

### **////Title: Four Countries Hold the Key to Primate Conservation**

**////Stand-first:** Primatologists Dr Alejandro Estrada and Dr Paul A. Garber, based at the National Autonomous University of Mexico and the University of Illinois-Urbana, investigate the social, economic and political factors that have contributed to primate population decline in Brazil, Madagascar, Indonesia and the Democratic Republic of the Congo. The researchers argue that unless change is immediately implemented, many primate species will go extinct. These four countries not only risk losing part of their identity and the special relationship that has formed between humans and nonhuman primates over thousands of years, but continued unsustainable levels of environmental destruction will also lead to increased income inequality and political instability. Urgent local and global action must be taken to reverse the current situation of impending primate extinctions.

### **////Body text:**

Nonhuman primates can be found in 90 countries around the world, but about two-thirds of all primate species are confined to only four countries: Brazil, Madagascar, Indonesia and the Democratic Republic of the Congo. Worryingly, about 60% of these primates (prosimians, monkeys, and apes) are on the International Union for Conservation of Nature's list of Threatened, Endangered, or Critically Endangered species, with Madagascar and Indonesia each having over 80% of their primates threatened.

Considering the important role that these countries play in primate conservation, Drs Alejandro Estrada and Paul Garber and their colleagues examined the factors that put their primate populations at risk. The researchers recently published their results in the scientific journal *PeerJ*.

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The team found that in all four countries, the increasing global demand for tropical products, such as soy, sugar cane and palm oil, as well as hardwoods, minerals and fossil fuel, has stimulated the expansion of industrial agriculture, principally for export, logging, mining and fossil fuel extraction. Inevitably, this means increased disruption of natural forests by the advance of roads and railway networks, which bring with them illegal hunting and animal trading.

Land used for industrial agricultural has been steadily increasing over the past 15 years, and this trend is set to continue in the future. Using information from the United Nations and the International Union for Conservation of Nature, Dr Estrada and Dr Garber showed that 70% of the area currently occupied by primates in these four countries will be lost in the coming years as a consequence of expanding agriculture. The situation is predicted to be particularly dire in Brazil and Indonesia. The researchers believe that implementing policies that divert agriculture to areas to where it would least affect primates and changing global consumer habits would go a long way to minimise habitat loss and deforestation.

Sadly, as humans and nonhuman primates come into closer and more frequent contact, this is likely to bring diseases to primate populations. For example, between 2002 and 2004, outbreaks of Ebola affected more than 80% of western gorillas and chimpanzees at the Lossi Sanctuary in Congo. In this case, the vaccine to treat these animals was available, but when local human communities were struggling to get it themselves, it raised an important ethical dilemma about whether or not to treat endangered species.

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Another challenge that primate populations have to face is illegal hunting. Drs Estrada and Garber found that hunting – both for meat and body parts – is targeted at many primate species in these countries. Even though data from the International Union for Conservation of Nature shows values ranging from 85% of species in Indonesia to only 35% in Brazil, it is likely that the actual values are much higher. In the Brazilian Amazon, hunting has wiped out local populations of woolly monkeys and spider monkeys, while it is now almost impossible to spot a gorilla or bonobo in Congo's Sankuru Natural Reserve. In Indonesia, though illegal, the pet trade happens openly in dozens of markets in Sumatra, Java and Bali.

Drs Estrada and Garber and their colleagues point out that only an average of 27% of the populations of primates in Brazil, the Democratic Republic of the Congo, Madagascar and Indonesia live inside protected areas such as national parks. But they report that even primates living inside protected areas face difficult challenges. In Madagascar and the Democratic Republic of the Congo, for example, decreasing populations of lemurs, monkeys and apes living outside of protected areas have increased the market value of these animals. This high price tag means hunters and poachers are increasingly willing to risk prosecution by hunting inside protected areas.

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Since the 1980s, logging of native forests has steadily increased in the four countries, to cover an expanding global demand for timber. Unsurprisingly, this has resulted in accelerated deforestation. Although some primate species can survive temporarily in logged forests, cutting trees reduces canopy cover, which leads to decreased humidity, making it harder for primates to find the resources they need to survive.

Drs Estrada and Garber note that mining is another persistent threat to primates. Extraction of precious gems and minerals not only contributes to deforestation, but also increases the risk of poisoning and pollution of soil and ground water. A particularly disastrous example of this is the increasing demand for coltan mined in the Congo, which is used to produce tantalum for mobile phones and laptops. The financial rewards for this mineral are so great, that miners have started setting up illegal mining camps inside national parks to obtain the precious mineral.

Corrupted law enforcement, often associated with illegal activities such as mining, also contributes to primate losses. All four countries are well known for their high levels of corruption, making their country-wide conservation of primate populations a complex challenge.

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Finally, human-induced climate change, resulting from both local and global deforestation, is another imminent threat facing primate populations in Brazil, the Democratic Republic of the Congo, Madagascar and Indonesia. Although the extent of the threat is difficult to quantify, predicted extreme temperatures and rainfall are likely to put primates and humans at risk by altering ecosystems, prolonging droughts, and increasing the intensity of cyclones, leading to critical changes in resource availability.

Climate change is also likely to bring civil unrest and war, with both armed militias and displaced civilians turning to primates as a source of food. In extreme situations like this, it is easy to forget about protecting wildlife and the policing of national parks.

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Effective long-term conservation of primates is only possible when backed up by financial resources, appropriate conservation laws and public interest. Unfortunately, due to the high levels of poverty present in these four countries, primate conservation is very low in the national list of priorities.

Creating protected areas has been one of the most successful conservation tools for primates. Sadly, the distribution of protected areas in the four countries is often patchy and irregular, and fails to consider the needs of individual primate species. For Drs Estrada and Garber, the solution includes a partnership between governments, the scientific community, international NGOs and local organisations to design interconnected and extensive networks of protected areas with sustainable resources.

A second possibility involves the reintroduction of species to areas where they no longer exist. However, it is imperative to ensure that the factors that caused species to disappear in the first place – such as poaching – are under control. This method attracts much attention and is ideal for garnering public interest. However, it is difficult to predict how an ecosystem is going to react and reintroduction programs are very expensive and have obtained mixed results. In Brazil, for example, the reintroduction of golden lion tamarins led to a self-sustaining population, while introduced populations of Javan slow lorises have experienced high mortality rates. Proactive measures to protect primate populations before they become threatened are a much less expensive and more effective conservation tool.

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Drs Estrada and Garber emphasise that long-term success can only be achieved by engaging with governments, multinational corporations, and global citizens to set up ways to control demands on the environment and prioritise programs that promote sustainable land use. There are policies starting to point in this direction, including several attempts by the European Union to prevent illegal timber coming into Europe, as well as the Amsterdam Declaration, which aims to limit deforestation caused by expanding agriculture. In addition, programs that require consumer nations to pay into a sustainability or conservation fund based on their levels of consumption and environmental impact need to be seriously considered.

Some programs are beginning to show promising results in Congo and Brazil, but Drs Estrada and Garber point out that there is still much work to do if we want to see any positive impact on the survival of our closest relatives. The researchers also caution that as we continue to harvest resources unsustainably, pollute water, soil and air, cut down tropical forests, lose biodiversity, and increase carbon emissions, environments that we have depended on for tens of thousands of years will no longer be capable of supporting human and nonhuman primate populations.

Finally, and importantly, the four main primate countries, along with the global community, need to prioritise programs that integrate sustainable land-use planning and economic development designed to protect primate populations and their habitats, reduce poverty and improve the living standards of local human communities. Drs Estrada and Garber emphasise that primate

conservation is most effective when people in the local communities lead secure lives.

### **Meet the Researchers**

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