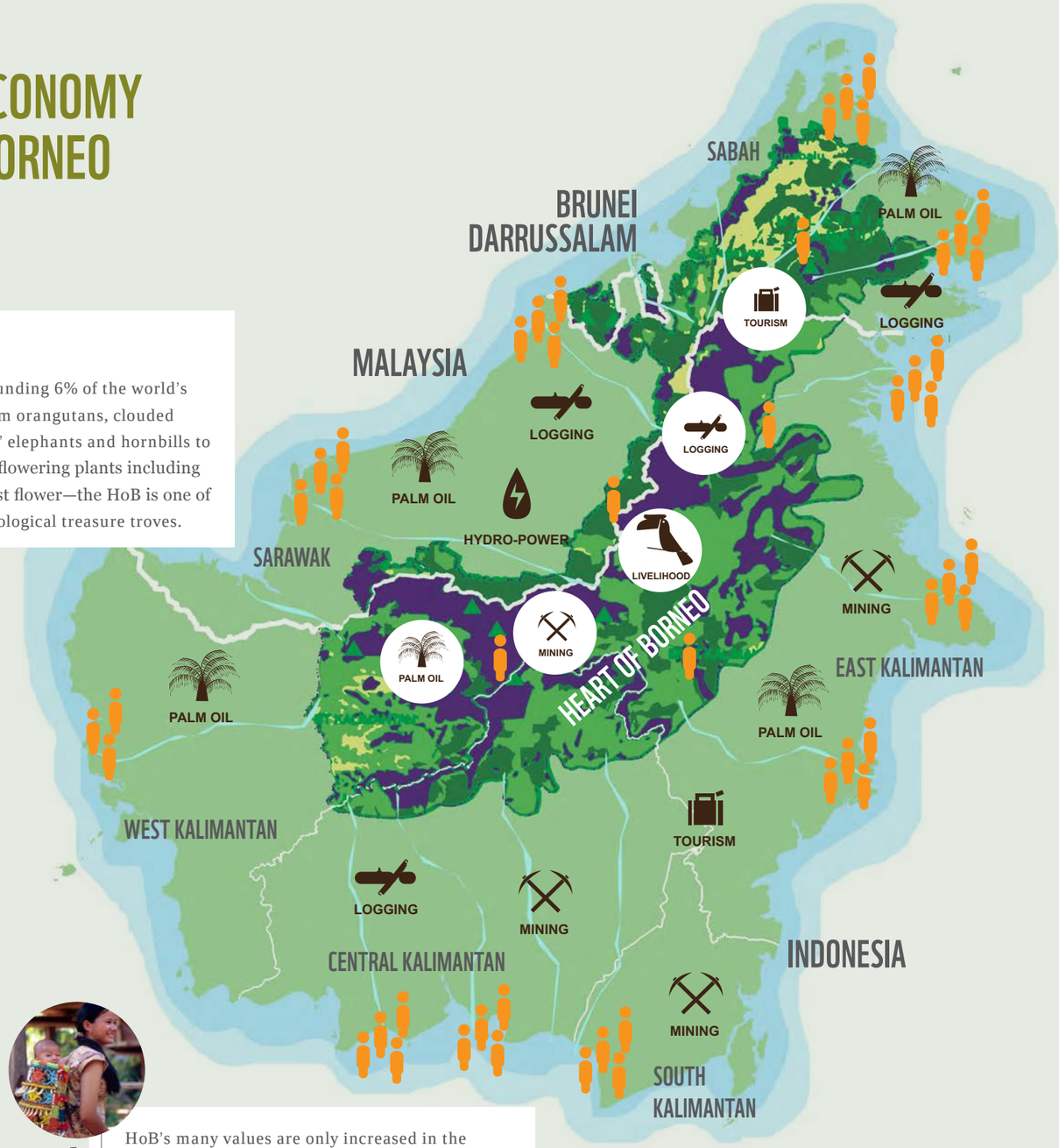
Home to an astounding 6% of the world's biodiversity—from orangutans, clouded leopards, 'pygmy' elephants and hornbills to 15,000 different flowering plants including the world's largest flower—the HoB is one of earth's richest biological treasure troves.

HoB's forests cover upstream and midstream portions of 29 river basins, including the sources of 14 of the island's 20 major rivers. Hydropower, freshwater fisheries, sediment retention, drinking water provision, pest control and pollution control are among the many valuable services provided by the HoB landscape. These services contribute to many sectors of the economy, across an area of 54 million ha—or more than 70% of Borneo—benefiting over eleven million people.

'In myriad ways, HoB's natural capital stocks and ecosystem services are instrumental in supporting the productivity of multiple economic sectors. They play an essential role in ensuring the food, water and energy security of millions of Borneo residents.'



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HoB's many values are only increased in the context of a changing climate, where their contribution to ecological and economic resilience becomes critical. Healthy ecosystems and biodiversity are important buffers against the worst impacts of climate change. Their maintenance therefore has a critical role to play in Borneo's climate change adaptation strategy.

- Conservation Forest (existing and proposed)
- Sustainable Management
- Potential Sustainable Management
- Developed Area

Accounting for some 30% of Borneo's land area, the Heart of Borneo (HoB) covers more than 22 million hectares of tropical rainforest across three countries: Brunei Darussalam, Indonesia (Kalimantan) and Malaysia (Sabah and Sarawak). It is the largest remaining expanse of transboundary tropical forest in Southeast Asia.

HoB's treasure trove—its 'natural capital'—is valued by people at local, national and global levels. Many aspects of this value are difficult to quantify, such as social values related to traditional knowledge and sacred sites, or the value of biodiversity and ecosystems in creating resilience to a changing climate. However, the value of HoB's natural capital is also directly linked with the abundant range of goods and services that its ecosystems provide to people and to economies — which are more amenable to economic valuation.

Local people living within the HoB depend on a broad range of services provided by the area's natural capital. For indigenous Dayak communities, over one million of whom live within the HoB, the area has provided a multitude of forest and freshwater resources over many thousands of years. Villagers living in the HoB use areas adjacent to their villages for mixed fruit orchards, agro-forestry and swidden agriculture. Further afield, they collect fuel wood and non-timber forest products, including honey, nuts, wildlife meat, song birds and a resinous wood known as 'gaharu'. Finally, freshwater fisheries provide a key source of protein for these communities.

More modern sectors of Borneo's economy, both within and outside of the HoB, depend heavily on ecosystem goods and services produced by the area as inputs into their production processes. Industries like liquefied natural gas (LNG) in Brunei require large quantities of water for processing, most of which originates from the HoB. Hydroelectric power plants in Sarawak benefit from retained sediments and water supplied by HoB forests. Sustainable production of palm oil requires healthy ecosystems and associated ecosystem services, including hydrological and decomposition services and nutrient cycling. Many mining companies in the HoB rely on river-based transport to deliver their output to market; they depend on forests' sediment retention and erosion control functions to avoid costly dredging or even temporary shutdown. Mining also benefits from the capacity of ecosystems to detoxify pollutants.

Thanks to the above ecosystem services—as well as others like water buffers, water purification, flood prevention, pest control and climate regulation—HoB ecosystems represent an essential component underlying sectoral productivity. However, economic activities are currently having significant impacts on the area's natural capital and are thereby eroding its capacity to sustainably provide many of these goods and services. Climate change is having further impacts, including sea level rise, risk of floods and fires and changes in the duration and intensity of wet and dry seasons. Together these impacts are feeding back to the sectors themselves—causing a parallel erosion of their long-term economic prospects and viability.

Is the economy at the service of people and ready for climate change?

DECREASED WATER SUPPLY AND SALTWATER INTRUSION IMPACTS WATER SECURITY
Declining seasonal flows in West Kalimantan rivers result in increased saltwater intrusion, with significant impacts on drinking water quality. To increase the capacity of water distribution in the dry season, the city of Pontianak in West Kalimantan is constructing a second pipeline to extract water from further upstream at an additional cost of over US$ 10 million. An additional US$ 2 million/year, exceeding US$ 2.5 million/year in extreme dry periods, is needed to pump drinking water.

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IMPACTS OF PALM OIL EXPANSION ON WATER QUALITY AND SUPPLY
Lukas Subardi,Director of Sanggau, local-government-owned drinking water utility, West Kalimantan, Indonesia:
Lukas is concerned by the rapid expansion of palm oil plantations in West Kalimantan: “In the dry season, all of the smaller rivers are dry due to the endless deforestation of the Kapuas natural forest…in the rainy season, the river water is very turbid and heavily polluted by waste from leaching chemicals such as herbicides, pesticides, industrial waste, sludge, silt, etc…all due to expansion of oil palm upstream.” (Lukas’s blog is at http://pdamsanggaukapuas.blogspot.com/)

FIRE AND HAZE DISRUPTS ECONOMIES
In the 1997-1998 forest fires, total damages directly resulting from haze due to forest clearance and burning were US$ 1,012 million for Indonesia, US$ 310 million for Malaysia, US$ 104 million for Singapore.

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IMPACTS OF MINING ON WATER QUALITY
Sumadi, 45. Desa Harowu-District, Gunung Mas. Central Kalimantan, Indonesia:
“Mining thoroughly contaminated the river and destroyed its quality as well as causing damages everywhere. As for the impacts, most of the rivers in which mining occurs can no longer provide other benefits, such as fish for the community.”

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CLIMATE WITNESS
Mohamed Jerome Robles, 37, Miri, Sarawak, Malaysia:
Mohamed has observed the impacts of a changing climate in Miri, Sarawak: “There does not seem to be a distinct monsoon season anymore. The rain is more frequent, random and certainly more intense….now we are afraid of flash floods and strong winds which accompany the intense rains.”

FLOODING IMPACTS LIVES AND INFRASTRUCTURE
Flooding has become commonplace in Samarinda, along the Mahakam River, East Kalimantan, since coal mining and deforestation began upstream. Major floods in 2008-2009 affected families and disrupted the economy, transportation, employment and livelihoods. The total cost of these floods was estimated at US$ 9 million, while the cost of flood prevention is far greater than the town’s income from coal. US$ 7 million has already been spent to construct a flood polder and local government has elaborated a flood mitigation plan that would cost another US$ 350 million.

IMPACTS OF FLOODING:
Udin, farmer from Nunukan, East Kalimantan, Indonesia:
“The shallow river can no longer retain heavy rainfall; it overflows and our fields are inundated with water. We have only managed to sell 20% of the harvest. A loss of hundreds of millions of rupiahs for us farmers. There are also landslides, floods, houses destroyed and no electricity.”

INCREASED SILT LOAD IMPACTS RIVER TRANSPORT
Transport capacity—rather than production capacity—is the primary factor limiting the output of coal mining companies in Central and South Kalimantan. High levels of silt in the Barito River, which originates in the HoB, limit river transportation some 40% of the year. Yearly dredging costs in the port of Banjarmasin, where 30% of sediments are from the Barito River, are US$ 11 million.

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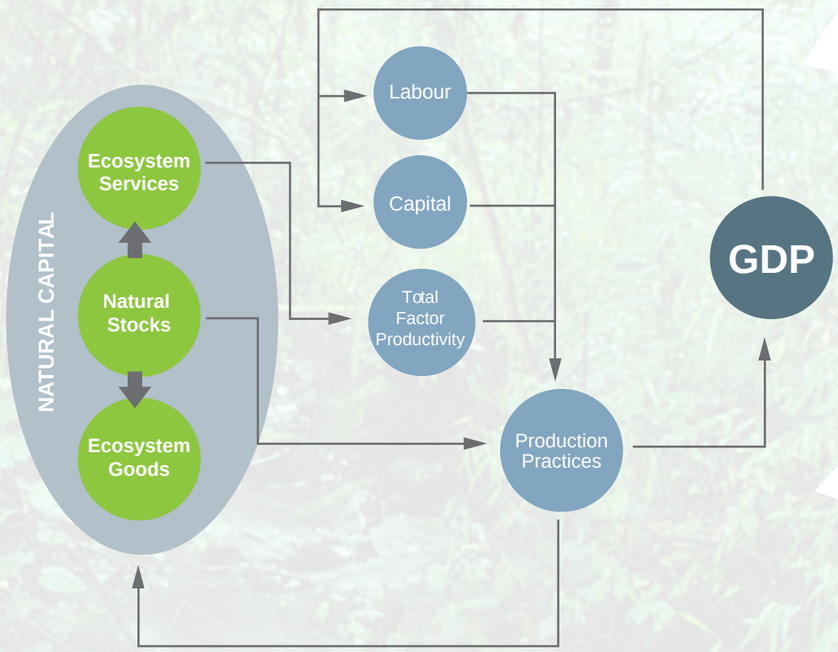
IMPACTS OF UNSUSTAINABLE LOGGING ON LIVELIHOODS
Anya Apui, Customary Chief of Hulu Bahau, Malinau, East Kalimantan, Indonesia:
Fears for the future of his people if their forests are destroyed: “Timber is gold, but this is not the kind of gold that is good for us. I want to protect the forest in my area, as the forest is life for Dayak people.”

The Nature - Economy Disconnect



Conceptual model of the conventional economy which externalizes natural capital from production

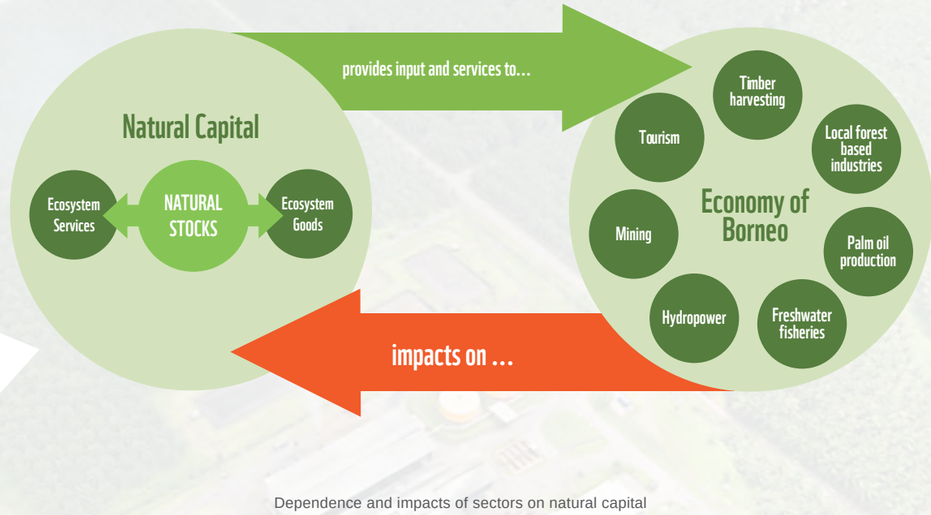
Despite the economic and social values of HoB's natural capital, and the high costs of poor management, its critical role in the economy and in broader human welfare largely continue to be ignored. GDP measures fail to account for the important role of natural capital in determining productivity. Few industries take into consideration the costs of reduced or lost ecosystem services. Policy continues to incentivize extraction. External costs remain external to those responsible.

The value of HoB ecosystems and biodiversity is poorly recognized because they are 'public' goods and services without markets or prices. The lack of incentives to conserve results in poor ecosystem management, impacts on ecological functions and, eventually, losses due to foregone revenue streams. Considerable investments may be required to offset the losses incurred.

'As ecosystem services are impaired, costs to businesses, governments, and individuals are increasing.'

'Business-as-usual' practices, based on unsustainable use of natural resources, are having negative impacts on ecosystems, biodiversity and on the quality of individuals' health and livelihoods, not least among forest-dependent communities. These impacts rarely respect sectoral boundaries and are imposing widespread external costs—or 'externalities'—on other economic sectors and on society as a whole. The profitability of HoB's extractive industries often depends to a significant degree on the fact that many of the environmental costs associated with productive processes are externalized. Some industries are now paying for services, such as water treatment or dredging, that a well-managed and functioning ecosystem would provide for free or at lower cost.

'Deforestation and environmental degradation have multiple causes, but they share a common root cause: the fundamental disconnect between economy and nature.'

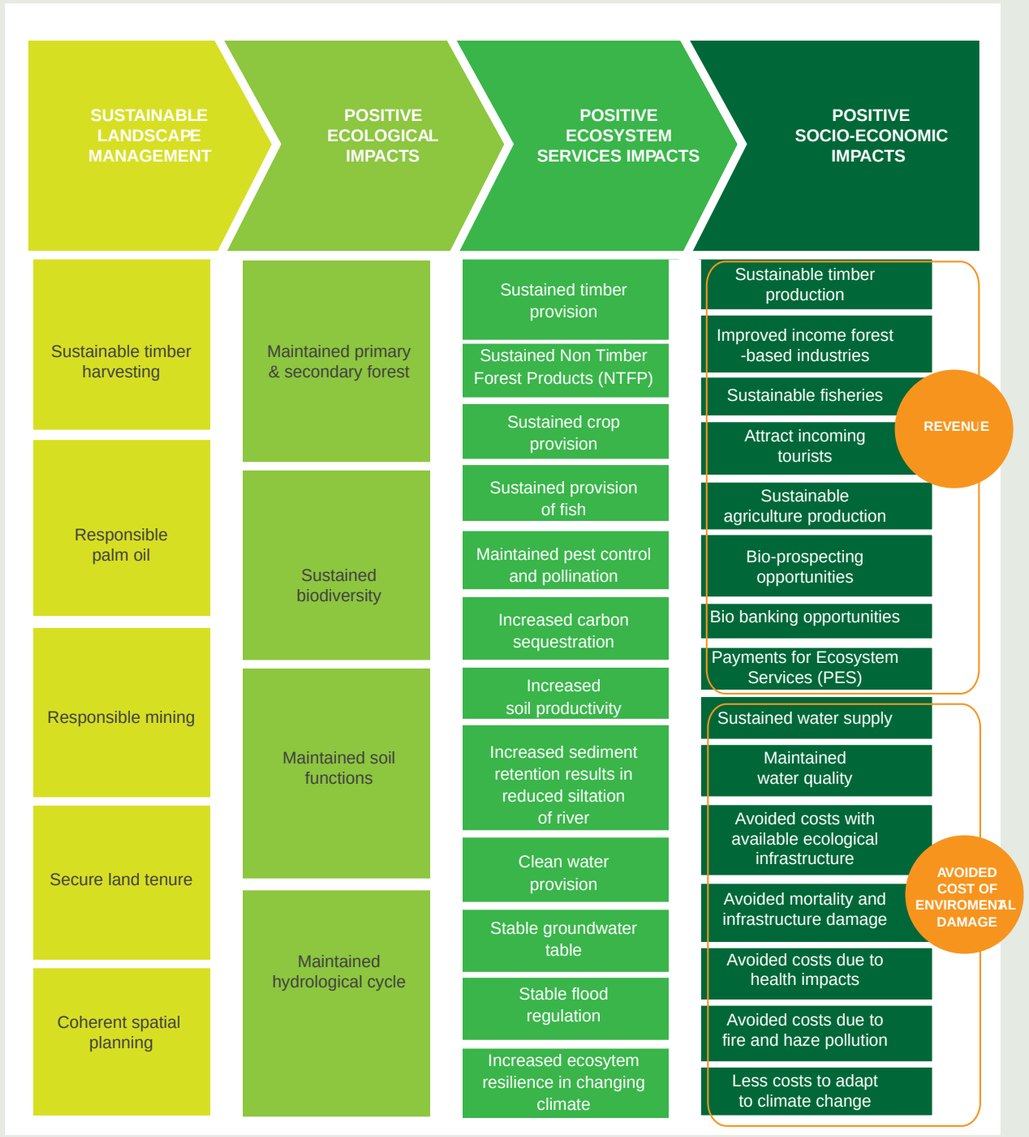


Dependence and impacts of sectors on natural capital

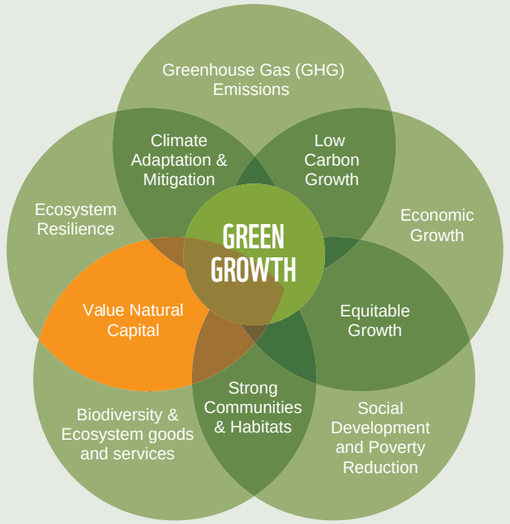
'Declining ecosystem services, species loss, and deteriorating ecosystem health and resiliency are impacting the profitability of business sectors and increasing the vulnerability of people and local economies.'

The current economy not only undervalues natural capital but is neither inclusive nor sufficiently equitable. The rapid economic growth that has taken place in Borneo in recent years has clearly benefited some. However, growth in its current form appears to be unsustainable both for the island's ecosystems and species—which are facing severe pressures—as well as for its people—many of whom, despite rapid increases in GDP, continue to suffer from high levels of unemployment and poverty.

A BETTER FUTURE ? ENVISIONING AND MODELING A GREEN ECONOMY



In stark contrast to continuing along the 'business-as-usual' pathway, under a green economy scenario increased conservation and improved management of HoB's forests, freshwater and biodiversity enhance natural stocks and the flow of ecosystem goods and services, while building resilience in a changing climate. Enhanced natural capital in the HoB results in increased revenue flows and benefits to all stakeholders, while avoiding costs associated with lost ecosystem services, particularly for the most vulnerable.



Five dimensions of a green economy

A green economy:

- Increases human well-being and social equity while significantly reducing environmental risks and ecological scarcities.
- Delivers inclusive growth while sustaining natural capital to provide food, water, climate, soil and resource security.
- Delivers on development priorities of local and national governments for the benefit of society, particularly its most impoverished segments.
- Secures more natural stocks for future use, enhances the provision of goods for revenue generation opportunities and avoids costs associated with damaged ecosystem services.

Worldwide, as evidence of ecological damage and economic costs has mounted, interest in identifying alternatives to 'business-as-usual' has also increased.

A 'green economy' can be seen as a new economic paradigm, driving growth of income and jobs, while reducing environmental risks and scarcities—in short, delivering sustainable development.

Such an economy would sharply reduce or even reverse environmental damage, while also mitigating climate change or aiding adaptation to it. It is an alternative economy, based on acknowledgement of the value of nature for people and incorporation of natural capital into economic policy and private sector decision making.

The concept of a green economy has developed largely in response to the need for low-carbon development strategies. However, in addition to being dramatically less carbon intensive, a green economy, particularly in forested nations such as Brunei, Indonesia and Malaysia, must fully value natural capital as an engine of sustainable development.

Implementing a green economy requires accounting for the contribution of nature to GDP and rethinking capital allocations, incentives, markets and development indicators.

What would it cost to shift the path of development from its current, unsustainable trajectory onto a more sustainable, green economy pathway? And what would be the impacts on economic growth, jobs and other economic and social outcomes?

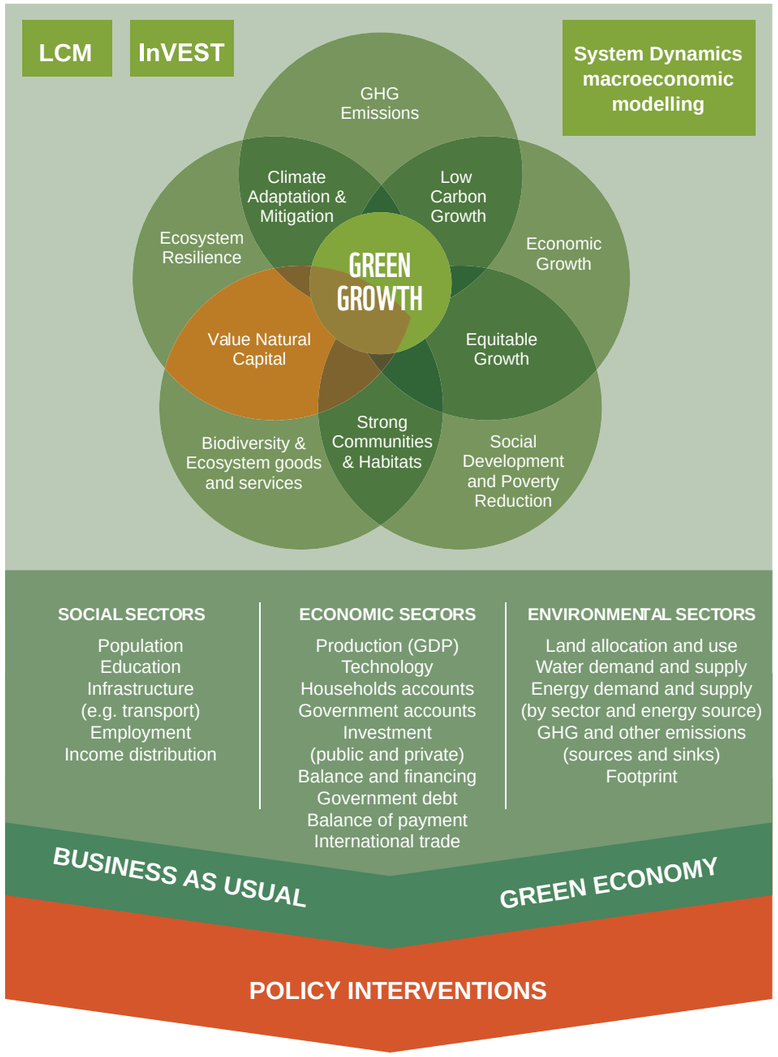
Can societies afford to put in place a green economy? Can we afford not to?

Finding the answer is an essential step in gathering political will and consensus for what will inevitably be a challenging shift in economic direction and priorities.

Two contrasting scenarios

Theme	Business as Usual (BAU)	Green Economy (GE)
Spatial Planning	Limited enforcement or reconciliation of land use plans leads to deforestation and forest degradation	Coherent land use plans including the creation of a category for degraded land, expanding community forests and implementation of watershed protection
Protected Areas	Poorly managed protected areas lead to loss of biodiversity and fragmentation of natural habitats	Effective protection of natural habitats with improved connectivity among protected areas
Forestry	Widespread conventional logging and plantation within High Conservation Value Forest (HCVF) Areas with inactive forestry concessions result in degradation due to lack of management	Reduced impact logging, international certification of sustainable forest management, plantations limited to highly degraded or deforested areas that are not HCVF. Concession management is improved. Inactive forestry land is protected to reduce degradation. Forest restoration concessions are implemented within natural forest areas following logging
Palm oil Plantation	Oil palm expansion is permitted in natural forest areas and HCVF No improvement in oil plantation management	Oil palm plantations do not expand in any area of natural forest. Land swaps for permits granted within natural forest, to ensure expansion on degraded land only Roundtable for Sustainable Palm Oil (RSPO) ensures that management practices are improved, including improved fertilizer and pesticide application management
Mining	Mining causes forest degradation within concessions and air and water pollution	Mining follows international good practice guidelines, with improved waste management treatment reducing impacts on air and water quality
Agriculture	No improvement in agricultural practices, increasing reliance on chemical fertilizers, use of monocultures results in greater vulnerability to pests and diseases	Sustainable agriculture practices maintain and restore soil quality, use of chemical fertilizers is reduced, larger biodiversity gene bank provides wild varieties that may be hybridized to ensure greater resilience to pest and diseases
Energy	Energy consumption grows, reducing exports and increasing the cost of energy use Power is mostly generated from coal and other fossil fuels, limiting exports and generating GHG emissions	Increased energy efficiency reduces domestic consumption (especially of fossil fuels), renewable energy use expands, costs and impacts of fossil fuel consumption are reduced Investments in non-hydro renewable energy power plants are implemented to decentralize power generation and to reduce consumption of coal for electricity supply and lower GHG emissions
Biodiversity based enterprises	Limited infrastructure and support to advance biodiversity-based products such as NTFP and agro-forestry	Sustainable biodiversity products from legal community forests (NTFP and agro-forestry), bioprospecting and biotechnology supports soil quality, minimizes erosion and sedimentation and secures forest carbon by reducing pressure to convert forests
Innovative Green Sectors	Limited infrastructure and support to advance innovative green sectors	New business models build local economies, e.g., using 'waste products' from waste produced by current HoB industries

The reliability of the modeling work was greatly enhanced by the use of a participatory approach in developing appropriate development scenarios, defining drivers and cause - effect relations, and collating data input into models. Stakeholders provided input to explore the prospects of future development.



The three key layers of System Dynamics integrated modeling: Analysis, Scenario and Policy

Building Scenarios

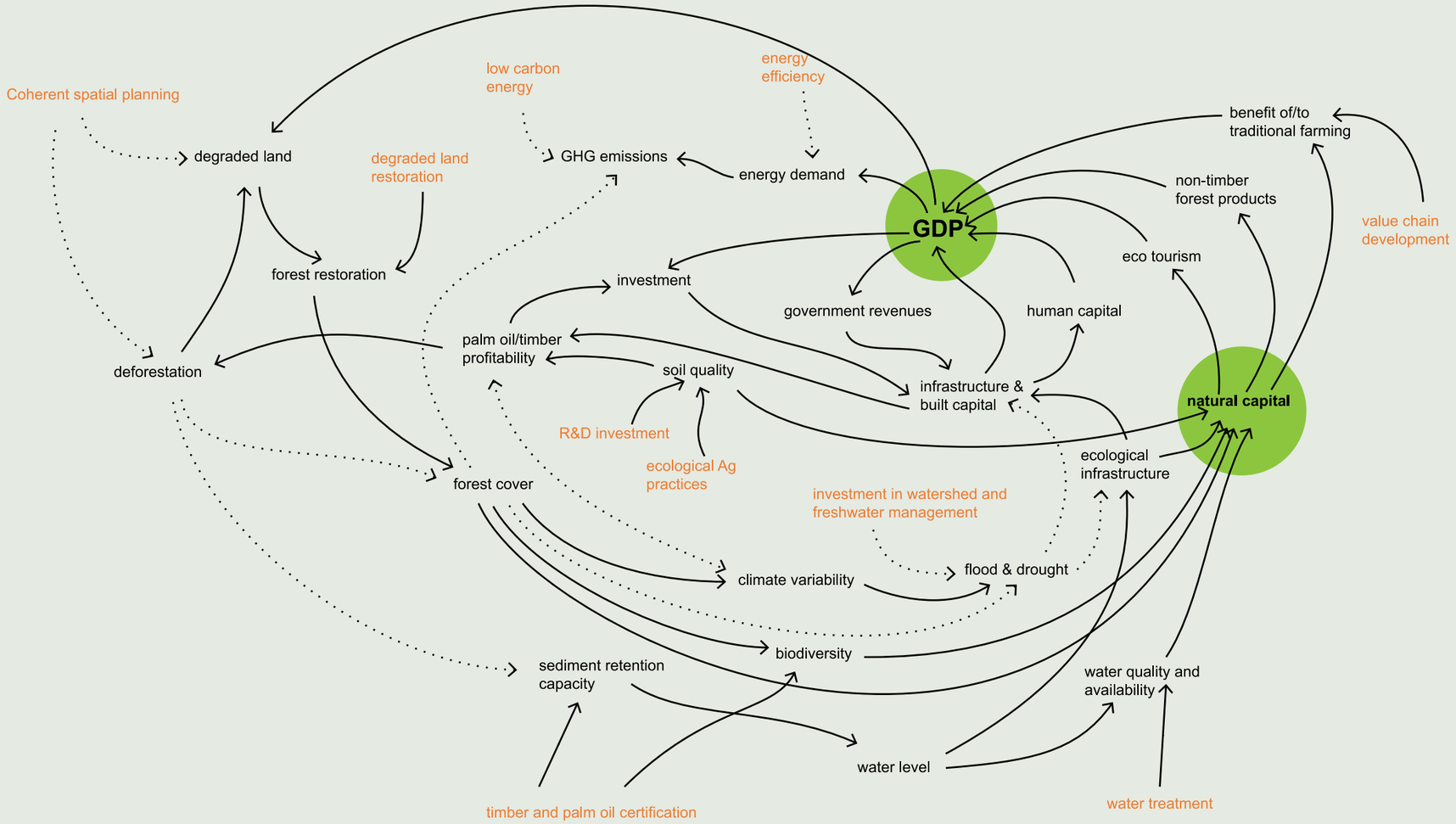
Economic and environmental modeling provides a practical way to examine the likely costs, benefits and overall implications of a green economy approach. A first attempt has been made for Kalimantan, which covers approximately 72% of the HoB.

The approach compared, and estimated various differences between, two very different future paths, or scenarios. The first path, known as the 'Business-as-Usual (BAU)' scenario, was derived from a set of land cover and land use datasets that identified the areas and locations of permits for forestry, palm oil and mining development. The scenario is based on the assumption that developments under these permits would all be implemented and that sustainable practices would not be commonplace.

Under the 'Green Economy (GE)' scenario, significant changes would be implemented. For example, palm oil development only takes place in degraded areas; certified palm oil and timber increase; idle forestry land is protected and/or restored; applications of fertilizers and pesticides are reduced; mining practices are aligned with international best practices; energy efficiency and investments in renewable energy are prioritized; biodiversity-based industries are expanded, and; innovative business models to build local economies are in place.

Spatial scenarios for the Green Economy and Business-as-Usual scenarios were developed using the IDRISI Land Change Modeler (LCM), along with other GIS analyses. The scenarios represented inputs used to assess the gains or losses of ecosystem services using the Integrated Valuation of Ecosystem System Services and Tradeoffs (InVEST) tools. A dynamic simulation tool for development planning, based on Threshold 21, was used to create a more integrated nature-economy analysis.

Modeling results



Simplified Causal Loop Diagram (CLD) highlighting the main systemic relations between natural capital and key socio-economic and environmental variables on Borneo. Variables are related by causal links, indicated by lines with arrows.

Each line starts at the independent variable and each arrow points at the dependent variable, indicating that the former is having an influence on the latter. That influence may be either positive or negative.

A solid line indicates a positive influence: as the independent variable increases, the dependent variable also increases. A dashed line indicates a negative influence: as the independent variable increases, the dependent variable decreases.

An alternative future which recognizes the value of natural capital is feasible; it reduces poverty, increases growth, builds local economies and supports climate change mitigation and adaptation strategies.

The assessment finds that investing in natural capital will:
- decrease future costs to businesses, households and government;
- increase future revenue from biodiversity-based and green industries;
- raise crop yields and lower domestic energy consumption, and;
- support a transformation to a more just and equitable economy.

Positive impacts on growth in GE scenario

In the BAU scenario, economic growth and short-term private profits are linked to public losses of natural capital and loss of profit from sectors which depend on biodiversity and functioning ecosystems. Depletion of natural capital imposes costs on society; natural capital's ability to support economic growth decreases each year.

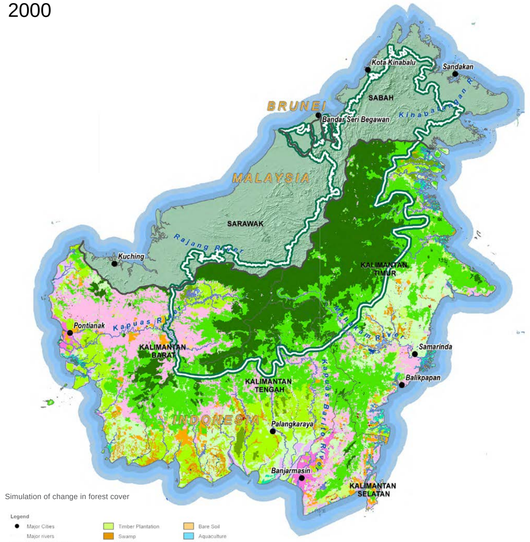
In the GE scenario, sustainable management of natural capital leads to increases in its value, with net benefits accruing to present and future generations. Maintaining forest cover and improved management of standing forests enhances biodiversity, carbon storage and soil functions, resulting in higher revenue from forest products and ecotourism. Costs are avoided by maintaining hydrological services (water availability, water quality, sediment retention, flood prevention and maintaining ecological infrastructure as in river transport), reduced road disruption, reduced frequency of floods and enhanced soil services.

In a BAU scenario, by 2020 the environmental costs of economic growth are estimated to outweigh revenues from natural capital. In a GE scenario, an investment of 0.6% of GDP per year is necessary to ensure economic growth and environmental quality beyond 2020. Investment needs will decline over time as progress is made.

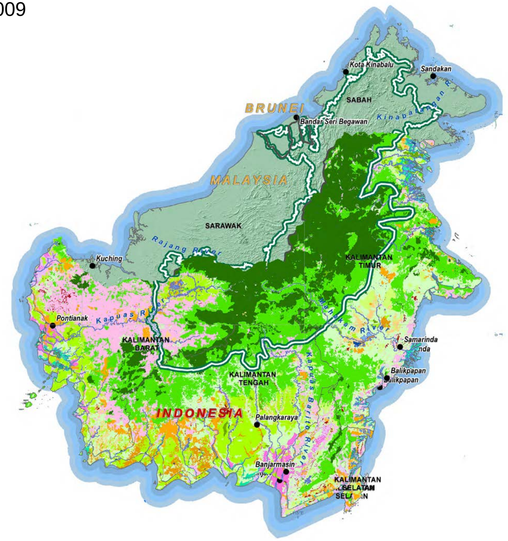
Land use projections

The BAU scenario for forest cover projects a loss of 3.2 million ha of primary and secondary forest cover between 2009 and 2020, primarily due to palm oil expansion, mining and unsustainable forestry practices. Under the GE projection, the loss of forest cover is 0.1 million ha. The difference in this forest cover under the two contrasting scenarios represents the foundation upon which further modeling results—including quantified gains / losses of ecosystem services and the value of natural capital in the integrated cross sector analysis—are built.

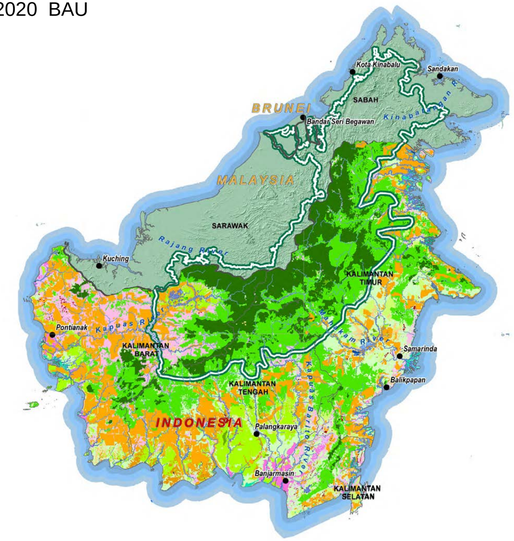
2000



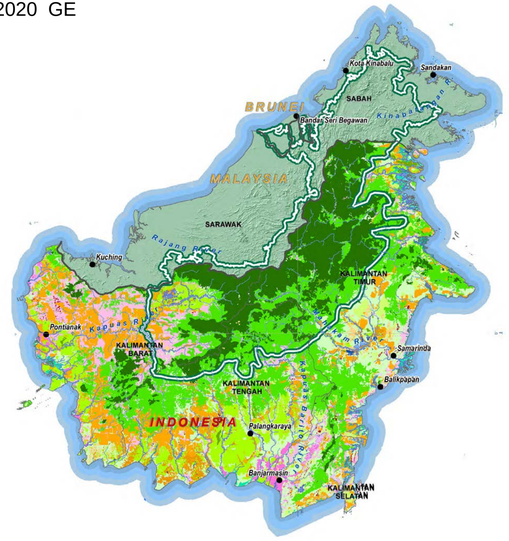
2009



2020 BAU



2020 GE



Simulation of change in forest cover

see www.hobgreeneconomy.org for interactive maps

© Sylvia Jane Yorath / WWF

In contrast to a BAU scenario, in the long term, growth will increase more rapidly under a GE scenario where natural capital is sustained. Growth, under the GE scenario was assessed based on a conventional and a green calculation for GDP. Under the GE scenario, both conventional and green GDP would grow as fast as, or faster (and more sustainably) than under BAU. Gains steadily increase under the GE scenario, while in the BAU scenario the rate of growth in GDP slows down more quickly in the medium and longer term (for scenario description see page 15).

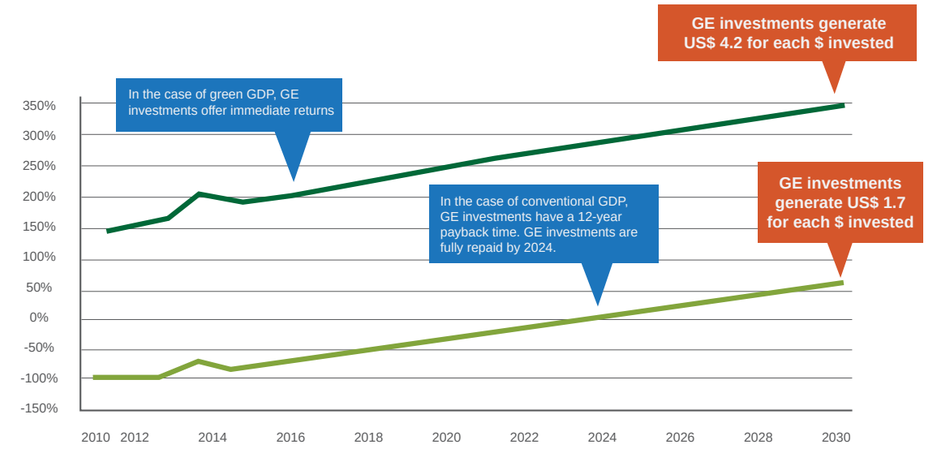
When measured according to conventional GDP, GE investments will generate US$ 1.7 for each $ invested by 2030. The break-even point (considering all investments) is achieved by 2024. When measured according to green GDP—which includes the contribution of natural stocks and welfare and takes into account the effects of production practices and GDP on natural capital—GE investments by 2030 will generate US$ 4.2 for each $ invested.

When investments are introduced, a key difference can be noticed between the net return on investment using a conventional GDP calculation or the green GDP approach.

Using green GDP, the return on investment is immediately positive. Green GDP in the simulations grows faster and more sustainably than conventional GDP. The added benefit from nature and avoided costs from damaged ecosystem services, facilitated by GE investments, is 161% higher than the investment itself. This is driven in part by two key changes arising out of successfully sustaining HoB's natural capital:

• avoided costs (reduced risk and damage from floods and droughts, resulting also in lower road and infrastructure disruption, higher river transport capacity and reduced siltation);
• added benefits (higher production of non-timber forest products, ecotourism, higher biodiversity, more carbon stored and enhanced ecosystem services).

Using conventional GDP, at the outset there are only costs, which is why the return on investment starts at -100%. Over time, as GDP grows, the net return on investment increases.



Net return on investment, under the GE scenario, comparing GDP and Green GDP

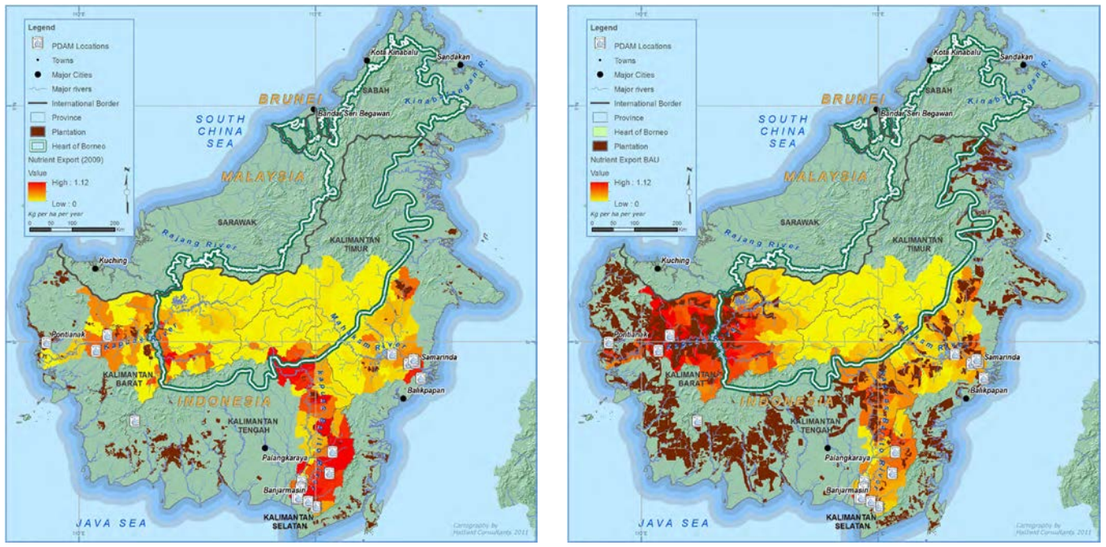
Whether measured according to conventional or green GDP, the GE scenario indicates a potential slight reduction in profitability of the palm oil sector due to lower yields on degraded land, offset by improved ecosystems (leading to reduced costs for businesses, households and the government), larger revenues from non timber forest products and tourism, higher crop yields and lower domestic energy (especially fossil fuel) consumption, allowing energy costs to decline below BAU and exports to increase beyond the base case. The development of biodiversity based businesses and the expansion of innovative green sectors also contribute to improved economic performance.

Below are specific findings based on the Integrated Valuation of Ecosystem Services (InVEST) Tool. For further details, see: Dean *et al.* 2012. *Building a Green Economy in Borneo: Assessing Outcomes for Ecosystem Services under Different Business and Policy Decisions* www.hobgreeneconomy.org

The Heart of Borneo provides water to 70% of the population of Kalimantan.

Modeling results have indicated that the Heart of Borneo contributes as much as 60%, 40% and 55% of annual water supply to the Kapuas, Kapuas-Barito, and Mahakam River basins, respectively.

Water quality is impacted by large scale palm oil development. InVEST analysis showed that palm oil plantations affect water quality through increased nitrogen export due to extensive fertilizer use affecting local water utilities. Under business as usual, additional application of fertilizer and loss of filtering riparian forests along waterways could increase nutrient export tenfold compared to 2009 in the three basins assessed. Similar results might be expected for other pollutants, such as pesticides.



Maps of nitrogen exports, where red is high and yellow is low, for three watershed that originate in HoB. Left map shows the nutrient pollution in 2009 affecting drinking water utilities. Right map shows the likely distribution of nutrient pollution and affected drinking water utilities under BAU in 2020

A complete shift to Reduced Impact Logging (RIL) practices secures carbon, reduces erosion and river sedimentation. Approximately 115 million additional tonnes of carbon (tC) could be stored by implementing RIL in 158 timber concessions. With improved timber management practices, about 19 more tonnes of carbon (tC) per hectare could be stored as compared to existing concession management practices. Based on the social cost (i.e. the damage to global society) of these emissions, the social value of storing that carbon would be close to US$4 billion. In the Mahakam basin, the InVEST analysis showed that improved timber management could increase sediment retention by 2020 by close to 900,000 tonnes across all 49 timber concessions in the basin, with a mean avoided erosion of around 37 tonnes of soil per hectare annually.

GE scenario results in higher carbon stocks compared with BAU—curbing the projected reduction in carbon stocks.

Based on the projected forest cover loss of 3.2 million ha, the difference in carbon stocks between the BAU and GE scenarios is 1.2 billion tonnes of CO_2e, of which 23% is contributed by land use change in the HoB. Assuming a carbon price in the range of US$2/ton and US$15/ton, the total value of the projected reduction in carbon stock under the GE scenario would be between US$2.4 billion and US$ 18 billion.

GE scenario results in enhanced soil services.

Green economy interventions also increase the soil's ability to perform its function in natural and sustainably managed ecosystems. These services, among others, include carbon stored in organic matter, soil water holding capacity, nutrient flow and soil erosion control.

GE scenario results in more effective ecological infrastructure.

When river systems are no longer maintained because bulk transport uses other infrastructure, local people suffer due to impacts on their mobility. For them, the river system is the cheapest, and in some cases only, means of transportation. The BAU scenario presents a worsening trend of siltation and sedimentation, which will require additional infrastructure investments (for transport and energy in the specific cases analyzed), both for additional maintenance and for construction to make up for the ecological infrastructure lost (e.g. reduced river use). However, sustaining Heart of Borneo's ecosystems through green economy interventions will have positive impacts on watersheds. Sediment retention capacity will be increased due to reduced run-off and landslides and avoided siltation.

GE scenario secures future revenue from improved natural capital and land management.

A green economy approach would allow HoB governments to capitalize on a valuable opportunity once green markets and mechanisms being developed under the United Nations Framework Convention on Climate Change (UNFCCC) and other international initiatives are established.

The assessment indicates that the HoB landscape generates a multitude of ecosystem services with local, downstream and global benefits which will be largely maintained under the GE scenario.

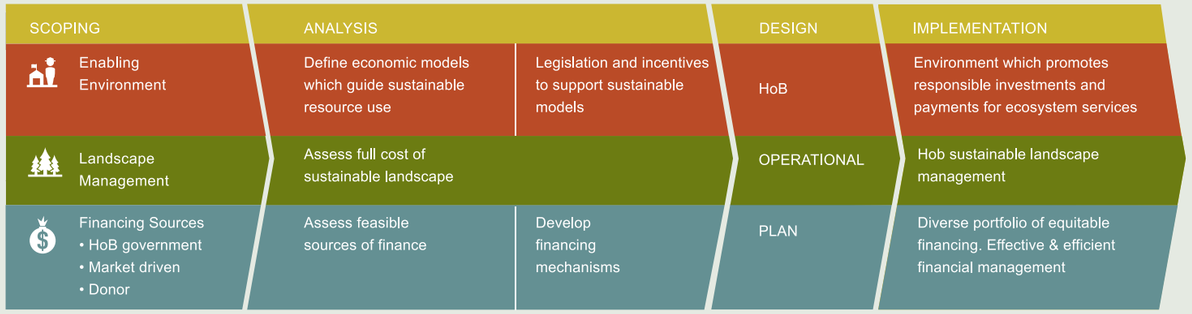
A green economy results in the protection of ecosystem services benefiting Borneo's economy and society, as well as global stakeholders.

The type of policy package put in place to achieve a green economy will be critical in determining the kinds of investments that will be made and the realization of costs and benefits, i.e., who will pay and who will benefit.

These results provide a basis for policy discussions regarding investments, policies and incentives to be put in place by national and local governments. To build upon this work, more extensive efforts—especially in systematic data collection, verifying relationships between ecosystem services and benefits at the local level, with strong stakeholder engagement at local levels—will be needed. Subsequent findings could be actively used to support economic policy decision making on HoB's natural capital to create socio-economic as well as environmental benefits and synergies across borders.

DELIVERING THE GREEN ECONOMY

HoB Initiative: A Natural Priority for a Green Economy



HoB Governments approach taken from *"Financing the HoB – A partnership approach to economic sustainability"*, a three-country publication

In September 2010, the three countries launched a joint publication: *Financing the Heart of Borneo-A partnership approach to economic sustainability*. The report highlights priority actions needed in order to integrate the value of natural capital into national and local development plans, while optimizing economic returns to improve people's livelihoods and national economies.

"With one conservation vision and with a view to promote people's welfare, we will cooperate in ensuring the effective management of forest resources and conservation of a network of protected areas, productive forests and other sustainable land-uses within an area which the three respective countries will designate as the "Heart of Borneo (HoB)"

- from HoB Declaration, 2007

BIOPROSPECTING IN BRUNEI:
Brunei is exploring the potential of bioprospecting through an agreement with a Japanese Institutional Partner, the National Institute of Technology and Evaluation (NITE). Together with NITE, Brunei is identifying microorganisms from Brunei's rich forest and genetic resources with the potential for pharmaceutical or industrial applications for biological resources. The five-year agreement focuses on capacity building and developing inventories of Brunei's biological resources.

PAYMENTS FOR ECOSYSTEM SERVICES (PES) IN KALIMANTAN, INDONESIA:
An ongoing initiative in the Conservation District Kapuas Hulu seeks to improve watershed management through incentive schemes and capacity building to assist village institutions in planning and implementation of development programmes. Potential buyers include the Public Water Service, other districts along the Kapuas River, provincial government and industry, while the sellers are communities living in and around Betung Kerihun National Park.

BIOBANKING IN SABAH, MALAYSIA:
A mitigation banking and biodiversity offset payment pilot is underway in Sabah, where the state Government has licensed conservation rights to the Malua BioBank and a private investor has committed up to US$10 million for the rehabilitation of the Malua Forest Reserve. In this initiative, the Malua BioBank sells Biodiversity Conservation Certificates, revenues from which are used to recover costs incurred and to endow a trust fund to manage the long-term conservation management of the area.

The HoB Governments have already begun to take coordinated action to recognize and act upon the value of natural capital, some of which are highlighted in the timeline below. Brunei, Indonesia and Malaysia have begun a transboundary effort known as the 'Heart of Borneo Initiative'. The commitments of the three HoB governments are contained in the HoB Declaration of 2007. All three countries have established governance structures to help fulfill their obligations under the HoB Declaration and have developed Strategic Plans of Action.

These bold steps—undertaken based on an enhanced recognition of the importance of HoB's forests, freshwater and biodiversity—represent the beginning of a journey towards an economy that respects nature and is at the service of people. Sectoral policies such as land-use and emission reduction policies in Kalimantan, feed-in-tariffs for renewable energy (to remove the barriers to entry to the market) in Malaysia, and a public private partnership for biodiversity conservation in Brunei provide evidence that progress towards a green economy has already begun.

Remaining challenges include aligning and harmonizing relevant economic and development plans with the HoB Initiative. While sectoral policies are beginning to emerge in each of the HoB countries, an integrated green economy approach across sectors is necessary to accelerate the transition to an economy that values natural capital. To date, economic plans, such as the Master Plan for the Acceleration and Expansion of Economic Development of Indonesia (MP3EI) in Indonesia, Sabah Development Corridor (SDC) in Sabah and Sarawak Corridor of Renewable Energy (SCORE) in Sarawak have been developed in parallel and independently from one other; as a result, a consistent holistic green economy approach, one that mainstreams the ecosystem value of the HoB landscape into policy and economic decision making, is not yet the norm.

Ongoing implementation of the HoB Declaration is demonstrating that three countries sharing a common vision are able to move beyond this vision into action.

2007 Feb

The three HoB governments commit to the HoB Declaration to enable conservation and sustainable development that improves the welfare of those living on the island, while minimizing deforestation, forest degradation and associated loss of biodiversity and ecosystem services.

2008

In Indonesia, the HoB is designated as a Strategic National Area with significant environmental value and has been included in the island-wide spatial plan.

The three governments jointly develop a trilateral Strategic Plan of Action.

2009

The three HoB governments have established governance structures to help fulfill their obligations under the HoB Declaration: the HoB National Council in Brunei, HoB Working Groups in Indonesia and National Expert Group and Steering Committees in Malaysia.

2010

Each country completed an HoB-specific Strategic Plan of Action, or Project Implementation Framework.

Sept 2010

The three HoB governments launch a joint publication: *Financing the Heart of Borneo – A partnership approach to economic sustainability.*

2011

In Malaysia, the state government of Sabah develops policies related to REDD+ within the framework of a green economy to mainstream REDD+ into economic development and land-use planning.

In Indonesia, the district government of Kutai Barat in Kalimantan is creating enabling conditions for a district level REDD+ program which includes spatial planning, governance, and stakeholder involvement to improve forest protection, utilize degraded lands for palm oil expansion and secure community forests for biodiversity, carbon and socio-cultural values.

Brunei greatly increases the area of its protected forests, ceasing to log natural forests entirely.

A green economy for people's well-being

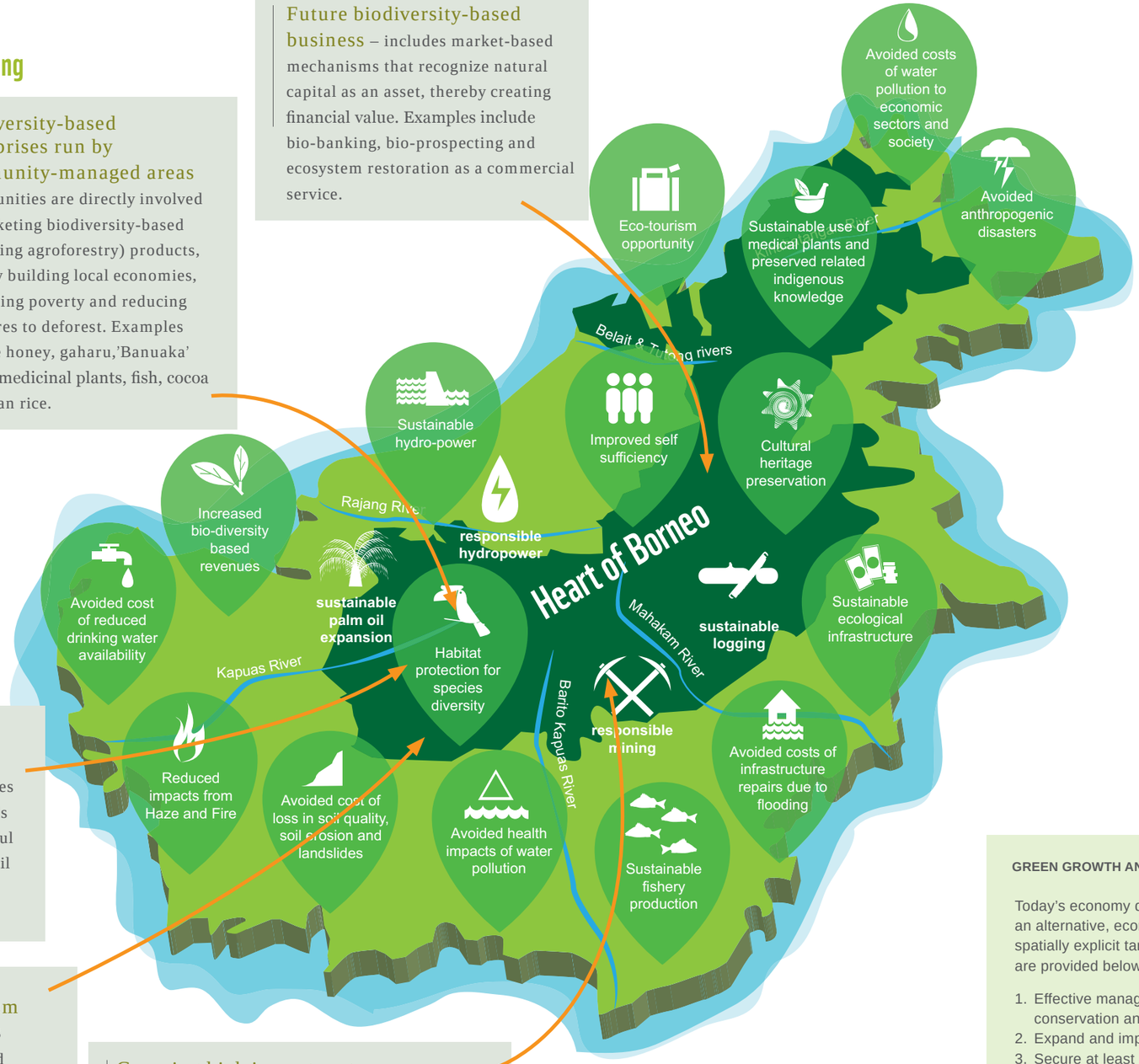
'Throughout 2011 and 2012, stakeholder consultations and workshops were held to explore the potential for, and local views on, a green economy in Borneo and HoB's potential role. Potential on-the-ground green economy (GE) solutions were identified, which would direct all stakeholders towards an economy that values natural capital, reduces poverty and builds local economies. Many of these solutions are already starting to emerge, but not yet at scale.'

Biodiversity-based enterprises run by community-managed areas

Communities are directly involved in marketing biodiversity-based (including agroforestry) products, thereby building local economies, alleviating poverty and reducing pressures to deforest. Examples include honey, gaharu,'Banuaka' beads, medicinal plants, fish, cocoa and adan rice.

Future biodiversity-based business

– includes market-based mechanisms that recognize natural capital as an asset, thereby creating financial value. Examples include bio-banking, bio-prospecting and ecosystem restoration as a commercial service.



Innovative green sectors

This includes green energy such as micro-hydro power and technologies which turn waste into raw materials for generating energy or other useful products (e.g. processing of palm oil effluent to energy).

Transboundary ecotourism

An integrated strategy for HoB cross-border ecotourism would enhance biodiversity, local livelihoods and help to sustain Dayak culture.

Five categories of sector - specific green economy solutions

Greening high impact sectors

Large-scale high impact sectors, including logging, palm oil cultivation and mining, require a range of investments to enhance their sustainability (including landswaps). These efforts need to be supported through incentives for following certification processes and internationally recognized sustainability standards and through penalties for unsustainable practices.

CROSS CUTTING GREEN ECONOMY SOLUTIONS

The following are essential interventions across the landscape which require a collaborative approach among sectors:

Participatory ecosystem-based spatial planning

This tool for landscape management uses ecosystem boundaries as the delineating factor rather than district, state or other administrative boundaries. Developed in a participatory way, the approach aims at the harmonious coexistence of all living organisms—humans, plants, animals and microorganisms—together with the abiotic environment.

Integrated watershed management

This approach promotes the coordinated development and management of water, land and related resources in a watershed in order to maximize economic and social welfare and equity without compromising the sustainability of vital ecosystems and the environment.

Expanding protected areas networks and improving connectivity

Effective management as well as increasing the size of protected areas and enhancing their connectivity helps to preserve their ecological integrity for enhanced flow of ecosystem services while facilitating gene flow and building resilience in a changing climate.

GREEN GROWTH AND NATURAL CAPITAL INDICATORS AND TARGETS

Today's economy depends too much on standard measures of progress like GDP growth. As an alternative, economic, social and natural capital indicators in the HoB could be linked to spatially explicit targets associated with spatial plans. Examples of such measurable targets are provided below.

1. Effective management of __ha (__% of HoB) consisting of national parks, other conservation and restricted areas.
2. Expand and improve connectivity between protected areas covering an area of __ ha.
3. Secure at least __ ha for its essential watershed services to support more than 70% of the island of Borneo for the benefit of key economic sectors and for over 11 million people.
4. Secure at least ____ ha (___ % of HoB) under Sustainable Forest Management of which __ha under FSC certification.
5. Ensure that all existing palm oil (__ ha – __ % of HoB) is under Responsible Palm Oil Cultivation, independently certified and prioritizing degraded lands.
6. Refrain from further conversion of natural forests to other land use.
7. Secure __ Gt of Carbon through a mosaic of different land uses and avoid at least __ CO_2 emissions in support of national emission reduction targets.
8. Restore at least __ ha of degraded forests (__% of HoB).

Note: Quantities are deliberately left blank in this example, the purpose of which is to give an idea of the kinds of quantitative indicators that could be used rather than to propose specific figures.

AN ESSENTIAL STEP IN MOBILIZING GREEN ECONOMY SOLUTIONS IS OVERHAULING THE CURRENT ECONOMIC INFRASTRUCTURE

A potential country specific economic policy package for the Heart of Borneo could be...

HEART OF BORNEO – Green economy policy package to deliver sustainable development and conservation

This figure illustrates how a package of economic policy interventions at national and sub-national levels, specific to HoB, can help to protect nature, boost green growth and build local economies.

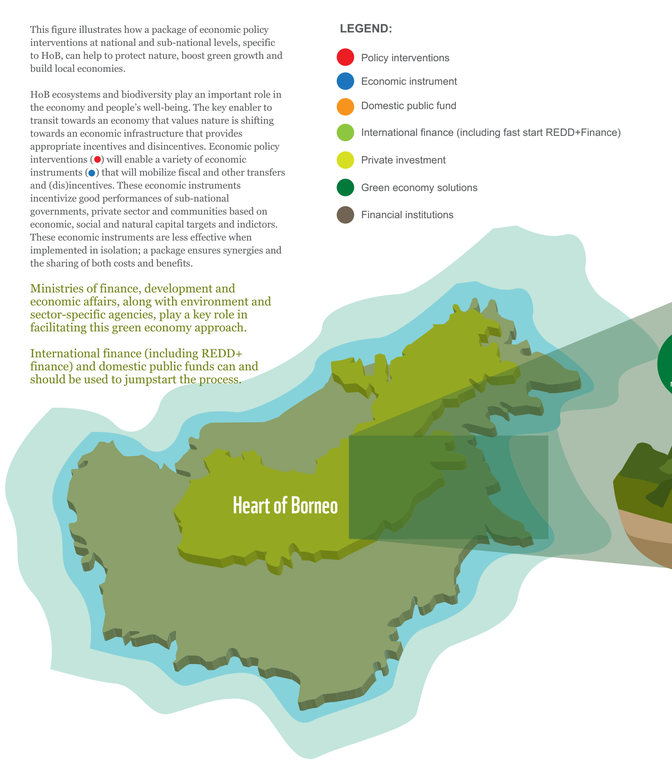
HoB ecosystems and biodiversity play an important role in the economy and people's well-being. The key enabler to transit towards an economy that values nature is shifting towards an economic infrastructure that provides appropriate incentives and disincentives. Economic policy interventions (●) will enable a variety of economic instruments (●) that will mobilize fiscal and other transfers and (dis)incentives. These economic instruments incentivize good performances of sub-national governments, private sector and communities based on economic, social and natural capital targets and indictors. These economic instruments are less effective when implemented in isolation; a package ensures synergies and the sharing of both costs and benefits.

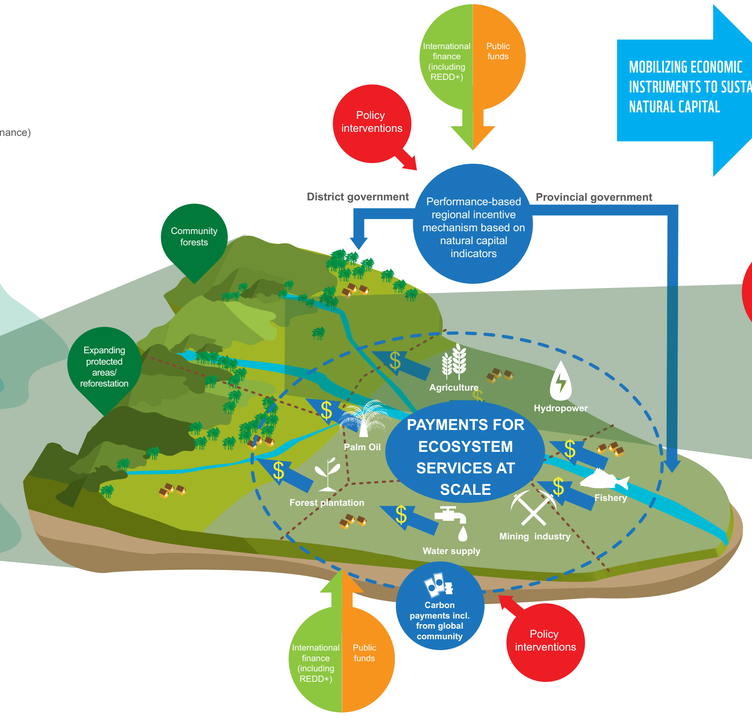
Ministries of finance, development and economic affairs, along with environment and sector-specific agencies, play a key role in facilitating this green economy approach.

International finance (including REDD+ finance) and domestic public funds can and should be used to jumpstart the process.

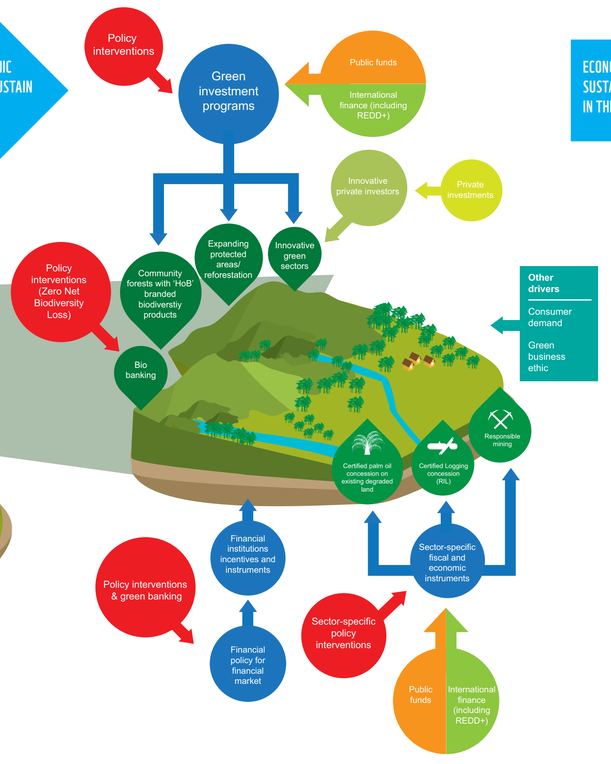
LEGEND:

- Policy interventions
- Economic instrument
- Domestic public fund
- International finance (including fast start REDD+Finance)
- Private investment
- Green economy solutions
- Financial institutions



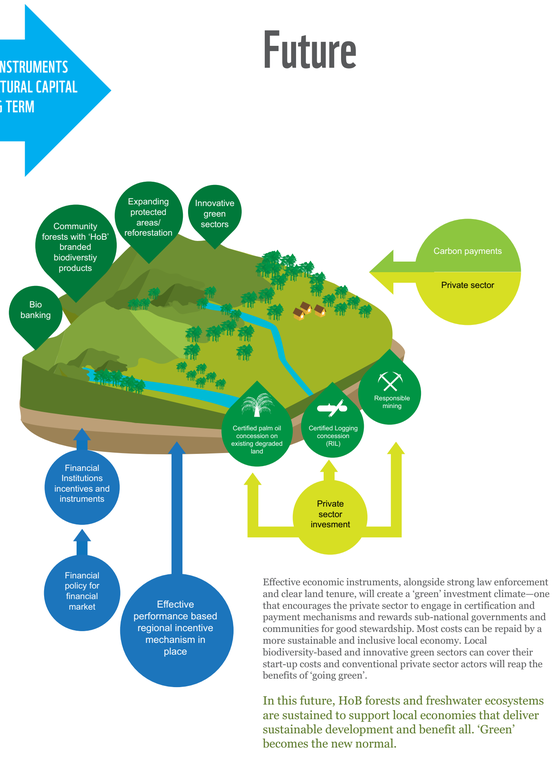


MOBILIZING ECONOMIC INSTRUMENTS TO SUSTAIN NATURAL CAPITAL



ECONOMIC INSTRUMENTS SUSTAIN NATURAL CAPITAL IN THE LONG TERM

Future



Effective economic instruments, alongside strong law enforcement and clear land tenure, will create a 'green' investment climate—one that encourages the private sector to engage in certification and payment mechanisms and rewards sub-national governments and communities for good stewardship. Most costs can be repaid by a more sustainable and inclusive local economy. Local biodiversity-based and innovative green sectors can cover their start-up costs and conventional private sector actors will reap the benefits of 'going green'.

In this future, HoB forests and freshwater ecosystems are sustained to support local economies that deliver sustainable development and benefit all. 'Green' becomes the new normal.

A cross-sectoral economic policy package is a necessary, but not a sufficient, step in encouraging a green economy. There are limitations in governments' ability to modify fiscal regimes, given that Borneo's economy is closely integrated with national and global economies.

Governments could take the following additional steps to develop a suitable enabling environment to encourage a green economy to take root:

- **Institute regulations which mandate accounting for natural capital throughout all economic sectors:** While central to measuring sustainable growth, natural capital has not been explicitly quantified in economic models and accounting frameworks. Natural capital values need to be systematically integrated into national accounts and into macroeconomic indicators that monitor development progress and resource management.

- **Ensure land tenure and property rights are addressed:** This task can only be undertaken by Governments. Greater land tenure security— including greater clarity on forest carbon assets and rights—has positive economic implications. It reduces uncertainty and generates incentives to improve natural capital management by increasing the likelihood that communities will retain and enjoy the economic benefits of their labor and time in managing natural capital. Greater recognition of community forest management and ownership also significantly incentivizes sustainable management of natural capital.

- **Devise transparent and accountable procedures to facilitate a green economy:** This requires financing mechanisms based on natural capital indicators which direct public funds towards targeted stakeholders based on performance in achieving measurable targets—emissions reduction, certification, poverty reduction targets, etc. Effective monitoring and verification capacities are additional essential elements.

Roles of other stakeholders

A green economy will not emerge through the efforts of governments alone. Business, civil society, the global community and media represent important additional constituencies in this process.

BUSINESS needs to...

ensure that their impacts on natural capital are either minimized or positive: this should apply throughout the production process, as well as in procurement and outsourcing activities.

share information through platforms such as forums, roundtables or through certifying organizations such as the Roundtable on Sustainable Palm oil (RSPO): this can greatly reduce the costs of risk assessment and data collection. Partnerships with like-minded businesses, organizations or NGOs can help to fill gaps in knowledge related to green business operations. In 2011, the HoB Green Business Network (HoB GBN) was launched in Indonesia and in Malaysia as a business community network committed to playing a leading role in the transition towards a green economy. The HoB GBN aims to bring together stakeholders to generate tools and provide support to businesses willing to work towards a sustainable future for the HoB.

ensure transparency and accountability both for trust within partnerships as well as to provide the basis of trust in community relations.

CIVIL SOCIETY needs to...

act as proposer of ideas, builder, partner. It can monitor and hold other actors accountable. Civil society is essential for democratic ownership of a transition towards a green economy.

MEDIA needs to...

become the most effective tool to spread the message that HoB's natural capital is important to people both within and beyond the HoB itself, including the global community. Media exposure can help to increase awareness of HoB's values, change people's behavior and leverage attention towards the need for policy change and mobilization of fiscal and economic instruments. Media attention can help to stimulate stakeholders, attract new partners and spur momentum.

GLOBAL COMMUNITY needs to...

direct REDD+ finance in the framework of a green economy
Carbon sequestration by forest ecosystems is one of the many globally significant values negatively impacted by deforestation and forest degradation. The global community needs to support the development of economies that recognize the true value of forests, not only to support climate mitigation and biodiversity conservation but also for the range of resources, ecosystem goods and services that forests provide. Placing REDD+ within the framework of a green economy is essential in order to ensure its success.

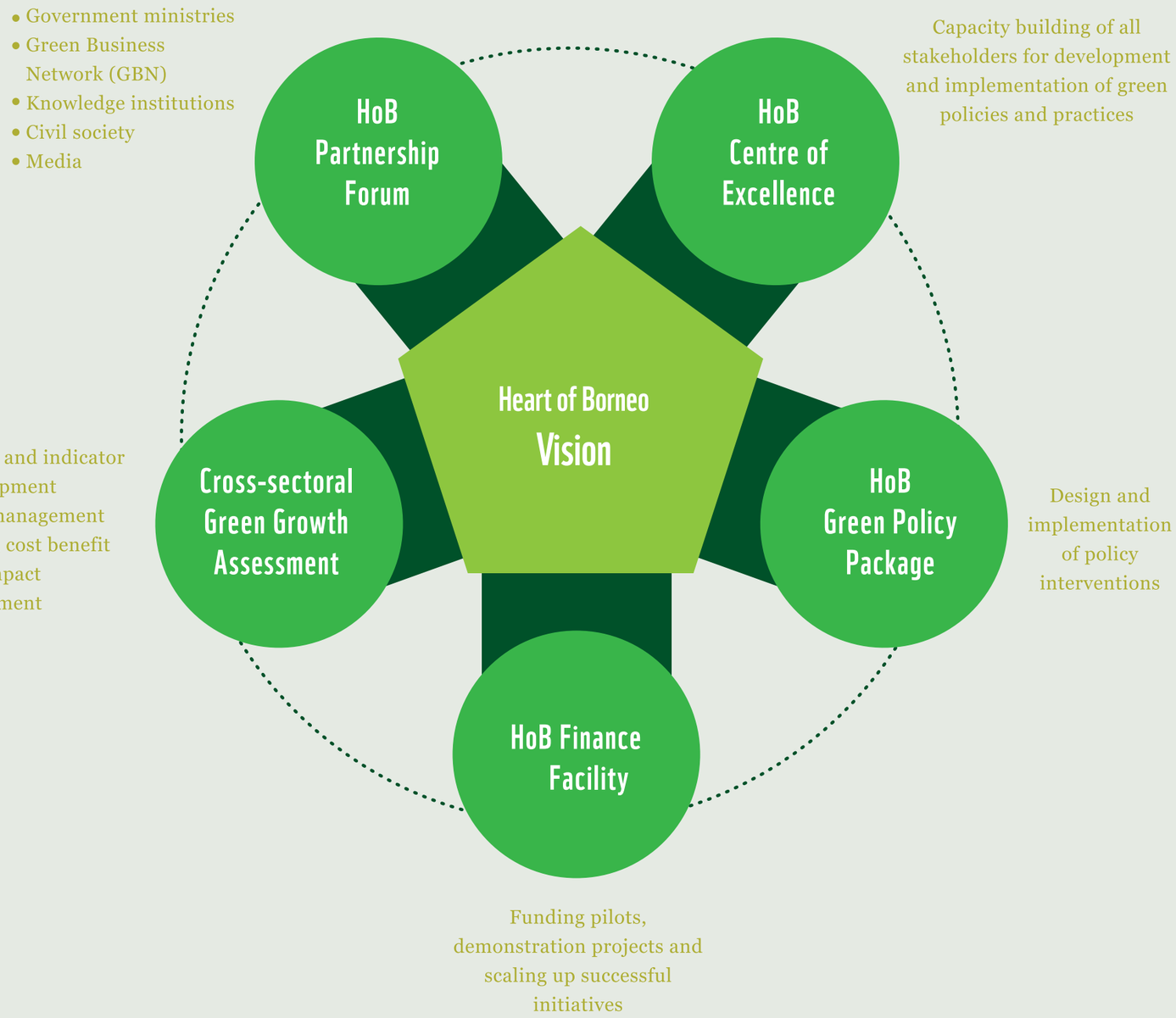
support biodiversity-based enterprises, greening conventional sectors and new green innovative sectors
Technology transfer, skills and capacity are needed in a range of sectors, across government agencies and levels of governance. These sectors have the potential to generate revenue while maintaining valuable ecosystem goods and services for a range of sectors.

be a resource gateway on natural capital of forests
Continued research on the economic value of natural capital, the transfer of knowledge and green technology, together with capacity building, are important elements in building a green economy.

stimulate collaboration amongst different actors and improve effectiveness of technical and financial contributions
The international community has the ability to attract the attention of the commercial and financial sectors. Lending, investment and insurance can be major channels of private financing for a green economy.

CRITICAL NEXT STEPS

The HoB Declaration represents the three countries' common vision for the area. The countries have already taken steps to implement this vision, including establishing institutional arrangements and developing REDD+ related policies. A wide range of stakeholders have roles to play in realizing this vision. Together, a number of critical next steps could be taken to accelerate implementation of the green economy approach to deliver sustainable development and conservation in the HoB.



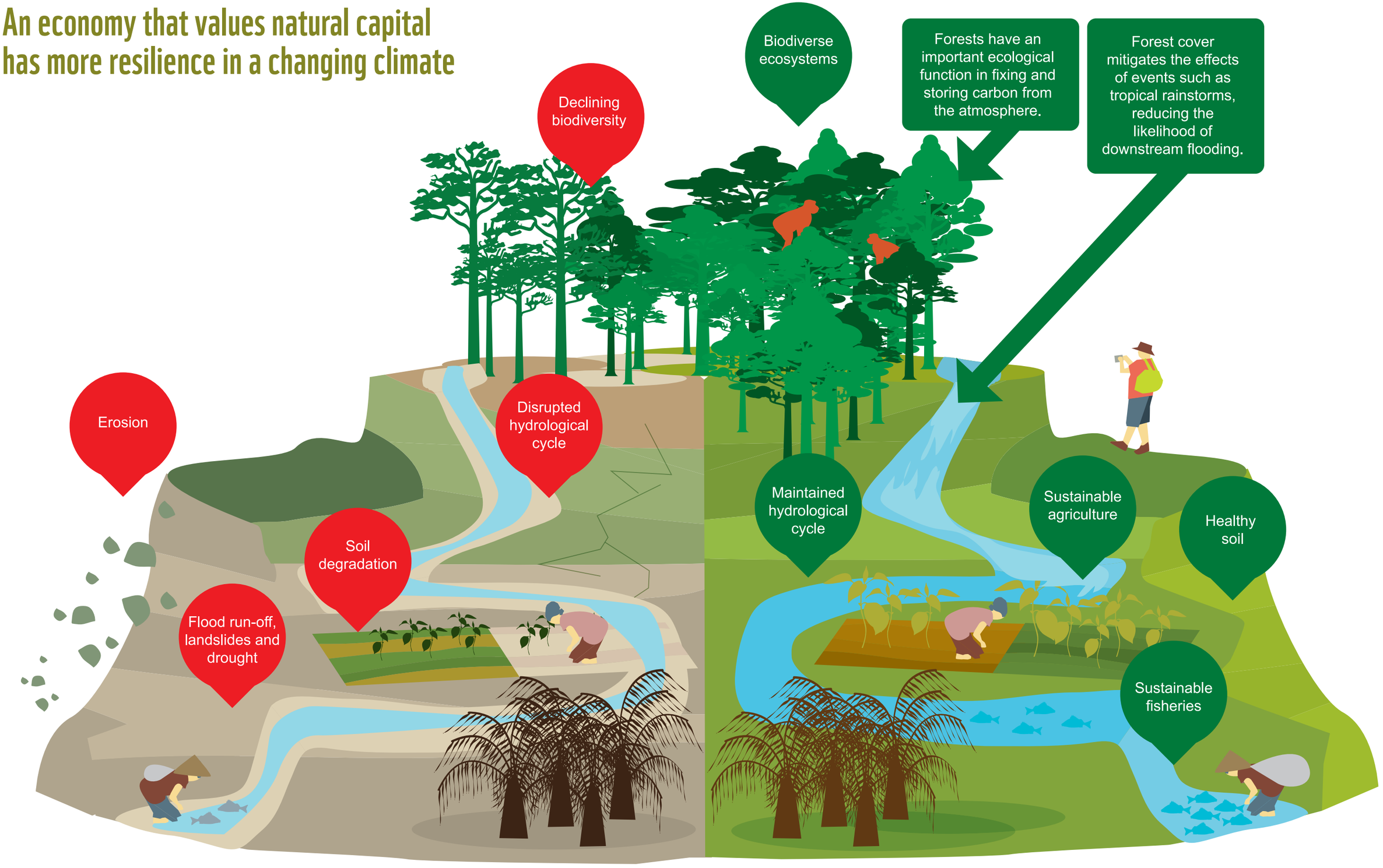
The critical social and economic role of HoB ecosystems is rapidly becoming more widely understood. Ongoing efforts are beginning to demonstrate that a green economy approach to achieving the HoB governments' vision of conservation and sustainable development will lead to more inclusive economic planning, management and accounting within the economies of Brunei, Kalimantan, Sabah and Sarawak. As a result, the HoB is poised to become a leading example of a green economy approach in Southeast Asia.

Wiser and more inclusive decisions are being made on policies such as REDD+, Payments for Ecosystem Services (PES) and on the development of relevant fiscal and economic instruments and policy packages. However, important challenges remain, including capacity constraints, the continuing reliance on economic growth based on unsustainable natural resource use and the high costs of investing in economic transformation. To be truly successful and transformative, efforts to achieve a green economy will require additional direction, coordination and large scale implementation support. Changes to policies and practices are urgent, but they need to be based on sound evidence generated through robust analyses, stakeholder engagement and demonstration projects.

This process has the potential to mobilize an economy in which the value of natural capital and its importance in climate change are mainstreamed into economic and development decision-making.

An economy of this nature will drive growth of income and jobs, reduce environmental risks and scarcity and increase resilience to a changing climate. It will also lead to greater food, water and energy security for all. Such benefits make HoB's natural capital well worth the investment.

An economy that values natural capital has more resilience in a changing climate



www.hobgreeneconomy.org

Ban Ki-moon,
UN Secretary-general

"Based on our collective experiences, the best way to enhance the framework for strong, sustainable and balanced economic growth is to put development front and centre,and to invest in a green economic recovery for all."

Al Gore at The Business 4 Environment Summit, in Jakarta (2011)

"A Green Economy may not be the easy choice today, but history will show that it is the right choice."

Pavan Sukdev,
Leader of the 'The Economics of Ecosystems and Biodiversity' (TEEB) Series

"We are probably the first generation of leaders who have the chance to take decisive action and probably the last generation who have the option not to do so."

Susilo Bambang Yudhoyono,
President of Indonesia

"I believe Indonesia can implement green economy to achieve 7% economic growth and 26% reduction of greenhouse gas emissions by 2020."

HRH Prince Hj Al-Muhtadee Billah,
The Crown Prince and Senior Minister at the Prime Minister's Office, Brunei Darussalam

"Best practices in development projects in use must be strengthened to ensure that they take into account the priority to preserve the environment. This is consistent with our aspiration to build on the strong image of Green of Brunei Darussalam."

Datuk Zakri,
Science Advisor to the Prime Minister of Malaysia

"Developing countries are falling behind in the fight against their deteriorating environment. They are rapidly losing their natural resources and ecosystem services, being the foundations for their economies, because they have not put in place a national environmental governance system."

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