



TROPICAL FORESTS AND BIODIVERSITY

An issue primer for religious leaders and faith communities

MEETING THE GLOBAL BIODIVERSITY CHALLENGE

Tropical forests are amongst the most diverse ecosystems on Earth, providing a home to vast numbers of species. This rich biodiversity is a wonder—an embodiment of physical and spiritual abundance. We are part of this fabric of life—woven into it and dependent on it for our material sustenance and the spiritual food of wonder and inspiration. As our biological heritage, it supports our economic wealth, physical and psychological health, and cultural identity. For many indigenous peoples in particular, forest ecosystems are central to their cosmologies, cultures, and spiritual lives.

Tropical Forests and Biodiversity

KEY FACTS

- Home to the vast majority of terrestrial species in the world, forests are the most varied ecosystems on land and amongst the oldest ecosystems on the planet (CIFOR n.d.).
- 80% of all known amphibian species, 75% of all known bird species, and 68% of all known mammal species hold habitats in forests (FAO and UNEP 2020).
- About 60% of the 400,000 species of vascular plants that have been identified by science can be found in tropical forests (FAO and UNEP 2020).
- Biodiversity nurtures human life and culture, with humans depending on at least 40,000 different animal and plant species for their daily requirements of shelter, clothing, food and medicine (CIFOR n.d.).
- The FAO estimates that roughly one-third of the global population of 7.8 billion people has a close dependence on forest species and their products (FAO and UNEP 2020).

- Over 28,000 plant species, many of which are from forest ecosystems, are used for medical purposes (FAO and UNEP 2020).
- According to the 2020 *Living Planet Index* (LPI), an analysis that followed almost 21,000 different wildlife species, the populations of birds, reptiles, fish, mammals, and amphibians decreased by an average of 68% globally from 1970 to 2016 (WWF 2020).
- Out of the 33,000 tree species whose conservation status has been assessed, more than 12,000 are considered “threatened,” and over 1,400 are highly endangered and require urgent conservation action (FAO and UNEP 2020).
- Changes in land use are a key driver of the loss of global biodiversity. In forests, this often takes the form of converting forest areas to agriculture. The production of livestock and crops currently occupies over a third of the world's land area and roughly 75% of its freshwater resources (IPBES 2019).
- Indigenous peoples today manage 28% of the world's land surface, which includes numerous biodiversity hotspots and some of the most ecologically preserved forests (Garnett et al. 2018).
- Despite international commitments to reduce forest loss, deforestation and forest degradation continue to ravage the world's rainforests. For example, recent satellite data from Brazil show that deforestation in the Brazilian Amazon rose nearly 22% from August 1, 2020 to July 31, 2021—a loss of 13,235 km² of biodiversity-rich rainforest (Government of Brazil 2021).
- Second only to agriculture, unsustainable wildlife hunting is one of the primary causes of biodiversity loss. A study of endangered tropical mammals and birds showed that in areas where they were hunted, the endangered mammals were 83% less abundant, and the endangered birds were 58 percent less abundant, greatly increasing the stress on these species (FAO and UNEP 2020).
- In a positive sign, the area of global tree cover protected in parks, conservation areas, game reserves, and other protected areas nearly doubled from 1992 to 2015. Globally, 18% of forested areas are located in officially recognized protected areas, where biodiversity conservation is a priority (FAO and UNEP 2020).

But this living birthright is in crisis. Forest biodiversity is declining at unprecedented rates. Forest destruction and its accompanying habitat loss, overharvesting of forest species, climate change, as well as other ecosystem disruptions have pushed many forest species to the brink. This loss of forest biodiversity is part of a larger global biodiversity crisis, with more than 1 million species throughout the range of Earth's ecosystems now at risk of extinction (IPBES 2019).

Faced with overwhelming evidence of the global extinction crisis, the international community has mobilized to set clear targets to mitigate biodiversity losses, address the causes of species decline, and protect and restore habitats to help species recover. This has taken shape as a new **Global Biodiversity Framework** negotiated through the **Conference of the Parties to the Convention on Biological Diversity (CBD)**. Now is a moment of clear recognition of the urgency of the plight of Earth's web of life, and a time to commit to meet the global biodiversity challenge head on.

Fortunately, many of the actions needed to address the biodiversity loss will also protect and enhance forest ecosystems, and therefore will contribute directly to meeting global climate goals. Indeed, the science is clear that climate change and biodiversity loss are two crises that must be tackled in parallel. Nonetheless, the new global biodiversity targets will be difficult to achieve, requiring transformational change in the way we protect and manage forests, produce, and consume our food, and regulate trade in forest species. How can we as spiritual communities contribute to meeting these global goals? How can we be part of the needed transformation? As the world community commits itself to recovering nature and restoring ecosystems, how can we participate and ensure long-term protection for tropical forests?

A NEW GLOBAL COMMITMENT TO PRESERVE AND RESTORE BIODIVERSITY

The international community has adopted a new **Global Biodiversity Framework** to confront the dramatic decline in global biodiversity. This Framework, which has been negotiated under the Convention on Biological Diversity (CBD), contains Four Goals for 2050 to conserve and restore the world's rich array of species and the ecosystems that support them.

FOUR GOALS FOR 2050

The Kunming-Montreal Global Biodiversity Framework (CBD/COP/15/L.25), includes four ambitious goals for 2050, reproduced here:

Goal A: Enhance ecosystem health and integrity.

- The integrity, connectivity and resilience of all ecosystems are maintained, enhanced, or restored, substantially increasing the area of natural ecosystems by 2050;
- Human induced extinction of known threatened species is halted, and, by 2050, extinction rate and risk of all species are reduced tenfold, and the abundance of native wild species is increased to healthy and resilient levels;
- The genetic diversity within populations of wild and domesticated species is maintained, safeguarding their adaptive potential.

Goal B: Recognize and maintain nature's contribution to human well-being.

- Biodiversity is sustainably used and managed and nature's contributions to people, including ecosystem functions and services, are valued, maintained and enhanced, with those currently in decline being restored, supporting the achievement of sustainable development, for the benefit of present and future generations by 2050.



Goal C: Share the benefits of biodiversity's genetic resources.

- The monetary and non-monetary benefits from the utilization of genetic resources, and digital sequence information on genetic resources, and of traditional knowledge associated with genetic resources, as applicable, are shared fairly and equitably, including, as appropriate with indigenous peoples and local communities, and substantially increased by 2050, while ensuring traditional knowledge associated with genetic resources is appropriately protected, thereby contributing to the conservation and sustainable use of biodiversity, in accordance with internationally agreed access and benefit-sharing instruments.

Goal D: Increase funding to achieve the 2050 vision of restoring and sustaining global biodiversity.

- Adequate means of implementation, including financial resources, capacity-building, technical and scientific cooperation, and access to and transfer of technology to fully implement the Kunming-Montreal global biodiversity framework are secured and equitably accessible to all Parties, especially developing countries, in particular the least developed countries and small island developing States, as well as countries with economies in transition, progressively closing the biodiversity finance gap of \$700 billion per year, and aligning financial flows with the Kunming-Montreal Global Biodiversity Framework and the 2050 Vision for Biodiversity.

2030 ACTION TARGETS

Recognizing the urgency of the biodiversity crisis and the need for immediate action and measurable progress, the new Global Biodiversity Framework also commits to 23 specific “action targets” to be reached by 2030 (CBD/COP/15/L.25). A sample of targets are adapted here:

- Effective conservation and management of at least 30% of the world's lands, inland waters, coastal areas and oceans, with emphasis on areas of particular importance for biodiversity and ecosystem functioning and services.
- Have restoration completed or underway on at least 30% of degraded terrestrial, inland waters, and coastal and marine ecosystems
- Reduce to near zero the loss of areas of high biodiversity importance, including ecosystems of high ecological integrity
- Cut global food waste in half and significantly reduce over consumption and waste generation
- Reduce by half both excess nutrients and the overall risk posed by pesticides and highly hazardous chemicals
- Progressively phase out or reform by 2030 subsidies that harm biodiversity by at least \$500 billion per year, while scaling up positive incentives for biodiversity's conservation and sustainable use
- Mobilize by 2030 at least \$200 billion per year in domestic and international biodiversity-related funding from all sources – public and private
- Raise international financial flows from developed to developing countries, in particular least developed countries, small island developing States, and countries with economies in transition, to at least US\$ 20 billion per year by 2025, and to at least US\$ 30 billion per year by 2030
- Prevent the introduction of priority invasive alien species, and reduce by at least half the introduction and establishment of other known or potential invasive alien species, and eradicate or control invasive alien species on islands and other priority sites
- Require large and transnational companies and financial institutions to monitor, assess, and transparently disclose their risks, dependencies and impacts on biodiversity through their operations, supply and value chains and portfolios



CELEBRATING TROPICAL FOREST BIODIVERSITY

One of the world's most diversified ecosystems is found in tropical forests. Despite only making up roughly 5% of the land surface of the Earth, they provide habitats for more than two thirds of all land-based species. The area they currently cover is less than half of what they did previously (Brandon 2014).

WHY SO DIVERSE?

The high diversity of species in tropical forests is associated with the structure of the forest canopy itself. The canopy has many layers of trees and consists of varied plant species with different heights. These give rise to a large living surface area, with many different habitats and opportunities for growth. The canopy offers sources of food and shelter. It also offers

places to mate, hide and interact with other species. The complexity of the canopy is shown by the existence of thousands of different plant species called epiphytes that grow suspended within it and use tree trunks and branches as support. For example, the stiff waxy tissues of bromeliads, common epiphytes in New World rainforests, often catch and hold rainwater. This captured water creates tiny ecosystems within the bromeliads, where other species feed and breed. Creeping vines create pathways for ground-dwelling animals to access these unique ecosystems and other resources found in the canopy (Butler 2019; Brandon 2014).

These many distinct ecological niches in close proximity to one another allow for a high variety and density of species. Coupled with the high availability of sunlight in the tropics, this enables the production of a large amount of biomass in a compact area. This makes tropical forests, rainforests in particular, among the most productive environments on Earth. Rainforests typically produce 22 tons of biomass per hectare, compared to 13 tons per hectare for temperate evergreen forests (Brandon 2014).

While the structure of the rainforest is crucial for the development of its rich biodiversity, that biodiversity itself is also crucial for the continued health and vitality of the forest. For example, forest-dwelling mammals are responsible for ecological functions including pollination, seed dispersal, and predation. They help regulate key processes associated with plant regeneration and carbon storage (UNEP 2020).

Although rainforests are species rich, that does not mean that every species is plentiful. In fact, the populations of rainforest species are often quite restricted since many are highly adapted to the specific niche or conditions that they inhabit. Within this niche, they may be common, but elsewhere, sometimes nearby, they may be rarer and replaced by a similar but distinct

species that is better adapted to that spot. In this respect, tropical forests are markedly different from temperate forests where a much smaller number of plant and animal species with much wider distributions usually dominate.

BIODIVERSITY INCREASES ECOSYSTEM SERVICES

High biodiversity generally enhances the functioning of tropical forests and increases the flow of ecosystem services that the forest produces. More and varied life pathways mean a greater ability to capitalize on the resources that the forest environment provides. Some services, such as pollination and biological pest control, are closely linked to biodiversity. High biodiversity also supports ecosystem resilience, which is the ability of the forest to withstand shocks and damage. The high number of similar species in these ecosystems provides redundancy so that there are more pathways to recover from forest disturbances (Brandon 2014).

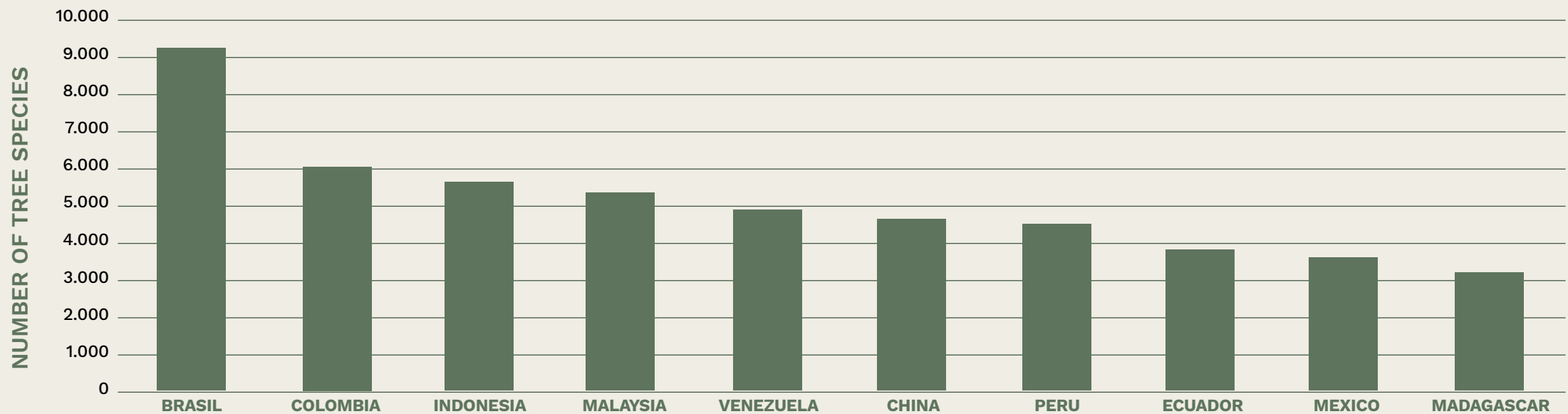
WHAT IS BIODIVERSITY?

'Biological diversity' or *biodiversity* means the variability among living organisms from all ecosystems both land and water-based. Biodiversity refers not only to *species richness*, the wide variety of species of plants and animals that exist, but also the variety of genes within the populations of these species (*genetic diversity*) and the variety of ecosystems in which these species reside (*ecosystem diversity*) (UNEP-WCMC 2019).

Among the many services that forest biodiversity supports, food production is among the most notable. For many rural households in particular, forests provide a critical supplement to small farm production and can be a food lifeline in times of scarcity (FAO and UNEP 2020).

Indigenous peoples are particularly reliant on an array of forest foods to enhance their diets. One study found that indigenous communities in 22 countries in Africa and Asia, including both developing and industrialized countries, utilize around 120 wild species (Bharucha and Pretty 2010).

FIGURE 1. TEN COUNTRIES WITH THE MOST TREE SPECIES



Source: Beech et al., *GlobalTreeSearch: The first complete global database of tree species and country distributions 2017*.



FOREST BIODIVERSITY AT RISK: THE FRAYING WEB OF LIFE

As our awareness of the majesty and importance of the world's biodiversity to our lives has increased, so too has the magnitude of the threats to this biodiversity. As a consequence, global biodiversity trends show a marked decline. This will have serious consequences for the health of forests and those who depend on them.

DOCUMENTED DECLINES

In 2019, the most comprehensive assessment of biodiversity trends ever conducted revealed the extent of tropical biodiversity declines. The assessment found that the population of native species in most tropical land habitats fell by

at least 20 percent since 1900 (IPBES 2019). According to the 2020 Living Planet Index (LPI), an analysis that followed almost 21,000 different wildlife species, the populations of birds, reptiles, fish, mammals, and amphibians decreased by an average of 68% globally from 1970 to 2016 (WWF 2020).

These population losses differ somewhat by region. Tropical Latin America and the Caribbean have registered a staggering 94 percent drop in surveyed species, with especially heavy losses found among reptiles, amphibians and fishes. In contrast, surveyed populations fell in Africa an average of 65 percent and 45 percent in the Asia-Pacific region. In all regions, the main reason behind the biodiversity drop-off was habitat loss and degradation from

activities like deforestation, forest conversion for agricultural use, logging and mining activities. Overharvesting, disease, and invasive species were also prominent factors in the declines (WWF 2020). As one of the largest repositories of the world's species, forests have been especially hard hit by the biodiversity crisis.

RAINFORESTS ARE BIODIVERSITY HOTSPOTS

A key problem associated with forests being hit so hard is that most of the world's biodiversity hotspots occur in tropical forests. A biodiversity hotspot is an area that contains an exceptional number of endemic species, found only in that area, and is suffering a high rate of habitat loss. In other words, hotspots have exceptional biodiversity that is under extreme threat. Currently, there are only 36 internationally recognized biodiversity hotspots. Although they represent just 2.5 percent of the Earth's surface area, they are home to more than half of Earth's endemic plants and over 40% of mammals, reptiles, amphibians and birds (Conservation International 2022). Tropical and subtropical forests “” comprise the ten hotspots with the largest concentration of vulnerable species and native higher terrestrial vertebrates (FAO and UNEP 2020). As of 2014, 26 percent of mammals and 13 percent of birds in tropical forests were listed by IUCN as endangered or vulnerable (CPW 2014).

THE CONSEQUENCES OF BIODIVERSITY LOSS

The downward trends in the state of ecosystems put at risk not just the biological functioning of the planet but the success and survival of humanity. Biodiversity is responsible for delivering key ecosystem services, providing food, water, fiber, medicines, energy, flood control and a host of processes like pollination and nutrient regulation that are critical to the success of global

agriculture. It also underlies all dimensions of human health and is interwoven into Earth's climate regulation.

Because of these interconnections, the continued loss of forest biodiversity will inevitably undermine our economic stability and the realization of a majority of the UN Sustainable Development Goals. Addressing the biodiversity crisis will help to mitigate climate change and support adaptation to it. It is not just a moral issue of ending the needless destruction of species and the unraveling of the web of life, but of ensuring our own survival as well (CBD 2020; WWF 2020).

“Biodiversity and nature’s contributions to people are our common heritage and humanity’s most important life-supporting ‘safety net’. But our safety net is stretched almost to breaking point.”

- Professor Sandra Diaz, Co-Chair of the 2019 IPBES Global Assessment Report on Biodiversity and Ecosystem Services



BRAZIL

Text based on the Convention on Biological Diversity website (2022) and other sources as cited.

Brazil is amongst the world's 17 megadiverse countries in terms of species biodiversity and endemic species (CBD 2022a, UNEP-WCMC 2014). It boasts two biodiversity hotspots (the Atlantic Forest and the Cerrado) and six terrestrial biomes. It hosts three large marine ecosystems which include the largest continuous stretch of mangroves in the world (1.3 million hectares) and the only reef environments found in the South Atlantic. Home to 70% of the world's catalogued plant and animal species, no less than 103,870 animal species and 43,020 plant species are presently known (CBD 2022a).

Brazil's biodiversity is a hugely important resource, not only in terms of the environmental services it provides but also with regard to the opportunities it presents for development and sustainable use. With more than 200 indigenous peoples and 170 languages, Brazil is also megadiverse from a cultural perspective. Local communities possess considerable knowledge of flora and fauna species, including on the traditional management systems for these natural resources. Their contribution is therefore fundamental for the conservation and sustainable use of the country's genetic and biological resources (CBD 2022a).

Indigenous lands cover a significant portion of the Brazilian Amazon region (27% of forest area) and are home to 173 ethnic groups. In addition to being critical for the physical and sociocultural survival of indigenous communities, the 98% of Brazil's area of demarcated indigenous lands that lie in the Amazon, are also key areas for conservation of regional and global biodiversity (IPAM 2015).

The main threats to Brazil's biodiversity are fragmentation and loss of habitats, introduction of alien species and exotic illnesses, overexploitation of plants and animals, use of hybrids and monoculture in agro-industry and reforestation programs, pollution and climate change. Habitat loss is by far the most significant threat (CBD 2022a).

COLOMBIA

Text based on the Convention on Biological Diversity website (2022) and other sources as cited.

Colombia is one of the world's 17 megadiverse countries in terms of overall species numbers and species unique to the country. It is the world leader in bird and orchid species diversity, whilst ranking second in freshwater fish, plants, amphibians and butterflies (CBD 2022b, UNEP-WCMC 2014). According to the *Biodiversity Information System in Colombia*, the country hosts more than 67,000 known species, with an estimated 2,363 bird species, 737 types of mammals and 4,128 species of fish (SIB 2023). With over 7,000 species being endemic, Colombia has the third-highest number of endemic species in the world after Brazil and Indonesia (SIB 2022).

Hosting 314 types of ecosystems, Colombia is home to a diverse spectrum of ecological, climatic, biological, and ecosystem elements (CBD 2022b). Due in part to the fact that the country's enormous watersheds flow into the four massive sub-continental basins of the Amazon, Orinoco, Caribbean, Magdalena-Cauca, and the Pacific, it is also considered to be one of the world's most abundant countries in terms of aquatic resources (CBD 2022b).

Carrying out sustainable development amid this species richness represents a real challenge. Indeed, a significant percentage of the country's natural ecosystems have already been transformed for agricultural use, primarily in the Andean and Caribbean regions. One of the most threatened forest ecosystems is the dry forest, whose present range is only 2% of its original extent.

The main drivers of biodiversity loss in Colombia include armed conflict in critical ecosystems, the illegal drug trade, unsustainable livestock and crop agriculture, weak land titling policies and increasing social inequality. Such factors contribute to habitat degradation, land use change, increased invasive species, overexploitation of ecosystems and greater pollution (CBD 2022b).





DEMOCRATIC REPUBLIC OF THE CONGO

Text based on the Convention on Biological Diversity website (2022) and other sources as cited.

The Democratic Republic of the Congo (DRC) has one of the highest levels of endemic species and total species overall. As one of the world's top 17 biodiversity-rich countries, it is one of the most crucial countries in Africa for biodiversity conservation (CBD 2022, UNEP-WCMC 2014). It is the African country with most species for almost all groups of organisms, with the exception of plants, in which it is second only to South Africa.

The DRC also harbours charismatic endemic species like the okapi, bonobo, Grauer's gorilla and Congo peacock. It is home to 60 percent of the Congo rainforest, the second-largest intact tropical forest area in the world (Rainforest Foundation UK n.d.). Rainforest covers over half of the country's total land area of 2.3 million km² (World Bank 2022) and plays a critical role not only in homing its biodiversity but in stabilizing the global climate. The country also possesses roughly half of the freshwater resources of the African continent (UNEP 2011), which provide the home for diverse species of aquatic fauna.

Unfortunately, the IUCN Red List of Threatened Species classifies 190 species in the DRC as Vulnerable, Endangered or Critically Endangered (UNEP 2017). Elephants and mountain gorillas are among the species under threat. Habitat loss from extensive slash and burn farming practices is a primary driver of biodiversity loss in DRC. Such shifting cultivation often follows road building for commercial logging operations or mining.

The expansion of palm oil plantations and other large scale agricultural forest conversions is also a major threat, as are mining operations exploiting the nation's considerable diamonds, copper, gold and other mineral wealth. Other threats to biodiversity are armed conflict, animal poaching (sometimes in protected areas) and the associated commercialization of bushmeat. Every year, illegal hunting and poaching result in the harvest of up to 1.7 million tonnes of bushmeat (primarily antelope, duiker, monkey, and wild boar), contributing to the extinction of species (UNEP 2017).

INDONESIA

Text based on the Convention on Biological Diversity website (2022) and other sources as cited.

The Indonesian archipelago is megadiverse in fauna and flora with a high number of endemic and highly-adapted species. This positions Indonesia as part of the world's 17 most megadiverse countries (UNEP-WCMC 2020). For example, Indonesia possesses 10% of the world's flowering plant species, an estimated 25,000 species of which 55% are endemic. For fauna diversity, Indonesia is home to about 12% of mammals globally, with about 515 species including 35 primates, ranking second in the world after Brazil (CBD 2021b). It also contains 17% of the world's birds (1,592 species), 16% of the world's reptiles (781 species) and some 270 species of amphibians. More than 8,000 fish species swim in its nearshore waters and in its extensive coral reefs (Von Rintelen et al. 2017).

About 50 million Indonesians depend on the nation's extensive forests (Birdlife International 2022). In Central Kalimantan, for example, nearly 80% of rural households depend on forests for their income. Unfortunately, 140 species of birds, 63 species of mammals and 21 species of reptiles are now at risk of extinction, including such notable species such as the Sumatran tiger, the Javan and Sumatran Rhinos and the Orangutan (Von Rintelen et al. 2017; IRI 2019a; CBD 2021b, Rainforest Action Network n.d.).

The main factors affecting biodiversity loss and species extinction in Indonesia are habitat degradation and fragmentation, landscape changes, overexploitation, pollution and the introduction of invasive species. In forest environments, conversion to agriculture, particularly the expansion of oil palm and pulp wood plantations, is a leading cause of deforestation and subsequent habitat loss. From 2000 to 2017, Indonesia lost 15% of its tree cover. Lowland forests, which are the richest in biodiversity and carbon storage potential, bore the brunt of this loss. From 1990 to 2010, the lowland forests of Sumatra and Kalimantan shrank 40% in area as oil palm plantations increased six-fold in area.





PERU

Text based on the Convention on Biological Diversity website (2022) and other sources as cited.

Peru's rare combination of cold oceans, Andean mountains and tropical forests within the Amazon basin have given rise to diverse ecosystems. As one of the world's 17 megadiverse countries it hosts a vast biological diversity with high numbers of endemic species (BIOFIN 2021, UNEP-WCMC 2014). Notably, the country holds more than 20,375 plant species, about 10% of the global total. It also hosts 523 mammal species (5th most in the world), 1,847 birds (3rd most in the world), 624 amphibians (4th most in the world), and more than 2,000 species of fish. Its forests, mountains and plains hold some 4,000 species of butterflies alone, the most of any nation. Peru is also a centre of agrobiodiversity, with 52 species of corn, 700 varieties of cassava and more than 4,500 species of potato (BIOFIN 2021; World Bank 2013).

However, Peru's rich biodiversity is under increasing pressure. From 2001 to 2017, Peru lost nearly 4% of its tree cover. According to Peru's Red Book of threatened fauna, the country has 389 threatened species, including 120 amphibians, 122 birds, 23 invertebrates, 92 mammals and 32 reptiles (SERFOR 2018). Notable threatened species include the yellow-tailed woolly monkey, the tundra peregrine falcon, white-winged guan, four different types of marine turtles (the green, hawksbill, olive Ridley, and leatherback turtle) and two species of caiman (USAID 2014). Deforestation is the greatest threat to biodiversity in Peru. The country hosts an area of Amazonian tropical second only to Brazil, providing the nation's largest biodiversity reservoir. Agriculture and livestock expansion, including conversion of forests for cattle pasture, coffee plantations, palm oil and coca and other illegal crops are major drivers of deforestation here. Illegal logging, expansion of oil and gas concessions, and gold mining also play a major role.

TIME FOR ACTION: CONSERVING AND ENHANCING FOREST BIODIVERSITY



The dire trends in forest biodiversity loss make it clear that it is well past the time to take decisive action to reverse the impacts of habitat loss, overexploitation, invasive species, pollution and other forces contributing to the biodiversity crisis. Without such action, the loss of forest species will continue and intensify (Leclère et al. 2020). For example, without substantial changes to our current agricultural practices, scientists warn

that an additional 200 million hectares of forest will be converted to cropland by 2050 to meet global food demand. This will greatly aggravate the current habitat loss. Likewise, under a “business as usual” approach, alien species invasions can be expected to increase between 3 and 20 times from current levels by 2050 and plastic pollution in terrestrial ecosystems can be expected to nearly triple (CBD 2020).

In contrast, a coordinated global plan, undertaken with determination, could make great strides in reversing current biodiversity loss. To be effective, such a plan will need to bring about truly transformative change in the way we manage and exploit both land and water ecosystems, in how we grow and consume our food, build our cities, roads, and other infrastructure (CBD 2020), and in the way we govern and manage our systems (following equity and gender-responsive approaches). Some of the critical areas for action include halting the conversion of forest lands to agriculture and halting the gradual degradation of remaining intact forest areas caused by logging and infrastructure development. Increasing the land under conservation management, including areas looked after by indigenous peoples will be helpful. It will also be essential to restore degraded lands, expand landscape-level conservation planning and better manage the trade of wildlife. Taking these steps would support achieving the UN Sustainable Development Goals and could be done without handicapping our ability to increase the global food supply to accommodate expected population growth (Leclère et al. 2020).

REFORMING AGRICULTURE TO STOP DEFORESTATION

Attaining the global biodiversity goals will not happen without progress against the continued destruction of forests and the loss of habitats this brings. Ending the conversion of forests to croplands and pasture is one key to that progress. However, changing the incentives to convert forests to farm fields will likely only come as part of a larger transition away from current unsustainable food production and consumption practices. Logging, mining, energy production, road building and other infrastructure developments are important contributors to the recent surge in deforestation and will need to be dealt with independently of efforts to make agriculture more sustainable (CBD 2020).

The agricultural transition we need must include both greater productivity per hectare (producing more from the same amount of land) and more sustainable production techniques that use agroecological principles to minimize impacts of food production on biodiversity. This is important because, aside from habitat loss, many current agricultural practices also degrade the diversity of soil organisms, deplete crop genetic diversity, deplete soil nutrients, and contaminate water sources. These are all factors that worsen the biodiversity crisis (CBD 2020; Leclère et al. 2020).

The transition to forest-friendly agriculture must also include cutting drastically the amount of waste in the cycles of food production and consumption. This will allow us to make full use of what is now produced and minimize the need for additional production, and the new cropland needed to produce it, as global food demand increases in the decades ahead. Currently approximately 30% of food is wasted, whether that is because it is not sold and rots or because it is not eaten and is disposed of (CBD 2020, p. 165).

RESTORING DEGRADED FOREST HABITAT

To respond effectively to the forest biodiversity crisis, it will not be enough to stop deforestation and arrest the current loss of habitat. Major forest restoration will also be necessary. Restoring forest ecosystems means regaining critical habitats and revitalizing the ecosystem processes that support healthy and diverse species populations.

Returning trees to previously forested areas or restoring degraded forests that already exist are both examples of forest restoration. It can take a variety of forms, ranging from assisting natural forest regrowth with additional native tree planting and care to adding trees to agricultural lands and creating agroforestry systems that exhibit some of the same ecosystem services as full forests.

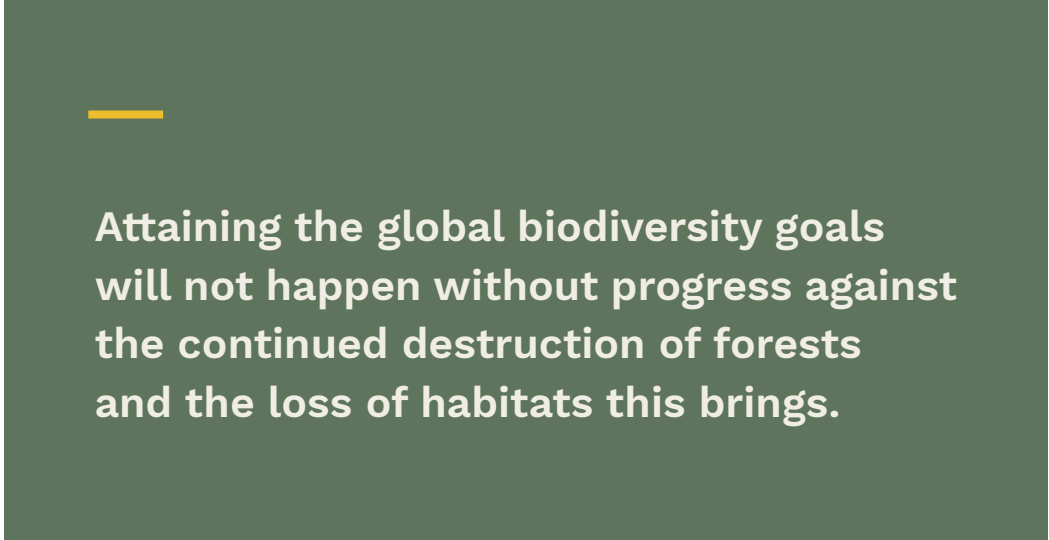
Establishing tree plantations is also a form of forest restoration but it is considered much less valuable for biodiversity recovery than other options (UNEP 2021). To ensure biodiversity benefits of restoration efforts, it is essential that restoration is based on local species.

The benefits of forest restoration to biodiversity will depend on the extent of the recovery of the forest ecosystem, but they can be considerable even at an early stage of recovery and will likely increase over time. For example, in 1971 the Santa Rosa National Park in Costa Rica was introduced on reclaimed ranch land. The park's population of white-faced capuchin monkeys, which can inhabit young forest patches, was small at first but has steadily increased as the forest has recovered. In contrast, the spider monkeys in the region, which are also native to the area but prefer old-growth forests with trees that are over a hundred years old, are not expected to see their numbers rebound for many decades (FAO and UNEP 2020).

Because of its demonstrated benefits to recovering biodiversity, forest restoration has been a key part of the global strategy to address biodiversity loss for many years (FAO and UNEP 2020, p.96). Globally, the potential for forest restoration, and its biodiversity dividend, is quite large due to the extensive forest loss suffered over the last several decades. Restoring ecosystems in 15 percent of priority areas that have been converted could prevent 60 percent of expected extinctions, according to one study. (Strassburg et al. 2020).

Forest restoration is also an integral part of the global strategy to mitigate and adapt to climate change due to the carbon sequestration capacity of growing forests. It is also a key element of the international commitment to achieve the UN Sustainable Development Goals since

human dependence on forest foods, fuel and biodiversity are significant for a large portion of the global population. Recognizing these multiple benefits, the international community has embraced robust objectives for forest restoration. The **Bonn Challenge**, for instance, extended by the **UN New York Declaration on Forests** mandates that 350 million hectares of forest be restored by 2030 (Bonn Challenge 2022). Both are endorsed by a wide variety of nations, international organizations and businesses. To stimulate interest in restoration and further the global commitment to reaching these international restoration goals, the United Nations has announced 2021 to 2030 to be the UN Decade on Ecosystem Restoration. (For more on information on forest restoration and the opportunities for faith communities to participate in the UN Decade on Ecosystem Restoration, see the IRI primer on **Forest Restoration: Healing Tropical Forests for Spiritual Renewal and the Strategy for the Engagement of Faith Leaders and Faith-based Organisations in the UN Decade on Ecosystem Restoration**).



Attaining the global biodiversity goals will not happen without progress against the continued destruction of forests and the loss of habitats this brings.



EXPANDING PROTECTED AREAS

Establishing protected areas such as parks, preserves and conservation reserves is a well-established and effective strategy for conserving biodiversity. In fact, it is one of the few recent successes in the effort to stem global biodiversity loss. Over the last two decades, there has been a significant expansion of the total area of protected lands, from 10 percent of all terrestrial areas in 2000 to at least 15 percent in 2020. Without this and other conservation measures such as hunting restrictions and breeding programs for highly endangered species, birds and mammals would have experienced an extinction rate two to four times greater in the last ten years (CBD 2020, p. 11). Nonetheless, biodiversity experts contend that in order to have the best chance of reversing present biodiversity losses, protected areas as well as effective area-based policies must be implemented across at least 30% of all land and ocean. To be most effective, these protected area networks should include areas that are particularly biodiversity rich and those that host unique and threatened species. Protected areas that have the consent of local communities, and contribute to the livelihoods and well-being are also those most likely to be successful for biodiversity conservation. It is for this reason that tropical forests are so high on the list for expanded protection (CBD 2021a).

International acceptance of the idea of expanding protected areas to safeguard biodiversity and help achieve the Paris Agreement's climate goals is building. While national support is necessary, local support for conservation efforts is perhaps even more critical to achieving these goals. Protected areas that are supported and managed (or co-managed) locally have proven to be more equitable, effective and ultimately more sustainable than protected areas designated without significant local involvement or support. Indeed, to be effective at biodiversity conservation, protected areas do not necessarily need to have formal legal status as a protected area as much as local acceptance and involvement. This is demonstrated by the many Indigenous and Community Conserved Areas (ICCAs) in which indigenous groups use their own customary laws and practices to designate and manage conservation areas within their own lands (UNEP-WCMC and ICCA Consortium 2021).

INDIGENOUS AND COMMUNITY CONSERVED AREAS: LOCALLY DRIVEN CONSERVATION FOR COMMUNITY SURVIVAL

Indigenous and Community Conserved Areas (ICCAs) are lands owned or controlled by Indigenous Peoples and rural communities that they manage with nature conservation as a primary goal. Management of ICCAs typically emphasizes local customary tenure rules and land use practices informed by extensive knowledge of the local living environment, including the interdependency of the natural ecosystems and human communities in the area. The link between conservation of biodiversity and the cultural and economic survival of local communities is abundantly clear in most ICCAs.

Many of these locally determined conservation lands are located in highly biodiverse regions and are already recognized as an essential part of the global conservation effort. Supporting and expanding these Indigenous and local land conservation systems will be even more critical in the future if forest biodiversity is to survive. According to a recent global analysis, Indigenous Peoples' and local communities' territories "cover at least one third of intact forest landscapes globally" (UNEP-WCMC and ICCA Consortium 2021). These lands encompass nearly one third of the lands considered key to reversing biodiversity loss and mitigating climate change.



CREATING BIODIVERSITY-FRIENDLY LANDSCAPES

Relegating nature to a limited number of separate parks and protected areas will not adequately protect biodiversity if these parks are isolated habitat islands amid a sea of unfriendly land uses. Rather, protected areas will work best when embedded in a living landscape where biodiversity conservation is integrated into land uses like forestry and farming activities. There are even benefits granted by considering biodiversity conservation during urban planning. This kind of landscape management allows connectivity between protected forest areas and reduces the vulnerability of species as they migrate, intermix and disperse throughout the landscape (Kremen and Merenlender 2018).

Biodiversity-friendly techniques include agroforestry and silvopasture, where trees are mixed into cropland and pasture, as well as diversified farming, where smaller patches of different crops intermix to create a matrix of habitats that supports far more biodiversity than the large expanses of crop monocultures typical in many industrial farming operations today. In the Peruvian Amazon near Iquitos, some small farmers cultivate more than 260 varieties of plants in their agroforestry plots, resulting in both a high agricultural output and a tremendous diversity of species. Even in the intensively farmed landscapes of California, something as simple as planting hedgerows of native shrubs and trees along the borders of farm fields has been shown to enhance native bee and bird biodiversity (Kremen and Merenlender 2018).

These practices, which some people call “working lands conservation”, support biodiversity in their own right. When used in biological corridors and buffer areas bordering parks, they can help secure the conservation value of these protected areas while allowing these buffer lands to continue to produce food and timber while simultaneously providing other ecosystem services critical to local and national economies. To be most effective, this approach needs

to be applied at a landscape scale, with coordination among land owners and relevant stakeholders (including women), and requires a more integrated approach to land use planning (Kremen and Merenlender 2018).

BETTER MANAGEMENT OF THE GLOBAL WILDLIFE TRADE

To set the conditions for a biodiversity rebound, the unsustainable exploitation of forest wildlife must be reined in. Forest wildlife is harvested for personal use and local sale. However, it is also used to feed the global wildlife trade, which involves the international trade of billions of animal and plant specimens each year. This harvest of wild animals and plants contributes to the livelihoods of millions of people around the globe and generates hundreds of billions of dollars of economic value annually. Yet, all too often, this trade far exceeds the ability of forest species and the greater forest ecosystem to sustain themselves. This adds yet another threat to forest biodiversity (Timoshyna and Rodina 2019, p.20). The African elephant is a prominent example of such overexploitation, with a 90 percent overall decline in its population over the last century. This decline has had significant forest ecosystem consequences because elephants can move large seeds and create clearings in the forest that benefit many species (Maisels et al. 2013).

The pangolin is another prominent example of forest species suffering over-harvest, with the two Asian pangolin species now driven to the edge of extinction. These small nocturnal mammals are hunted for their scales and various body parts, which are highly prized in traditional medicines. They are also hunted for their meat, which is considered a delicacy in many restaurants. According to CITES data cited by Heinrich et al. (2016), between 1977 and 2014, more than 800,000 pangolins were harvested for global trade. This was mainly driven by demand from China and does not count the significant illegal harvest of these animals. As Asian pangolin populations have declined, traders have



turned to African species and this has, in turn, created extensive pressure on these animals. As the species has declined, the cost of pangolin scales in China has grown tenfold between 2005-2015 and driven ever more incentive for these already rare animals to be hunted (Heinrich et al. 2016).

Illegal harvesting and trade are major contributors to the unsustainable exploitation of forest wildlife. The illegal wildlife trade is difficult to track, but estimates put its global value at US\$7-23 billion per year, about 25 percent of that of the legal wildlife trade (World Bank 2019). Corruption is a big factor that allows this hunting and illegal trade to flourish in spite of international laws against it. Bribes are commonplace, occurring at the source, transit, and export stages.

Changing the dynamic around overexploitation of forest wildlife will require a range of strategies, including better enforcement of harvesting and trade rules, but also more involvement of local groups and diverse stakeholders (including women) in wildlife management, so that they have a stake in the maintenance of healthy wildlife populations. Greater education of local wildlife users is also necessary in order to help people understand the true costs of unchecked harvesting and shift the incentives toward sustainable management (CPW 2014).

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CAN GRANTING ECOSYSTEMS AND SPECIES LEGAL RIGHTS HELP SAVE BIODIVERSITY?

Should nature have the kind of legal protections that humans have? Should forests, fields, rivers, species, ecosystems and other elements of nature be able to defend these rights in court? If people violate nature's rights should they pay the costs of restoring these living systems to a healthy condition? Many legal scholars, religious leaders, policy makers, women's groups and communities think the answer to these questions is "yes." They argue this is the only way that the practice of coexisting with and sustainably using ecosystems will ever truly succeed.

Granting ecosystems, species, and other natural systems legal rights (known as Rights of Nature or Earth Rights) means recognizing that these parts of nature are not just property that can be owned and exploited but living entities that have an independent and inalienable right to exist and thrive. This idea of recognizing Rights of Nature comes from a more holistic and integrated view of nature than the ideas underpinning most environmental laws today. Current environmental laws treat nature and natural systems as property to be used and managed by the owner, whether that is an individual, a corporation, a community, or the state.

Granting legal rights to nature itself reverses this framework. It recognizes natural systems' inherent right to conditions where they can thrive and continue to support the human systems they are interwoven with. For example, rather than establishing an "Endangered Species" law that comes into play only when species are threatened, a Rights of Nature approach would establish a "Healthy Species" law requiring people to manage natural systems to establish and sustain thriving species populations indefinitely.

One crucial aspect of Rights of Nature laws is that they recognize the authority of any person, community, organization or government to defend and enforce these rights in court on behalf of ecosystems and natural communities. These laws also assert the right to recover monetary damages from those who have violated Nature's rights to enable restoration of the natural systems to a healthy state.

The belief in Rights of Nature aligns well with and has been influenced by the worldviews of many indigenous peoples. This worldview emphasizes the inseparability of human communities from the natural environment in which they live, with all elements of the human/natural community

Acceptance of the idea and practice of Rights of Nature has slowly grown over the last two decades. In 2009, Ecuador and Bolivia became the first countries to recognize the Rights of Nature in their national constitutions. Bolivia's Legislative Assembly adopted the first Law on the Rights of Nature at a national level in 2010. These actions were influenced by the traditional practices of Indigenous groups in these countries. Many other countries, as well as many other jurisdictions such as states, districts, and municipalities, have followed with laws and policies that aim to apply Rights of Nature in different localities. As of 2021, 17 countries had enacted laws based on the concept of Rights of Nature.

At the international level, discussions on Rights of Nature have taken place at the UN General Assembly. Some members have urged the adoption of a Universal Declaration of the Rights of Nature, similar to the UN's Universal



Declaration of Human Rights, which has provided nations a model for shaping human rights laws. However, while interest has steadily grown, there is still much resistance to the application of a Rights of Nature approach at the practical level. Such a change in approach would require significant reform of today's natural resource policies. This in turn, would challenge the economic interests that depend on the current system of resource exploitation, and would require considerable political will to enact and enforce.

Source: (Global Alliance for the Rights of Nature 2022; International Joint Commission 2019; United Nations 2022).

Granting ecosystems, species, and other natural systems legal rights means recognizing that these parts of nature are not just property – they are entities that have an independent and inalienable right to exist and flourish.



HOW CAN FAITH GROUPS CONTRIBUTE TO BIODIVERSITY RECOVERY?

Faith groups have many options to act on the spiritual imperative to safeguard forest life in all its varied forms. They begin with sharing religious, spiritual and cultural relationships with nature and biodiversity and encouraging personal and group choices that reduce harm to forest habitats and contribute to forest restoration. Political action and policy advocacy can also be effective in helping to mobilize the political will to craft and enforce policies that expand forest protections, discourage overexploitation of forest wildlife and reward land owners for conserving biodiversity on their lands. Below are a few of these possible actions:

PERSONAL AND GROUP CHOICES

- To reduce the impact of agriculture on forests, adopt a more sustainable diet that reduces meat consumption and supports agricultural products raised with forest-friendly farm techniques such as agroforestry, or in farm settings that incorporate wild areas alongside cultivated fields to provide biodiversity refuges.
- Make sure that wild foods or pet species purchased are sustainably and humanely obtained and legally imported.

- Moderate personal consumption patterns to ensure that the consumer products and building materials use are certified as sustainably harvested or rainforest safe and do not contribute to deforestation.
- Make yards and gardens biodiversity-friendly by reducing or eliminating pesticide use and planting bird- and pollinator-attracting species.
- Participate in or contribute to a community-based forest restoration project under the auspices of the UN Decade for Ecosystem Restoration (see ***Forest Restoration: Healing Tropical Forests for Spiritual Renewal***).

POLITICAL ACTION

- Advocate for programs that reward local forest restoration and sustainable forest management efforts. These include Payment for Ecosystem Services (PES) programs that pay landowners to retain or expand forest areas on their land, agroforestry programs that help farmers add trees to their crop lands, government technical support for forest restoration projects, and development of markets for forest products other than timber to increase the income that intact forests provide.
- Support the expansion of forest protected areas, but only with the active participation of local communities and their co-management.
- Support the recognition and integrity of indigenous territories where protection of forest biodiversity is central in the communities' management plans.
- Demand that national and local land use plans are formulated with an assumption of “no net loss of biodiversity.” In other words, make sure such plans balance potentially harmful forest uses with conservation and restoration activities that enhance forest biodiversity.
- Demand that legally recognized Rights of Nature are incorporated into the national constitution, allowing individuals, communities and governments to bring lawsuits on nature’s behalf when natural systems are harmed through unsustainable harvest and management practices.
- Establish dialogue with those groups and communities most directly affected by loss of forest and biodiversity (including women’s groups), learn from them and help voice their concerns.
- Support stronger enforcement of international laws on the trade of endangered wildlife and plants (the Convention on International Trade in Endangered Species of Wild Fauna and Flora, or CITES).
- Continue to demand that religious organizations divest themselves of any assets that contribute to deforestation.
- Re-wild and re-envision houses of worship and faith-owned land as learning spaces to build awareness about the importance of biodiversity.

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ABOUT THIS PRIMER

This primer is part of a series of briefs meant to inform and inspire faith communities to action to help safeguard tropical forests and their inhabitants. Through facts, graphics, analysis, and photos, these primers present the moral case for conserving and restoring rainforest ecosystems, supported by the latest science and policy insights. They bring together the research and practical tools that faith communities and religious leaders need to better understand the importance of tropical forests, to advocate for their protection, and to raise awareness about the ethical responsibility that exists across faiths to take action to end tropical deforestation.

PARTNERS

The Interfaith Rainforest Initiative welcomes engagement by all organizations, institutions and individuals of good faith and conscience that are committed to the protection, restoration and sustainable management of rainforests.

INTERFAITH RAINFOREST INITIATIVE

The Interfaith Rainforest Initiative is an international, multi-faith alliance working to bring moral urgency and faith-based leadership to global efforts to end tropical deforestation. It is a platform for religious leaders and faith communities to work hand-in-hand with indigenous peoples, governments, NGOs and businesses on actions that protect rainforest and the rights of those that serve as their guardians. The Initiative believes the time has come for a worldwide movement for the care of tropical forests, one that is grounded in the inherent value of forests, and inspired by the values, ethics, and moral guidance of indigenous peoples and faith communities.

QUESTIONS?

The Interfaith Rainforest Initiative is eager to work with you to protect tropical forests and the rights of indigenous peoples. Contact us at info@interfaithrainforest.org.



Norwegian Ministry
of Climate and Environment





INTERFAITH
RAINFOREST
INITIATIVE