



////Title: Improving Human Health and Wellbeing Will Protect Primate Populations

////Standfirst: As the human population continues to grow, increasing global market demands, land conversion and the unsustainable use of natural resources are having a negative impact on non-human primate survivorship. Dr Alejandro Estrada from the National Autonomous University of Mexico, Dr Paul Garber of the University of Illinois, and Dr Abhishek (Ah-bee-shack) Chaudhary (Chaw-der-ee) from the Indian Institute of Technology, examine the socio-economic factors that negatively impact primate populations. For conservation policies to be effective, the team explains that the wellbeing, health and security of people living in primate regions must first be improved.

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The demands of a growing human population are exerting extreme pressure on Earth's natural resources, putting approximately one million animal and plant species at risk of extinction. Large swathes of land have been converted for agricultural and industrial purposes, which has caused an increase in carbon emissions, pollution, deforestation, and widespread biodiversity loss.

Recent evidence has shown that the human population has expanded beyond the planet's sustainable limits, and it shows no sign of slowing down. At present, we are adding close to 80 million people each year, and it is predicted that the human population may exceed 11 billion by the year 2100. As the population continues to expand, increasing pressures on natural resources are expected to have catastrophic effects.

Non-human primates are our closest living biological relatives. As the third-largest group of mammals on the planet, primates include numerous species of monkeys, apes, tarsiers, and prosimians. Approximately 512 species are found across 91 countries, and some 65% of these are threatened or at risk of extinction due to unsustainable human activities.

In their recent paper published in *PeerJ*, Dr Estrada, Dr Garber and Dr Chaudhary examined the current and future trends in several socio-economic, ecological, and demographic factors that directly or indirectly affect non-human primates and their habitats. The team's investigation examines broad patterns that connect human wellbeing, sustainable development, and primate survival.

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The researchers collated information from several open-access databases in countries that have primate populations. They then analysed the data to examine how primate populations are impacted by human activity and the set of historical, socio-economic, political, demographic and cultural factors that drive patterns of resource consumption, environmental degradation, and biodiversity loss.

The team showed that each region has several socio-economic and socio-political traits in common, and all regions are losing primate habitats at an alarming rate. For example, between 2001 and 2018, five primate regions – Madagascar, mainland Africa, South Asia, Southeast Asia, and the Neotropics – lost



approximately 191 million hectares of tropical forest combined. The countries with the greatest loss were Brazil, Indonesia, the Democratic Republic of the Congo, China and Malaysia, which together accounted for 57% of forest loss. These areas are also predicted to be heavily impacted by climate change, which will place even greater stress on primate populations.

The exploitative practices of a small number of multinational corporations and the over-consumption of citizens in a small number of consumer nations are driving this habitat loss, as forests are cleared for large-scale agriculture and commodity production. These consumer nations, including most European countries, Japan, China, India, and the USA, are disproportionately contributing to climate change, pollution, food insecurity, habitat destruction, and income inequality worldwide.

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The expansion of urban areas and the increase in the human population since 1960 also has contributed to habitat loss. In 1960, the human population was 1.4 billion people in countries inhabited by non-human primates. By 2018, this had quadrupled to 5.6 billion people, accounting for 75% of the world's population. Urban areas are expected to continue to expand in the future, not only due to population growth but also as more people move from rural areas in search of work and a better quality of life. The continued growth and expansion of urban areas is expected to intensify the negative impacts that deforestation and other factors are having on primate populations.

Primate regions, in general, overlap with areas of low human development and poverty. Economic growth between 1960 and 2018 indicates that there is an enormous gap between countries in primate range regions and the top 25 developed nations of the world. As well as lower economic growth, many primate range countries also have low food security. The United Nations expects that in 2020, 47 of the 91 primate range countries will experience acute food insecurity, most of which are in Africa.

Conservation measures are likely to be more challenging to implement in Africa, as African primate countries have the highest population growth rates, the lowest levels of human development, low food security, and the highest rates of child mortality for children under the age of five. Together, these serious issues mean that primate conservation is not a priority.

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Dr Estrada and his colleagues argue that global approaches are needed to tackle the loss of biodiversity and to protect primate populations. In addition to slowing down human population growth, more importantly, there needs to be a global effort to increase the quality of life for people, through providing better healthcare, reducing poverty, empowering women, and increasing access to education.

The researchers also highlight the importance of acknowledging and protecting the rights of indigenous peoples to their lands and traditional ways of life. They demonstrate that this is critical to maintain local,



regional, and global biodiversity and to meet conservation targets for non-human primates and other threatened species.

The good news is that if people make changes to their daily lives, we can help to reduce habitat loss and protect primate populations. To decrease habitat loss, and therefore biodiversity loss, society needs to focus on sustainable methods of food production and the implementation of large-scale reforestation programs. The researchers add that we also need to reduce our reliance on global supply chains and instead focus on local food production and consumption.

The main take-home message from the team's investigation is that if we are to move forward with effective policies to protect primate habitat and restore global biodiversity, we simultaneously need to improve the wellbeing, health and security of people and communities in countries inhabited by our closest living relatives.

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This SciPod is a summary of the paper 'Current and future trends in socio-economic, demographic and governance factors affecting global primate conservation' from PeerJ. <https://peerj.com/articles/9816/>

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