Committee: UNESCO

Agenda: Devising Solutions for the Conservation of Biodiversity Hotspots in Tropical Asia

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Introduction

Biodiversity is everywhere. From microorganisms to entire rainforests, the Earth is composed of millions of unique and diverse ecosystems. Through the interplay of these ecosystems, nature maintains equilibrium and protects its inhabitants. Humans are heavily dependent on the basic nutrients, suitable habitats, and diverse resources nature provides. In recent years, however, biodiversity rates have been declining expeditiously. Compared to natural extinction rates, current biodiversity loss estimates are 1,000 to 10,000 times higher.

There are five main drivers attributed to the decline in biodiversity. Changes in land and sea use, direct exploitation of natural resources, climate change, pollution, and invasive alien species (IAS). All five have one thing in common; they are directly intensified by human activity. These drivers spur anthropogenic biodiversity decline and climate change on the terrestrial, freshwater, and marine front, ultimately impairing human quality of life and causing irreparable environmental damage.

No region is more vulnerable to these changes than biodiversity hotspots. Biodiversity hotspots refer to regions with distinctively high levels of biodiversity. Although the 36 hotspots globally only make up 2.5% of total land surface, they support more than half of the world's terrestrial life. Simultaneously, these hotspots are vital to mitigating climate change by serving as natural carbon sinks, absorbing significant amounts of carbon dioxide and reducing emissions caused by deforestation. They also sustain essential ecosystem services like water filtration, soil fertility, and pollination, all indispensable to human life. Among these diverse forms of life are endemic species, or species which exist only in a particular region. Not only are they more sensitive to environmental shifts, but their extinction has cascading consequences for regional biodiversity as a whole.

Out of the 36 recognized biological hotspots, six are located in Tropical Asia: Western Ghats-Sri Lanka, Indo-Burma, Sundaland, Wallacea, Himalayas, and the Philippines. These regions will serve as the primary focus of this agenda. Biodiversity remains a daunting impediment against a safe and sustainable future. Biodiversity hotspot preservation in Tropical Asia is crucial to realizing the UN Sustainable Development Goals, particularly SDG 13 (Climate Action), SDG 14 (Life Below Water), and SDG 15 (Life on Land).

Given the unique characteristics of these hotspots and their diverse habitats, preservation measures must be tailored to the specific ecological, cultural, and socio-economic contexts of each region. Tailored strategies ensure ecological integrity while crafting a sustainable future for both nature and humanity. Community-based conservation efforts are pivotal in integrating indigenous knowledge and practices, empowering local populations, and promoting culturally sensitive solutions. Furthermore, by maintaining resilient and adaptable ecosystems, these hotspots not only support biodiversity but can better navigate environmental risks, improving the security of local communities.

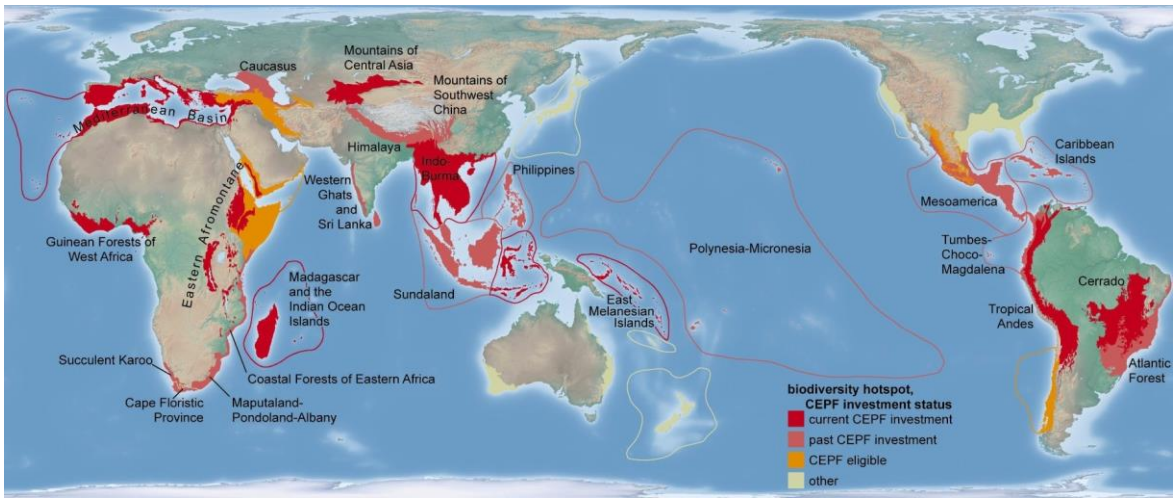
Definition of Key Terms

Biodiversity

Biodiversity refers to the variety of life on Earth within species, between species and of ecosystems, including plants, animals, bacteria, and fungi.

Biodiversity Hotspots

Biodiversity hotspots refers to biogeographic regions with significant levels of biodiversity that are threatened by human habitation. To qualify as a biodiversity hotspot, a region must have lost at least 70 percent of its original natural vegetation, and it must have more than 1,500 endemic plants.



#1: The World's Biological Hotspots - European Commission

Endemic Species

Endemic species are species that are unique to a particular geographic territory. In most cases, they exist in confined environments, which prevents habitat expansion and dispersion. This is attributed to narrow ecological amplitudes, or a low degree of adaptation to habitat conditions. Endemic species can further be identified into two main subtypes: neo-endemism, when a taxon is evolutionarily young and has not spread

yet; palaeo-endemism, when a now-restricted taxon was once widely-distributed. Ultimately, endemic species are exposed to an elevated risk of extinction.

Keystone Species

Keystone species refer to species with a disproportionately large impact on its ecosystem. In their absence, the ecosystem is exposed to risks of decline or complete extinction. Defined by their low functional redundancy, no other species can substitute the ecosystem functionality of keystone species. Keystone species are divided into three: Predators, which help control prey population; ecosystem engineers, which creates, changes, or destroys a habitat; and mutualists, or multiple species interacting for each other's benefit.

Invasive Alien Species (IAS)

Invasive alien species are plants, animals, pathogens and other organisms that are non-native to an ecosystem with negative consequences to their new environment. In particular, the introduction of IAS can result in the decline or elimination of the native inhabitants through competition, predation, or transmission of pathogens. Since the 17th century, invasive alien species have contributed to nearly 40% of all animal extinction.

History

Historically, there have been five mass extinctions resulting in the vanishment of a high percentage of species. In nature, background extinction is inherent, if not frequent. But in recent years, biodiversity loss has eclipsed the sustainable rate. Since 1970, Earth has lost 58% of its biodiversity, and an estimated 30% of all species will become extinct by 2050.

Human involvement in biodiversity loss can be traced back to the Paleolithic era, as early hunter-gatherer societies began to form. The arrival of humans equipped with tools and sophisticated hunting methods coincided with the extinction of several megafauna such as mammoths and saber-toothed cats. Over time, humans transitioned towards farming societies; agricultural methods like land conversion, habitat modification, and irrigation dramatically shifted the environment. As populations expanded over time, so did the manipulation of landscapes.

The Industrial Revolution further exacerbated things as rapid industrialization, urbanization, and fossil fuel use drastically increased habitat destruction and biodiversity loss. In the mid-20th century, the Green Revolution introduced high-yield crop varieties and intensive farming techniques at the environment's detriment. Mass-food production remains a problem, being responsible for 30% of all human-produced emissions.

During the colonial periods, environmental exploitation reached new heights, marked by overhunting, heavy logging, and resource exhaustion. During British rule, Indo-Burma forests were cleared for rubber and tea plantations. Altered landscapes spurred ecosystem disruption and habitat fragmentation. This continued even post-independence, as newly-liberated regions struggled to balance environmental preservation with economic pursuits.

The Convention of Biological Diversity (CBD) marked the first global effort for biodiversity conservation, which seeks to navigate the sustainable use and benefit-sharing of natural resources. It pioneered a comprehensive framework for biodiversity conservation while addressing the ecological, economic, and social dimensions of global sustainability, marking a groundbreaking shift in international environmental governance. Amongst the 196 nations that ratified CBD, many Tropical-Asian states are signatories, pledging to protect hotspots through meaningful measures.

In terms of cross-border efforts in Tropical Asia, some progress has been made. The Heart of Borneo initiative established transboundary conservation areas in Brunei, Indonesia, and Malaysia. It seeks to conserve Borneo's rainforests and water catchments. However, a significant gap remains in cooperative approaches that integrate the diverse interests of stakeholders and governing bodies.

The Himalayas, for one, was *and* remains a difficult climate to live in. Historically, indigenous communities practiced terrace farming, a method which preserved soil. However, recent demand for its natural resources has skyrocketed, spurring deforestation and grassland clearing for farming, as well as prevalent logging. Poaching also remains a threat to preserving environmental integrity.

The Indo-Burma is unique not only in its scope of biological diversity, but in the sheer size of its population. More than 300 million people occupy the region, the largest number for any hotspot. They are very dependent on the assets provided by the region's natural ecosystems. This strengthens the interlink between biodiversity conservation and welfare development. For instance, the people's diets consist of mostly fish, which makes it vital to procure sufficient amounts of fish. But this reliance is a double-edged sword, with British and French colonial exploitation having exhausted regional resources.

Sundaland is located in the Indonesian archipelago, comprising 17,000 islands. It is home to 25,000 vascular plant species, out of 60% of which are endemic. It has a unique environment defined by high mountain ranges, volcanoes, plains, lakes, swamps and shallow coastal waters in a tropical climate. At the same time, the colonial introduction of exotic species disrupted native ecosystems.

Western Ghats-Sri Lanka is one of the most ecologically significant hotspots globally, characterized by high endemism among plants, amphibians, reptiles, and mammals, including iconic species like the Sri Lankan leopard and Nilgiri tahr. It also comprises diverse habitats such as rainforests, montane forests, and

wetlands, shaped by millions of years of evolution and human history. While traditional farming and sociocultural reverence for nature once protected its biodiversity, colonial-era monocultures, post-independence urbanization, and hydropower projects sparked widespread habitat fragmentation. Challenges like climate change, human-wildlife conflict, and unsustainable resource use continue to threaten ecosystems. Conservation efforts, including protected areas, UNESCO recognition, eco-tourism, and policies, attempt to address these issues.

The colonial era was a lasting encroachment on the biodiversity of the Philippines, characterized by the heavy exploitation of natural resources. For instance, extraction of timber under Spanish and American colonial rule resulted in large-scale deforestation. Land conversion for cash crop cultivation further disrupted the ecosystem balance. Addressing the deep-rooted impacts of colonial exploitation and reclaiming local environmental heritage remains a vital task.

Lastly, Wallacea designates a cluster of several Indonesian islands separated by deep-water straits from the Asian and Australian continental shelves. It is a mosaic of biodiversity, with the majority of its species endemic. The region has more marine species than anywhere else on the planet, including it in an area called the 'coral triangle', where the rate of coral diversity is the highest globally. However, it is not an exemption to overdevelopment and unsustainable farming practices.

Key Issues

Changes in Land and Sea Use

Since 1990, around 420 million hectares of forest have been lost through conversion to other land uses. Agricultural expansion continues to be the main driver of deforestation, forest degradation and overall biodiversity loss in forests. Behind the consistent increase in land and sea use is the global food system, which has caused overproduction and misallocation of resources. It is crucial that we, as a global society, reexamine the way in which our food is grown and consumed.

Natural Disasters and Climate Change

Global warming remains a prominent issue of concern. Greenhouse gas emissions have increased exponentially, raising average global temperatures by 0.7 degrees Celsius minimum. This is alarming news for some of the most vulnerable ecosystems globally such as coral reefs, mountains and polar ecosystems. It has even been determined that climate change-induced temperature increase may threaten as many as one in six species at the global level. It has also spurred more frequent natural disasters, damaging the environment necessary for the survival of species.

Increased Human Activity and Overexploitation

Overexploitation

The Earth's resources are limited, but the speed in which humans exploit its organisms has surpassed the rate of environmental growth. This is not only detrimental to the environment but to economic stability and progress as well. In particular, marginalized communities such as indigenous people who rely on more traditional methods of income are more vulnerable to these changes. A subsistence economy where people depend on natural resources rather than money to ensure basic needs has been brought up as a way to mediate the situation.

Pollution

In biodiversity, pollution refers to a phenomenon in which an ecosystem's natural coping mechanisms are unable to deal with the extreme amounts of compounds and chemicals introduced. Hence, they are accumulated and bleed into that ecosystem. Primary sources of pollutants come from toxic substances, accidental spills, industrial processes or illegal dumping, all the results of human activity. This has lasting consequences for every constituent of the ecosystem.

Ecosystem Shifts

Invasive Alien Species (IAS) and the Extinction of Pre-existing Species

The introduction of foreign species to an ecosystem has devastating effects, foremost the decline and elimination of native species. Since the 17th century, IAS have led to nearly 40% of all animal extinctions. In the process of adjusting, it often disrupts the original rhythm of the ecosystem, and can inflict lasting and harmful changes. It can even lead to increased poverty rates as the sources of peoples' livelihoods are depleted. IAS cases have continuously increased due to climate disasters, habitat loss, and most importantly, human-induced disturbances such as globalization, with many unaware of the detrimental environmental, socio-economic, and health consequences.

Major Parties Involved and Their Views

Brazil

With one of the highest rates of deforestation in the world, Brazil has observed a major decline in the size of their rainforests. This is in part due to its policy, which promotes 'rational exploitation' as a means to goals such as cattle ranching, logging, and soybean production. Although its hotspots aren't located in Tropical Asia, for Brazil, the actions of the UN in regards to this agenda can be interpreted as the future blueprint for all hotspot-related agendas going forward. Hence, Brazil will opt to prioritize industry development and economic growth before biodiversity hotspot preservation.

Indonesia

Indonesia is home to Sundaland, one of the four biodiversity hotspots in Tropical Asia. It hosts more than 25,000 species of vascular plants, more than 450 species of reptiles, and 1,000 known freshwater species of fish. A study by the Study for Conservation Biology found that 70% of Sundaland has been heavily modified by humans. This indicates a 55% increase in areas influenced by intense human pressure in the last 30 years and displays a high human footprint. Indonesia has initiated biodiversity-friendly and sustainable policies, but the country's primary endeavors like Palm Oil Plantations and logging pose a threat to Sundaland preservation.

The Private Sector

The private sector's paramount interest is immediate profit. Although there has been an increased emphasis on Environmental, Social, Governance (ESG) operation goals, most companies continue to prioritize profit maximization as their singular interest. This tendency spurs the private sector to become the main origin of increased human activity in nature. From overexploitation and over-use to environmentally-harmful ways of building and development, their involvement in biodiversity loss cannot be overlooked.

Non-Governmental Organizations (NGOs)

Global NGOs such as the UN Environmental Programme (UNEP), Greenpeace, and the World Wildlife Fund all advocate for environmental preservation, sustainable development of natural assets, and reducing species extinction.

Timeline of Relevant Resolutions, Treaties and Events

Date	Description of event
June 5, 1992	The Convention on Biological Diversity (CBD) is ratified. It is the official international legal instrument for biodiversity conservation and the sustainable utilization of its assets.
2011	At the UN Convention of Biological Diversity, the Aichi Biodiversity Targets are set, providing guidelines for both international and domestic action.
2012	The UN Sustainable Development Goals (SDGs) are created at the UN Conference on Sustainable Development. Goal 14 Life Below Water and Goal 15 Life on Land further the agenda for biodiversity conservation.

January 18, 2022	The United Nations Biodiversity Conference (COP15) is held and the Kunming-Montreal Global Biodiversity Framework is adopted. The treaty seeks to halt human-wrought extinction of threatened species, slow species extinction, and promote sustainable use and management of biodiversity.

Evaluation of Previous Attempts to Resolve the Issue

There have been continuous efforts to address biodiversity loss since the ratification of the CBD. All of these attempts manage to take into consideration that the causes of biodiversity loss continue to diversify, and hence materialize in different forms across different forms. Based on said understanding, they paint a holistic understanding and evaluation of the status quo.

However, there are some evident pitfalls as well. As previously mentioned, human exploitation, especially by private companies or individuals remains one of the biggest contributors to biodiversity loss. Still, current international treaties are often non-binding or have a weak hold domestically. The incoherence between domestic and international measures are evident in both developed and developing nations. Therefore, wielding the comparatively thorough understanding of biodiversity loss, the global society should seek to effectively 'implement' and 'enforce' changes. Additionally to cement lasting and substantial changes, the cooperation and compliance of individual governments and major players of the private sector should be procured. Their conflicting interests can be mediated through interests or subsidies.

Large-scale reforestation projects, such as the Rimba Raya Biodiversity Reserve in Indonesia, have restored degraded peatlands, improved habitat connectivity, and sequestered carbon. While these initiatives have demonstrated localized success, they often face scalability challenges due to land-use conflicts and high restoration costs. Moving forward, balancing restoration with local development needs and integrating private-sector funding can help address these constraints and expand the reach of such projects.

Anti-poaching initiatives in hotspots like the Indo-Burma region have targeted illegal hunting of species such as pangolins and elephants. These efforts have made some progress, but poaching continues due to high demand for wildlife products and limited enforcement capacity. International cooperation to reduce demand and the use of advanced technologies like drones and AI surveillance can enhance the effectiveness of anti-poaching campaigns.

Efforts to regulate agricultural expansion, such as promoting RSPO-certified palm oil in Indonesia and Malaysia, have reduced some environmental harm. Certification schemes have encouraged more sustainable practices among producers. However, adoption has been slow, especially among smallholders, and non-compliance remains an issue. Strengthening monitoring systems and providing technical and

financial support to smallholders can help bridge this gap and improve compliance with sustainable agriculture practices.

Furthermore, there is a vacancy of documents which address biodiversity preservation within the unique context of Tropical Asian biodiversity hotspots. Ergo, there should be a specific and individualized approach catered to distinct environments. Considering that awareness is a big motivator for further biodiversity preservation, official recognition and discussion will garner further support.

Possible Solutions

1. Combat Wildlife Tracking

Wildlife tracking remains one of the most dangerous and active threats against endemic species. According to the World Wildlife Fund (WWF), the world is facing a poaching crisis, with illegal wildlife trading being the fourth biggest illegal trade worldwide. Hence, international legislative and policy cooperation is vital. There needs to be stricter penalties and stringent monitoring via advanced surveillance technologies and GPS tracking. Additionally, community-based anti-poaching initiatives can incentivize local populations to protect wildlife.

2. Restore Degraded and Disused Farmland

Human-induced land degradation has severely impacted agrifood systems, with over 60% occurring on agricultural land and nearly 30% in forested areas. The draining of production capacities further threatens global food security, environmental sustainability, and social stability. Transforming degraded and disused farmland can reverse these trends, restoring critical habitats. Furthermore it successfully implements the goals of initiatives like the UN Decade on Ecosystem Restoration (2021–2030), actualizing land degradation neutrality (LDN) and zero hunger targets. Farmland restoration also stabilizes food security and ecosystem recovery. Remote sensing and Geographic Information Systems (GIS) can identify degraded areas most suitable for restoration, while drones can assist in planting trees and monitoring progress. Additionally, AI-driven predictive models optimize restoration plans by simulating ecological outcomes under various scenarios.

3. Implementing Large-Scale Reforestation and Ecosystem Restoration Efforts

Reforestation and ecosystem restoration are crucial not only for recovering biodiversity, but providing essential ecosystem services such as carbon sequestration, water purification, and soil stabilization to create self-sustaining habitats. Incorporating Ecosystem-based Adaptation (EbA) strategies into national and

regional policies amplifies the benefits of restoration efforts. Wetland rehabilitation, peatland restoration, and mangrove reforestation not only address climate resilience but also provide protection against coastal erosion, storm surges, and flooding. Hence, governments should promote a dual approach to restoration: leveraging natural regeneration where possible while employing assisted restoration techniques in more severely degraded ecosystems. Cross-sector partnerships with private companies, NGOs, and research institutions, as well as engaging local communities through education and participatory programs is essential.

4. Developing Customized Regional Databases for Biodiversity Conservation

Effective biodiversity conservation is implemented through localized approaches grounded in robust, region-specific data. Comprehensive biodiversity assessments on species distribution mapping, habitat evaluations, and ecosystem health monitoring, are crucial to formulating actionable conservation strategies. To initiate a collective effort, UNESCO could establish centralized biodiversity data hubs, serving as repositories for regional information, facilitating standardized data collection, integration, and analysis. In the future, the culminated data could also be utilized to disseminate best practices and policy recommendations tailored to specific ecological and socio-economic contexts. This infrastructure would lead to more effective conservation plans and strengthen cross-border collaboration, not to mention a benchmark of progress toward global biodiversity targets.

5. Establish Community-Led Conservation Governance

Enlisting the active participation of communities and local governments is crucial to creating lasting change. By offering alternative and sustainable livelihoods, such as agroforestry, sustainable tourism, or handicrafts, member states should advocate to reduce dependency on environmentally detrimental activities. This can be furthered by capacity-building programs which educate communities on conservation techniques and importance of maintaining biodiversity. Operating regional task forces to combat wildlife trafficking and illegal logging is also an active method of regional participation. Further steps can be actualized through strengthening regional frameworks like the Coral Triangle Initiative.

Bibliography

1. “Article 2. Use of Terms”, Convention on Biological Diversity, https://www.cbd.int/convention/articles/default.shtml?a=cbd-02, Accessed 5 July 2024

2. “Biodiversity Hotspots”, Natural Geographic, https://education.nationalgeographic.org/resource/biodiversity-hotspots/, Accessed 6 July 2024

3. “Biodiversity Hotspots”, Conservation, https://www.conservation.org/priorities/biodiversity-hotspots, Accessed 5 July 2024

4. “Endemics: Types, Characters and Theories.”, Bhan, Preksha, https://www.biologydiscussion.com/angiosperm/taxonomy-angiosperm/endemics-types-characters-and-theories/34819, Accessed 19 August 2024

5. “Keystone Species”, National Geographic Education, https://education.nationalgeographic.org/resource/keystone-species/, Accessed 26 Aug 2024

6. “Role of Keystone Species in an Ecosystem”, National Geographic Education, https://education.nationalgeographic.org/resource/role-keystone-species-ecosystem/, Accessed 26 Aug 2024

7. “What are Invasive Species”, Convention on Biological Diversity, https://www.cbd.int/idb/2009/about/what, Accessed 5 July 2024

8. “Five Drivers of the Nature Crisis”, UN Environment Programme, https://www.unep.org/news-and-stories/story/five-drivers-nature-crisis, Accessed 27 Aug 2024

9. “What are Biodiversity Hotspots”, International Fund for Animal Welfare, https://www.ifaw.org/international/journal/what-are-biodiversity-hotspots, Accessed 27 Aug 2024

5. “Explainer: What Are the Aichi Biodiversity Targets?”, Earth.Org, 11 Oct 2011, https://earth.org/what-are-the-aichi-biodiversity-targets/, Accessed 5 July 2024

6. “Sundaland - Species”, Critical Ecosystem Partnership Fund, https://www.cepf.net/our-work/biodiversity-hotspots/sundaland/species, Accessed 6 July 2024

7. “Severe human pressures in the Sundaland biodiversity hotspot”, Study for Conservation Biology, https://conbio.onlinelibrary.wiley.com/doi/full/10.1111/csp2.169, Accessed 6 July 2024

8. “Himalaya - Threats”, Critical Ecosystem Partnership Fund, https://www.cepf.net/our-work/biodiversity-hotspots/himalaya/threats, Accessed 8 July 2024

9. “Indo-Burma”, Critical Ecosystem Partnership Fund, https://www.cepf.net/our-work/biodiversity-hotspots/indo-burma#:~:text=In%20 terms%20 of%20 species%20diversity,important%20regions%20of%20the%20planet, Accessed 8 July 2024

10. “Sundaland - Species”, Critical Ecosystem Partnership Fund, https://www.cepf.net/our-work/biodiversity-hotspots/sundaland/species, Accessed 8 July 2024

11. “Pollution and Biodiversity”, Earthwatch Institute, http://www.businessandbiodiversity.org/the_issues_pollution.html#:~:text=Pollution%20occurs%20when%20a%20system's,the%20loss%20of%20many%20species, Accessed 8 July 2024

12. “Stopping the Illegal Wildlife Trade”, World Wildlife Fund, https://www.wwf.org.uk/what-we-do/stopping-illegal-wildlife-trade, Accessed 9 July 2024

13. “Restoration of Degraded Agricultural Lands”, UN Food and Agriculture Organization, https://openknowledge.fao.org/items/183921be-218f-4e89-b8db-b9e68d702513, Accessed 25 November 2024

14. “Ecosystem-based Adaptation”, UN Environment Programme, https://www.unep.org/topics/climate-action/adaptation/ecosystem-based-adaptation, Accessed 10 July 2024

15. “What is EbA?”, Global EbA Fund, https://globalebafund.org/about/what-is-eba/, Accessed 10 July 2024